

RESOLUTION NO. 2022 - 470

**A RESOLUTION BY THE BOARD OF COUNTY COMMISSIONERS OF ST. JOHNS COUNTY, FLORIDA, AUTHORIZING THE AWARD OF BID NO. 23-11; CR 208 WATER BOOSTER PUMP STATION – GROUND STORAGE TANK WORK TO PRECON CORPORATION, AS THE LOWEST, RESPONSIVE, RESPONSIBLE BIDDER, AND EXECUTION OF A CONTRACT FOR COMPLETION OF THE WORK IN ACCORDANCE WITH THE BID DOCUMENTS.**

**RECITALS**

**WHEREAS**, the Utility Department has budgeted for the construction of a new ground storage tank and installation of related pipe work for the CR 208 Water Booster Pump Station project. The tank contractor will be responsible for coordinating with the general contractor that will be responsible for the construction of the CR 208 Water Booster Pump Station Facility. The Contractor shall provide all labor, materials, equipment, supervision, tools, and permitting necessary for the construction of the ground storage tank for the CR 208 Water Booster Pump Station project in accordance with Bid No. 23-11; and

**WHEREAS**, through the County's formal Bid process, Precon Corporation, submitted the lowest, responsive, responsible Bid at a price of \$2,309,900.00; and

**WHEREAS**, the County has finds that entering into a contract for completion of the work serves a public purpose; and

**WHEREAS**, the project will be funded by the County Utility System Connections Fees - Capital Projects.

**NOW, THEREFORE BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF ST. JOHNS COUNTY, FLORIDA**, as follows:

Section 1. The above Recitals are incorporated by reference into the body of this Resolution and such Recitals are adopted as finds of fact.

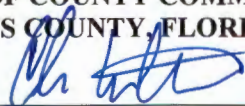
Section 2. Bid No. 23-11; CR 208 Water Booster Pump Station – Ground Storage Tank Work is hereby approved for award to Precon Corporation, as the lowest, responsive, responsible Bidder.


Section 3. Upon Board approval, a Contract shall be executed with Precon Corporation for completion of the Work as specifically provided in Bid No: 23-11.

Section 4. To the extent that there are typographical and/or administrative errors that do not change the tone, tenor, or concept of this Resolution, then this Resolution may be revised without subsequent approval by the Board of County Commissioners.

**PASSED AND ADOPTED** by the Board of County Commissioners of St. Johns County, Florida, on this 20th day of December, 2022.

**BOARD OF COUNTY COMMISSIONERS OF ST. JOHNS COUNTY, FLORIDA**

By:   
Christian Whitehurst, Chair

**ATTEST: Brandon J. Patty,**  
Clerk of Circuit Court & Comptroller  
By:   
Deputy Clerk



**DEC 20 2022**  
Rendition Date \_\_\_\_\_



**MASTER CONSTRUCTION AGREEMENT  
 BETWEEN  
 ST. JOHNS COUNTY AND CONTRACTOR**

Master Construction Agreement No: 22-MCA-PRE-17352

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This Master Construction Agreement (“Contract”) is made this \_\_\_\_\_ day of \_\_\_\_\_, 2022 (the “Effective Date”) by and between **ST. JOHNS COUNTY** ( “County”), a political subdivision of the State of Florida, whose principal offices are located at 500 San Sebastian View, St. Augustine, FL 32084; and **Precon Corporation** (“Contractor”), a company authorized to do business in the State of Florida, with its principal offices located at: 115 SW 140<sup>th</sup> Terrace, Newberry, FL 32669, Phone: (352) 332-1199, and E-mail: [mjv@precontanks.com](mailto:mjv@precontanks.com), for **23-11 CR 208 WATER BOOSTER PUMP STATION – GROUND STORAGE TANK WORK** hereinafter referred to as the “Project”. When referenced together, the County and Contractor shall collectively be referred to as the Parties.

In consideration of the mutual promises and covenants contained herein, the parties hereby agree as follows:

## **ARTICLE I CONTRACT DOCUMENTS**

### **1.1 The Contract Documents**

1.1.1 The Contract Documents are the collective documents which form the Contract, and shall govern completion of the Work. The Contract Documents hereby include the following:

- a) Fully Executed Change Orders and Amendments to this Agreement;
- b) Field Orders signed by County’s Project Manager;
- c) Notice to Proceed;
- d) This Master Construction Agreement and all Exhibits and/or Attachments hereto:
  - i. EXHIBIT A - Project Technical Specifications and Construction Plans
- e) Bonds and Insurance furnished by the Contractor
- f) Bid Documents and Bid Forms with all addenda thereto for Bid No. 23-11

1.1.2 Documents not enumerated above are not Contract Documents and do not form part of this Contract. No terms, conditions, limitations or exclusions in Contractor’s submitted Bid or invoices shall be binding upon County or become part of the Contract Documents. In the event of discrepancies, the Contract Documents shall be interpreted in the order of precedence as listed above in Section 1.1.1. Additionally, Specifications shall govern over Drawings, electronic documents shall govern over hard-copy documents, numerical dimensions shall govern over dimensions acquired by scaling, and fully executed documents shall govern over unsigned drafts.

1.1.3 Shop Drawings, Product Data, Samples and similar submittals (hereafter “Submittals”) are not Contract Documents. The County will review and take action upon Contractor's submitted Submittals but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Review of Submittals is not conducted for the purpose of determining the accuracy and completeness of other details, such as dimensions and quantities, nor for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of Contractor.

1.1.4 All Submittals (whether in hard or soft copy) prepared by or on behalf of Contractor in the course of the Work shall be the exclusive property of the County. Ownership of any proprietary information or intellectual property contained in such Submittals shall remain with Contractor. Contractor grants the County a perpetual, royalty-free, license to use, copy and allow third parties to use such Submittals and all proprietary information contained in them as may be required for the County’s internal business purposes including without limitation tendering, installing, operating, repairing, maintaining, modifying, reconstructing, replacing and/or upgrading the Work. Such license shall be capable of transfer and/or sub-licensing in whole or part without notice to or further consent of Contractor. Contractor shall not be held liable for reuse of Contractor’s Submittals by the County for purposes other than originally intended as stated in the Contract Documents.

1.1.5 Contractor is solely responsible for requesting instructions, interpretations, or clarifications to the Contract Documents and is solely liable for any costs and/or expenses arising from its failure to do so. Contractor shall have a continuing duty to read, carefully study and compare each of the Contract Documents, the Submittals and shall give immediate written notice to the Project Manager and the County of any inconsistency, ambiguity, error or omission which Contractor may discover with respect to these documents before proceeding with the affected Work. The issuance, or the express or implied approval by the County or the Project Manager of the Contract Documents or Submittals shall not relieve any such approval by evidence of Contractor’s compliance with the Contract. The County has requested the Project Manager to provide to Contractor documents for the Project, including the Drawings and Specifications for the Project,

which are accurate, adequate, consistent, coordinated, and sufficient for construction. HOWEVER, THE COUNTY MAKES NO REPRESENTATION OR WARRANTY OF ANY NATURE WHATSOEVER TO CONTRACTOR CONCERNING SUCH DOCUMENTS. By the execution hereof, Contractor acknowledges and represents that it has received, reviewed and carefully examined such documents, has found them to be complete, accurate, adequate, consistent, coordinated and sufficient for construction, and that Contractor has not, does not, and shall not rely upon any representation or warranties by the County concerning such documents as no such representation or warranties have been or are hereby made.

1.1.6 Any dispute relating to the Contract Documents, shall be resolved through good faith efforts upon the part of the Contractor and the County. Should Contractor have any questions concerning interpretation or clarification of the Contract Documents, Contractor shall submit to the County's Project Manager, in writing, a request for clarification that clearly and concisely sets forth the issues for which such request is sought. Such request shall be submitted to the Project Manager by the Contractor within three (3) business days of receipt of the Contract Documents, or the direction, interpretation, or clarification thereof provided by the County. The County's Project Manager shall render a determination concerning such interpretation or clarification, which shall be considered final and conclusive unless Contractor files a written protest within fourteen (14) calendar days of receipt thereof. Contractor's protest shall be submitted to the Assistant Director of Purchasing & Contracts, and shall state clearly and in detail the basis thereof. Failure by the Contractor to protest the County Project Manager's rendered determination within the timeframe above, shall constitute a waiver by the Contractor of all its rights to further protest, judicial, or otherwise. The Assistant Director of Purchasing & Contracts shall consider the Contractor's protest and shall render a decision thereon, in writing, within ten (10) calendar days. If Contractor does not agree with the determination of the Assistant Director of Purchasing & Contracts, the Contractor shall deliver written notice to that effect to the County within three (3) business days of receipt of the determination by the Assistant Director of Purchasing & Contracts.

1.1.7 Unless otherwise directed in writing, Contractor shall at all times carry on with the Work and maintain its progress schedule in accordance with the requirements of the Contract and the determination of the County, pending resolution of any Contract Document dispute. In no event will a dispute, the filing of a protest, claim or appeal, or the resolution or litigation thereof, relieve Contractor from its obligation to timely perform the Work required by the Contract and to maintain the progress schedule in accordance with the Contract.

1.1.8 Any and all Contract Documents shall remain the property of the County. Contractor is granted a limited license to use and reproduce applicable portions of the Contract Documents issued by the County appropriate to, and for use in, execution of the Work. Contractor shall have the right to keep one record set of the Contract Documents upon completion of the Work; provided, however, that in no event shall Contractor and/or its subcontractors use, or permit to be used, any or all of such Contract Documents on other projects without the specific written consent of the County.

## **1.2 Definitions**

Terms used within this Agreement shall have the meaning as set forth in the St. Johns County Purchasing Policy, or as provided herein. Terms defined herein for specific application to this Contract shall govern over definition of terms provided in the St. Johns County Purchasing Policy.

1.2.1 Acceptance of the Work: Written acceptance of the Work by the County and the County's Project Manager.

1.2.2 Applicable Laws: All local, state, and federal laws, statutes, codes, ordinances, rules and regulations in effect at the time Work and Warranty Work is performed under this Contract.

1.2.3 Claim: Any claim, liability, loss, demand, demand for arbitration, damage, lien, cause of action of any kind, obligation, responsibility, cost, expense, royalty, fee, assessment, penalty, fine, judgment, interest or award, pending or threatened, whether arising by law, contract, tort, voluntary settlement or otherwise.

1.2.4 Contract Price: The sum set forth in Article IV of this Contract shall constitute the Contract Price, as may be amended by Change Order. Unless otherwise approved by the County in writing, the Contract Price includes all taxes, including without limitation, income and withholding tax of any kind and sales tax imposed by the state or by the County and paid by Contractor or any Subcontractors with respect to sales of goods purchased for the performance of the Work.

1.2.5 Contract Time: The number of calendar days between commencement and completion of the Work, established in

paragraph 3.1.1 of this Contract, as may be amended by Change Order.

1.2.6 Design: Those design services related to the Project prepared by the County or the County's consultants or other representatives, which shall, as may be required, be included in Contractor's Work.

1.2.7 Drawings: The graphic and pictorial portions of the Contract Documents, illustrating the design, location and dimensions of the Work, generally including but not limited to, plans, elevations, sections, details, general notes, schedules and diagrams.

1.2.8 Final Completion: Completion of all Work in compliance with the Contract Documents, as determined by the County, and issuance of a Final Certificate for Payment.

1.2.9 Force Majeure Events: Those events that are not reasonably foreseeable and are beyond the control of both the Contractor and the County, including acts of war, terrorist attacks, labor strikes, floods, earthquakes, epidemics, pandemics, riots, adverse weather conditions, and other acts of God.

1.2.10 Jobsite: Any physical location or other place on, under, in, at or through which any aspect of the Work is performed.

1.2.11 Notice to Proceed: A written notice given by the County to Contractor fixing the date on which the Contract Time will commence to run and identifying the corresponding Substantial Completion and Final Completion dates.

1.2.12 Product Data: Illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by Contractor to illustrate materials or equipment for some portion of the Work.

1.2.13 Project: The total undertaking to be accomplished for County by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

1.2.14 Project Manager: The County's representative assigned to the Project, or any part thereof, to observe the Work and perform certain other obligations of the County as defined in Article VI below.

1.2.15 Shop Drawings: Drawings, diagrams, schedules, and other data specially issued for the Work by Contractor or a Subcontractor, Sub-subcontractor, and material suppliers to illustrate some portion of the Work.

1.2.16 Specifications: That portion of the Contract Documents consisting of the written requirements for materials, standards, equipment, construction systems, and standards of workmanship for the Work, and performance of related services.

1.2.17 Subcontractor: A Subcontractor is an individual, partnership, corporation, association, joint-venture or any combination thereof, which has a direct or indirect contract with Contractor to perform a portion of the Work.

1.2.18 Substantial Completion: The stage in the progression of the Work when the Work is sufficiently complete in accordance with this Contract so that the County can enjoy beneficial use or occupancy of the Work and can utilize the Work for its intended purpose.

1.2.19 Work: Construction and services required by the Contract Documents, including all labor, materials, equipment and services as well as other deliverables provided, or to be provided, by Contractor to fulfill Contractor's obligations under this Contract. The Work may constitute the whole or part of the Project.

### **1.3 Ownership of Contract Documents**

Any and all Contract Documents shall remain the property of the County. Contractor is granted a limited license to use and reproduce applicable portions of the Contract Documents issued by the County appropriate to, and for use in, execution of the Work. Contractor shall have the right to keep one record set of the Contract Documents upon completion of the Work; provided, however, that in no event shall Contractor and/or Contractor's subcontractors use, or permit to be used, any or all of such Contract Documents on other projects without the specific written consent of the County.

## ARTICLE II THE WORK

### 2.1 Project Description

The project involves constructing a new ground storage tank and installing related pipe work underneath the tank for the CR 208 Water Booster Pump Station project. The awarded contractor will be responsible for coordinating with the general contractor that will be responsible for the construction of the CR 208 Water Booster Pump Station Facility. All work is to be performed in accordance with the specifications and plans provided within the solicitation.

### 2.2 Labor and Materials

2.2.1 Contractor shall perform all of the Work required, implied, or reasonably inferable from, the Contract Documents. Unless otherwise provided in the Contract Documents, Contractor shall provide and pay for all labor, supervision, materials, supplies, tools, transportation, storage, construction equipment and machinery, utilities (including but not limited to water, heat, fuel, light, and cooling), and all other services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Materials, articles and equipment furnished by Contractor for incorporation into the Work shall be new unless otherwise specified in the Contract Documents.

2.2.2 Contractor shall use only competent and skilled personnel to perform and supervise the Work and shall remove from such Work any person determined to be unfit, unqualified, or acting in violation of any obligation of Contractor under this Contract. In the event a person is removed from the Work, Contractor shall promptly replace such individual with another who is fully competent and skilled to perform the Work at Contractor's sole expense.

2.2.3 Except as otherwise required for the safety or protection of persons or the Work or property at the Jobsite or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Jobsite shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with the County's prior written consent, which will not be unreasonably withheld.

2.2.4 In addition, when the Work requires by Florida Statute, Contractor shall use only licensed, registered and/or certified personnel to perform the Work. Such Statutes may include, but are not limited to, Chapter 489 (Regulation of Professions and Occupations Contracting) and Chapter 633, Part III (Fire Protection and Suppression) of the Florida Statutes.

### 2.3 Project Sequencing/Arrangement

Contractor shall not be limited in the sequencing or staging of the Work except to the extent that the Contract Documents impose limitations. Neither the organization of any of the Contract Documents into divisions, sections, paragraphs, articles, (or other categories), nor the organization/arrangement of the Drawings or Design, shall control Contractor in dividing the Work or in establishing the extent or scope of Work to be performed by Subcontractors.

### 2.4 Payment of Costs

Except as otherwise expressly provided, Contractor shall pay directly all costs and expenses of the Work of any kind or nature whatsoever including but not limited to all costs of permitting, regulatory compliance, obtaining and maintaining required bonds and insurance pursuant to Article 12, payments due to Subcontractors and suppliers, legal, financial, sales, use and similar taxes on materials and equipment, transportation and storage of materials and equipment, preparation of schedules, budgets and reports and all other costs required to achieve Substantial Completion and Final Completion in accordance with the Contract Documents.

### 2.5 Cleaning the Jobsite

Contractor shall keep the Jobsite neat, secure and orderly during performance of the Work and shall clean up and remove all waste, rubbish and construction debris from the Jobsite as they accumulate. Upon Final Completion of the Work, Contractor shall remove all waste, rubbish and construction debris from and about the Jobsite as well as all tools, appliances, construction equipment, temporary utilities, temporary construction and machinery and surplus materials. Contractor shall restore to original condition all property not designated for alteration by the Contract Documents.

### 2.6 Reporting Requirements

2.6.1 Daily Record. The Contractor shall keep a daily record of the Work at the Jobsite. At a minimum the Daily Record shall include weather conditions, number of workers (by trade) on the Jobsite, and material/equipment deliveries. Daily Records shall be submitted by close of business the following day.

2.6.2 Monthly Report. The Contractor shall prepare and submit a written monthly report by the tenth day of each calendar month. Monthly reports shall at a minimum describe Work completed in the prior month, planned Work for the current month, detailed explanations of any activity that is behind schedule, corrective actions taken to recover schedule, safety and environmental incidents and corrective actions taken.

## **2.7 Title and Risk of Loss**

Title to the structures, improvements, fixtures, machinery, equipment and materials constituting the Work or the Project shall pass to the County no later than time of payment. Such transferred title shall in each case be good, free and clear of any and all security interests, liens or other encumbrances. Contractor shall, however, bear all risk of loss concerning such structures, improvements, fixtures, machinery, equipment and materials until Substantial Completion, regardless of the extent to which the loss was insured or the availability of insurance proceeds. The transfer of title does not imply acceptance by the County nor does it relieve Contractor from the responsibility for any loss or damage to items.

## **2.8 Access to Work**

The County and the Project Manager, shall at all reasonable times have full access to all parts and locations of the Jobsite(s) from commencement of the Work through Final Completion. Contractor shall take whatever steps necessary to provide such access when requested.

## **2.9 Utilities**

Contractor shall, at its expense, make all arrangements necessary to secure the availability of and maintain all temporary utilities required to construct and operate Contractor's Work as required by the Contract Documents. If the scope of Work requires, Contractor shall arrange for activating permanent power, water, and sanitary service to the Project prior to Substantial Completion. This includes legal sketches and descriptions for easement as well as record drawings requirements required by utility companies. The County will assume permanent utility costs at Substantial Completion.

## **2.10 Existing Utility Lines**

2.10.1 When existing Utility Lines (e.g. conduits, pipelines, transmission mains and utility equipment and appurtenances) shown on the Drawings are to be removed or relocated, Contractor shall notify the Project Manager in ample time (but in no event less than five (5) business days) for taking measures for prevention of the interruption of any required services prior to the beginning of operations. Locations of existing utility lines shown on the Drawings are based on the best information available to the Project Manager, but shall not be considered exact either as to location or number of such lines.

2.10.2 Contractor shall protect Utility Lines constructed under terms of the Contract and those discovered or shown on Drawings to be existing. In the event that Contractor damages any existing Utility Lines, shown or not shown on the Drawings, Contractor shall immediately notify the Project Manager. Damage occurring to existing Utility Lines due to Contractor's failure to exercise reasonable care shall be repaired or replaced at no cost to the County.

## **2.11 Taxes**

2.11.1 Contractor shall pay all taxes, levies, duties and assessments of every nature which may be applicable to any Work under this Contract. The Contract Price and any agreed variations thereof shall include all applicable taxes imposed by law. Contractor shall make any and all payroll deductions required by law. Contractor herein indemnifies and holds the County harmless from any liability on account of any and all such taxes, levies, duties, assessments and deductions. The indemnity provision of this section shall survive the expiration or earlier termination of this Contract. Contractor may not use County's tax-exempt status unless specifically authorized in writing in advance.

2.11.2 Foreign Entity Tax Withholding. Amounts due to certain foreign persons or entities may be subject to backup withholding taxes under federal law. If Contractor is a foreign person or entity that is required to complete Internal Revenue Service ("IRS") Form W-8ECI, Contractor shall provide County a copy of Contractor's current Form W-8ECI prior to issuance of any invoice or payment under this Contract. If Contractor fails to timely provide a completed, current Form W-8ECI, County will withhold all backup withholding taxes from the amounts due to the Contractor, remit such sums to the IRS, and pay Contractor only the remainder. County makes no representation regarding the tax treatment of amounts due to Contractor, and Contractor releases and holds the County harmless from any claims or damages in any way relating to or arising from any tax withholding by County pursuant to this section.

## **2.12 Publicity and Advertising**



2.12.1 Contractor shall not make any announcement or release any information or publish any photographs concerning this Contract, the Work or the Project or any part thereof to any member of the public, press or any official body, unless prior written consent is obtained from the County.

2.12.2 Use of the County Seal or County Logo is strictly prohibited. In accordance with, County Ordinance 92-2 and County Administrative Policy 101.3, Contractor may not manufacture, use, display, or otherwise use any facsimile or reproduction of the County Seal or Logo without express written approval of the Board of County Commissioners of St. Johns County, Florida.

### **2.13 County Furnished Items**

2.13.1 The County shall furnish to Contractor, at the time of executing this Contract, written and tangible material concerning conditions below ground at the Jobsite. Such written and tangible material is furnished to Contractor only in order to make disclosure of such material and for no other purpose. By furnishing such material, the County does not represent, warrant, or guarantee its accuracy either in whole, in part, implicitly, or at all, and shall have no liability therefore. The County shall also furnish surveys, legal limitations and utility locations (if known), and a legal description of the Project's Jobsite.

2.13.2 Contractor shall obtain and pay for all permits, fees and licenses necessary and ordinary for the performance of the Work. Excluding such permits, fees and licenses, the County shall obtain all approvals, easements, and the like required for construction.

2.13.3 Subject to Paragraph 1.6 above, the County shall furnish Contractor electronic copies of the Contract Documents for execution of the Work. Hard copies of the Contract Documents shall be the responsibility of Contractor.

## **ARTICLE III CONTRACT TIME**

### **3.1 Contract Time**

3.1.1 Contractor shall commence the Work within ten (10) calendar days following receipt of the County's Notice to Proceed and shall substantially complete all Work within **three hundred (300)** consecutive calendar days as may be extended pursuant to Paragraph 8.2 of this Contract. Final Completion shall be reached within **thirty (30)** consecutive calendar days after Substantial Completion.

3.1.2 Contractor, prior to commencing the Work, shall submit to the Project Manager for his/her information, Contractor's schedule for completing the Work. Contractor's schedule shall be revised no less frequently than monthly (unless the parties otherwise agree in writing), and relate to the entire Work. By way of illustration and not exclusion, Contractor's schedule shall: (1) contain sufficient activities to assure adequate planning for the Work, (2) include approved changes to the Work that impact the schedule, (3) include a clearly defined critical path, and (4) include a unique description for each activity. In the event any schedule revision impacts the completion time as provided in Paragraph 3.1.1 above, Contractor shall submit a request for additional time, in accordance with procedures as provided in Paragraph 8.2 below. Failure by Contractor to strictly comply with the provisions of this Paragraph shall constitute a material breach of this Contract.

### **3.2 Time is of the Essence**

Time is of the essence regarding each and every obligation of Contractor under this Contract. Each obligation is deemed material, and a breach of any such obligation (including a breach resulting from untimely performance) is a material breach.

### **3.3 Substantial Completion**

3.3.1 When Contractor considers the Work is substantially complete, Contractor shall notify the Project Manager in writing and submit a comprehensive list of incomplete items to be completed or corrected prior to Final Completion. The Project Manager will promptly inspect the Work following receipt of Contractor's notice and attached list of incomplete items. The Project Manager may refuse to inspect the Work if the Work is obviously not substantially complete or when Contractor's list is not complete.

3.3.2 To the extent applicable to Contractor's specific Work scope, the following items shall be completed prior to Contractor's request for a Substantial Completion inspection.

- a) All general construction completed.



- b) Project Jobsite cleared of Contractor's excess equipment, storage shacks, trailers, and/or building supplies.
- c) Project record Drawings and Specifications submitted in accordance with the Contract Documents.
- d) Preliminary as-built drawings submitted.
- e) All applicable permits required for use provided.
- g) All operations and maintenance manuals, training literature, and software for all equipment provided.
- h) Manufacturers' certifications and warranties provided.
- i) All required spare parts and special tools provided.

3.3.3 If Substantial Completion is not obtained at the inspection called by Contractor, for reasons which are the fault of Contractor, the cost of any subsequent inspections requested by Contractor for the purpose of determining Substantial Completion shall be the responsibility of Contractor and shall be assessed against the final payment application.

3.3.4 Once Substantial Completion is achieved and within the time allowed by F.S. 218.70 et seq, the Project Manager will prepare the punch list required by the Local Government Prompt Payment Act. Unless otherwise mutually agreed, the punch list items shall be corrected by Contractor within thirty (30) calendar days and prior to any request for Final Inspection and Acceptance. The failure to include any corrective Work or pending items not yet completed on the list does not alter the responsibility of Contractor to complete the Work pursuant to this Contract.

### **3.4 Final Inspection**

When all the Work is finally complete and Contractor is ready for a final inspection, Contractor shall provide written notice to the County and the Project Manager. The Project Manager, with Contractor's cooperation, will conduct such reviews, inspections and tests as may be reasonably required to satisfy the County that the Work, or identified portion of the Work, conforms to all requirements of the Contract Documents. If the Project Manager determines that the Work or any part of the Work is not complete or fails to conform to the Contract Document requirements, Contractor will be notified in writing of deficiencies. After correcting all deficiencies Contractor shall again initiate the procedures for final inspection as set forth above. The Project Manager will issue a Final Certificate for Payment following satisfactory inspection of the Work provided Contractor has delivered to the Project Manager the final corrected as-built Drawings and the final bill of materials, if any.

### **3.5 Liquidated Damages**

3.5.1 Execution of this Contract by Contractor shall constitute Contractor's acknowledgment that the County will sustain damages in the amount identified in Paragraph 3.3.2 below for each and every calendar day during which completion of the Work required is delayed beyond Final Completion. Contractor and County agree that such damages shall be presumed to be the damages actually sustained by the County as defined below, and that because of the nature of the Project, it would be impracticable or impossible to determine or extremely difficult to fix the actual damages.

3.5.2 If Contractor fails to achieve Substantial Completion or Final Completion of the Work by its applicable date, then the County shall be entitled to withhold from any amounts otherwise due Contractor or to be paid as a debt due the sum of **\$1,500.00** per day for each and every calendar day of unexcused delay "Liquidated Damages". The parties agree that such Liquidated Damages are not a penalty but rather a genuine pre-estimate of monetary damages sustained by the County for loss of revenue and/or increased project administration expenses related to this Contract because Contractor failed to perform and complete Work within the time fixed for completion or additional time granted pursuant to the provisions hereof. The assessment of Liquidated Damages are without prejudice to the County's rights of termination and Contractor's obligation to complete the Work.

3.5.3 Should Contractor fall behind the approved Work schedule; the County reserves the right to deduct Liquidated Damages based on an estimated period of late completion. The County need not wait until completion of Work to withhold Liquidated Damages from Contractor's progress payments.

### **3.6 Disclaimer of Consequential Damages**

The County shall not be liable to Contractor, whether in contract, tort, warranty or under any statute or on any other basis, for any consequential, incidental, indirect, special, punitive or exemplary damages suffered or incurred by Contractor in connection with this Contract, even if the County has been advised of the possibility of such damages. Consequential damages shall include, by way of example and without limitation, opportunity costs, loss of use of facilities or other assets, consequential damage claims of subcontractors, lost profits, lost savings, lost business, lost bonding capacity, lost financing, lost reputation or lost goodwill.

## ARTICLE IV CONTRACT PRICE AND PAYMENT

### 4.1 Contract Price

4.1.1 This Contract is a LUMP SUM Contract. As compensation for satisfactory performance of the Work, the County shall compensate, and Contractor shall accept, as full and complete compensation for all the Work required herein a total Lump Sum price of **Two Million Three Hundred Nine Thousand Nine Hundred Dollars and Zero Cents (\$2,309,900.00)**, the “Contract Price”. The cost of any item of Work not covered by a specific Lump Sum shall be included in the Lump Sum price to which the item is most applicable.

4.1.2 If required by the County, Contractor shall have included unit prices in the base Lump Sum. Such unit prices shall apply to revisions to the Work as directed by the County in accordance with Article IX. Unit prices are “all-inclusive”, including labor, material, supervision, tools, equipment, insurance, taxes, fringe benefits, coordination, engineering, overhead, profit, performance and payment bonds, and all other things necessary. Unit prices are fixed for the duration of the Contract and are not subject to escalation for any cause.

### 4.2 Schedule of Values

4.2.1 Prior to the commencement of Work, Contractor shall submit to the County and to the Project Manager a Schedule of Values allocating the Contract Price to the various portions of the Work. Contractor’s Schedule of Values shall be prepared in such form, with such detail, and supported by such data as the Project Manager or the County may require to substantiate its accuracy. Contractor shall not imbalance the Schedule of Values nor artificially inflate any element thereof. The violation of this provision by Contractor shall constitute a material breach of this Contract.

4.2.2 Upon approval by the County the Schedule of Values shall be used as a basis for Contractor’s Application for Payment. The total of all payments in the Schedule of Values must at all times be equal to the Contract Price. No progress payment shall be made to Contractor until an acceptable Schedule of Values is submitted.

4.2.3 General conditions costs may be considered as a line item for the following items (break down required) (collectively the following shall be known as the General Conditions Costs):

- a) Contractor’s field office personnel (full-time on-site)
- b) Construction office and storage facilities
- c) Utilities required to sustain field office and sanitary facilities
- d) Electrical power and water for construction
- e) Bonds and Insurance

4.2.4 Progress payments for general conditions costs will be based on the percentage of Work completed to date, except bonds and insurance which may be requested in full. Separate payments for Shop Drawings and deposits for materials will not be allowed.

### 4.3 Measurement and Payment

4.3.1 Contractor shall make all surveys necessary for determining all quantities of Work to be paid under this Contract. Copies of field notes, computations and other records made by Contractor for the purpose of determining quantities shall be furnished to the Project Manager upon request. Contractor shall notify the Project Manager prior to the time such surveys are made. The Project Manager may but shall have no obligation to witness and verify such surveys. Measurements and computations shall be made by such methods as the County may consider appropriate for the class of work measured. The dividing limits, lines or planes between adjacent items or classes of excavation, concrete, or other types of Work where not definitely indicated on the Drawings or in the Specifications shall be as determined by the County.

4.3.2 No payments of invoices (or portions thereof) shall, at any time, constitute approval or acceptance of the Work under this Contract, nor be a waiver by the County of any of the terms contained herein.

### 4.4 Progress Payments

4.4.1 Prior to Contractor’s submittal of the initial Application for Payment, Contractor shall have delivered the following documents. The County will not make any payment to Contractor until Contractor has complied with these requirements.

- a) Schedule of Values

- b) Project Schedule
- c) Certified copy of recorded bond
- d) Insurance Certificates

4.4.2 On or before the tenth (10th) day of each calendar month, Contractor shall submit an Application for Payment to the Project Manager in such form and manner, and with such supporting data and content, as the Project Manager may require. Such Application for Payment shall be based on the amount of Work done or completed during the payment period which is defined as the first day of the preceding calendar month through the last day of the preceding calendar month. The Project Manager will review the Application for Payment to determine whether the quantity and quality of the Work is as represented in the Application for Payment and thereafter confirm to the County the amount properly owing to Contractor. Upon receipt by the County of the Project Manager's recommendation for payment, payments will be made in accordance with the Local Government Prompt Payment Act (Sections 218.70-218.80 of the Florida Statutes) less such amounts, if any, otherwise owing by Contractor to the County or which the County shall have the right to withhold. Any Application for Payment determined by the County not to be suitable for payment shall be modified and processed in accordance with the County's assessment.

4.4.3 In the event any dispute with respect to any payment or Application for Payment cannot be resolved between Contractor and the County's Project staff, Contractor may demand in writing a meeting with and review by the County's Assistant Director of Purchasing and Contracts. Such meeting and review shall occur within ten (10) business days of receipt by the County of Contractor's written demand. The Assistant Director of Purchasing and Contracts shall issue a written decision on the dispute within ten (10) business days of such meeting. This decision shall be deemed the County's final decision for the purpose of the Local Government Prompt Payment Act.

4.4.4 The County may withhold from each progress payment made to Contractor an amount not to exceed five (5%) percent of payment as retainage until final acceptance of all Work in accordance with Section 255.078 of the Florida Statutes. Any interest earned on retainage shall accrue to the benefit of the County. The County shall make prompt payment to Contractor, unless in accordance with Section 255.078(6) of the Florida Statutes, such funds are the subject of a good faith dispute, claim or demand by the County or Contractor.

4.4.5 Contractor warrants and guarantees that title to Work, materials, and equipment covered in any Application for Payment, whether incorporated in the Project or not, shall pass to the County no later than the time of payment and shall be free and clear of liens, claims, security interests or other encumbrances.

## **4.5 Application for Payment**

4.5.1 Contractor may make Application for Payment, at intervals of not more than once a month for Work satisfactorily completed during the Project. Contractor shall submit with each Application for Payment an updated Project schedule acceptable to the Project Manager. Each Application for Payment shall clearly include:

- a) Contract Number;
- b) A unique Application for Payment number;
- c) Contractor's legal name and address;
- d) Taxpayer identification number (Contractor's federal employer identification number);
- e) Brief description of the completed Work, in accordance with Contractor's Schedule of Values;
- f) Original Contract Price including approved Change Order amounts; and,
- g) Preferred remittance address, if different from the mailing address.

The County may require any other information from Contractor that the County deems necessary to verify Contractor's Application for Payment. No later than ten (10) days after execution of this Contract or Notice to Proceed has been issued, the County will identify in a separate written notice the submittal requirements for Contractor's payment requests.

4.5.2 Delivered, stored or stockpiled materials may be included in an Application for Payment provided Contractor meets the following conditions:

- a) Materials are suitably and securely stored at the Jobsite or a bonded warehouse (acceptable to the County);
- b) An applicable purchase order or supplier's invoice is provided listing the materials in detail, cost of materials and identifying this specific Project by name; and

- c) The material is insured against loss or damage (from whatever source) or disappearance prior to incorporation into the Work.

Payments for such materials shall be at the sole discretion of the Project Manager, shall be based only upon the actual cost of the materials to Contractor, and shall not include any overhead or profit to Contractor.

4.5.3 Each Application for Payment shall be signed by Contractor and shall constitute Contractor's representation that the Work has progressed to the level for which payment is requested, that the Work has been properly installed or performed in full accordance with this Contract, and that Contractor knows of no reason why payment should not be made as requested. Contractor's final Application for Payment shall also be accompanied by a full and complete release and/or waiver of all liens complying with Section 713.20 of the Florida Statutes.

4.5.4 Contractor must remit undisputed payment due for labor, services, or materials furnished by Subcontractors and suppliers hired by Contractor, within ten (10) days after receipt of each progress payment from the County pursuant to Section 218.735 of the Florida Statutes. If necessary for the protection of the County, the County shall have the right, at its sole option, to make payment by joint check or by direct check to Contractor's Subcontractors or suppliers without advance notice to or consent of Contractor. If joint checks are issued following claims by Contractor's Subcontractors or suppliers, the County shall be entitled to an administrative fee of \$50.00 per check for the expense of processing each joint check. Any amounts paid directly to a Subcontractor or supplier will be deducted from payments made to, or amounts due or that may become due to, Contractor. The issuance of a joint check shall create no rights in favor of any person or entity beyond the right of the named payees to payment of the check and shall not be deemed to commit the County to repeat the procedure in the future.

4.5.5 No progress payment, nor any use or occupancy of the Project by the County, shall be interpreted to constitute approval or acceptance of any Work under this Contract, nor be considered a waiver by Contractor of any of the terms of this Contract.

4.5.6 The County's performance and obligation to pay under this Contract is contingent upon an appropriation of lawfully available funds by the Board of County Commissioners. The County shall promptly notify Contractor if the necessary appropriation is not made.

#### **4.6 Withheld Payment**

4.6.1 The County may decline to make payment, may withhold funds otherwise payable and, if necessary, may demand the return of some or all of the amounts previously paid to Contractor, if:

- a) Any Claims are made against Contractor by the County or third parties, including Claims for liquidated damages or if reasonable evidence indicates the probability of the making of any such Claim;
- b) Any Claims are made against the County, the County's property or any other party indemnified hereunder which is or might be covered by Contractors Indemnification obligations under Section 11.2 below;
- c) Contractor fails to pay Subcontractors or others in full and on-time;
- d) Contractor fails to submit schedules, reports, or other information required under the Contract;
- e) Contractor fails to diligently prosecute the Work and maintain progress to assure completion within the Contract Time;
- f) Contractor persistently fails to fully and timely perform the Work in accordance with the Contract Documents;
- g) Defective or nonconforming Work is not remedied; or
- h) Contractor is in default of any other representation, warranty, covenant or performance obligation of this Contract.

4.6.2 If Claims or liens filed against Contractor or property of the County connected with performance under this Contract are not promptly removed by Contractor after receipt of written notice from the County to do so, the County may remove such Claims or liens and all costs in connection with such removal shall be deducted from withheld payments or other monies due, or which may become due, to Contractor. If the amount of such withheld payments or other monies due Contractor under the Contract is insufficient to meet such cost, or if any Claim or lien against Contractor is discharged by the County after final payment is made, Contractor and its surety or sureties shall promptly pay the County all costs (including attorney's fees) incurred thereby regardless of when such Claim or lien arose.

## **4.7 Final Payment**

4.7.1 Upon Contractor's receipt of the Final Certificate for Payment, Contractor may submit a final invoice provided the following has been completed or submitted with such final invoice:

- a) Complete all items applicable to the Work identified in Paragraph 3.3.2;
- b) Complete all Work listed on the punch list prepared in accordance with Paragraph 3.3.4;
- c) Consent of Surety for final payment and/or retainage;
- d) Final Waiver and Release of Claim signed by Contractor;
- e) Submittal of final corrected as-built (record) Drawings;
- f) Settlement of Liquidated Damages, as applicable; and
- g) Settlement of liens and Claims, if any.

4.7.2 Acceptance of Final Payment shall constitute a waiver of all Claims against the County by Contractor except for those Claims previously made in writing against the County by Contractor, pending at the time of Final Payment, and identified in writing by Contractor as unsettled at the time of its request for Final Payment.

4.7.3 In the event Contractor fails to make a Request for Final Payment, or to resubmit a final Application for Payment within ninety (90) days after being requested to do so, the County may deem any and all retained funds to be abandoned property and shall give notice of abandonment to Contractor. The County may set off against the final payment any amounts due to County from Contractor arising out of or under this or any other Contract or Contract between them.

## **ARTICLE V CONTRACTOR RESPONSIBILITIES**

### **5.1 Performance**

5.1.1 Contractor warrants that, to the best of its knowledge, there is no pending or threatened action, proceeding, or investigation, or any other legal or financial condition, that would in any way prohibit, restrain, or diminish Contractor's ability to satisfy its contractual obligations hereunder.

5.1.2 Contractor shall perform no part of the Work at any time without adequate Contract Documents or, as appropriate, approved Shop Drawings, Product Data or samples for such portion of the Work. If Contractor performs any portion of the Work where Contractor knows or should know such Work involves a recognized error, inconsistency or omission in the Contract Documents without notice to the Project Manager and the County, Contractor shall bear responsibility for such performance and shall bear the cost of correction.

5.1.3 Contractor shall perform the Work strictly in accordance with this Contract.

5.1.4 Contractor shall confine its operations to the Jobsite or such other land and areas identified in and permitted by the Contract Documents. Contractor shall assume full responsibility for any damage to any such land or area, to the County or occupant thereof, or of any adjacent land or areas, resulting from the performance of the Work. Should any Claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the Claim by other dispute resolution proceeding or at law. Contractor shall, to the fullest extent permitted by Applicable Law, indemnify and hold harmless the County, and its officers, directors, agents and employees and anyone directly or indirectly employed by them from and against Claims, costs, losses, and damages arising out of or resulting from any Claim or action, legal or equitable, brought by any such owner or occupant against the County or any other party indemnified hereunder to the extent caused by or based upon Contractor's or a Subcontractor's performance of the Work.

5.1.5 Contractor is solely and exclusively responsible for supervising all workers at the Jobsite. Contractor shall supervise and direct the Work using Contractor's best skill, effort and attention. Contractor shall be responsible to the County for any and all acts or omissions of Contractor, its employees and others engaged in the Work on behalf of Contractor.

5.1.6 Contractor and the Work must comply with all Applicable Law and the requirements of any applicable grant agreements.

### **5.2 Authorized Representative**

5.2.1 Prior to commencing Work, Contractor shall designate in writing a competent, authorized representative(s)



acceptable to the County to represent and act for Contractor (“Authorized Representative”). Absent such written designation, Contractor’s Jobsite superintendent shall be deemed Contractor's Authorized Representative and s/he shall be authorized to receive and accept any and all communications from the County or the County’s Project Manager. All communications given to the Authorized Representative shall be binding upon Contractor. An Authorized Representative may be added, removed or changed upon prior written notice given pursuant to Section 13.18 titled “Written Notice”.

5.2.2 At all times while performing the Work and Warranty Work, Contractor shall have one or more Authorized Representatives present on the Jobsite. Such Authorized Representative shall be capable to effectively communicate with the County or the County’s Project Manager, execute and enforce applicable Contract Documents and address Jobsite safety and environmental requirements.

### **5.3 Environmental, Safety and Health**

5.3.1 Safety and Protection. Contractor shall be solely and exclusively responsible for conducting operations under this Contract to avoid risk of harm to the health and safety of persons and property and for inspecting, supervising and monitoring all equipment, materials (whether in storage on or off the Jobsite), work practices and safety precautions (including but not limited to adequate maintenance of traffic) used in the Work to ensure compliance with its obligations under this Contract. Contractor shall provide or cause to be provided necessary training and furnish all safety construction equipment/tools, including OSHA compliant and ANSI certified personal protective equipment as appropriate and necessary for the performance of the Work, to its subcontractors of every tier and enforce the use of such training and safety construction equipment/tools.

5.3.2 Compliance. Contractor shall comply with all Applicable Laws bearing on the safety of persons or property, or their protection from damage, injury or loss including compliance with applicable permits, Project plans and approvals. To the extent allowed by law, Contractor shall assume all responsibility and liability with respect to all matters regarding the safety and health of its employees and the employees of Contractor’s subcontractors and suppliers of any tier, with respect to the Work.

5.3.3 Stop Work Authority. Notwithstanding the foregoing, the County reserves the right to direct Contractor to stop Work and correct an unsafe condition at any time that any person present at the Jobsite identifies any unsafe condition or action. For this purpose only, any person at the Jobsite is authorized to act on behalf of the County.

5.3.4 Safety Representative. Prior to commencing Work, Contractor shall designate in writing a member(s) of its Jobsite construction team as its Safety Representative. Such Safety Representative shall be acceptable to the County and shall have responsibility for implementing all safety procedures, including OSHA, responsibility for the prevention of accidents, authority for monitoring safety of the Work, authority to correct unsafe conditions or acts by its employees or Subcontractors, the ability to oversee compliance with and address environmental requirements, and coordinate with other on-site contractors and subcontractors on safety and environmental matters required for the Work. In the absence of the required written designation, this person shall be Contractor’s Superintendent.

5.3.5 Safety Reporting Requirements. Contractor shall maintain accident and injury records as required by Applicable Law. Such records will be made available to the County upon request. Contractor shall immediately report to the County any death, injury or damage to property incurred or caused by Contractor’s employees and employees of Contractor’s subcontractors and suppliers of any tier.

5.3.6 Drug Free Workplace. By signing this Contract, Contractor agrees to maintain a healthy and productive workforce and safe working conditions thru compliance with the Drug-Free Workplace Act (Chapter 112, Florida State Statutes). Contractor’s personnel shall not possess, use, manufacture, distribute or be under the influence of while on the Jobsite (or any other location where the provisions of this Contract applies) alcoholic beverages and/or illegal drugs or any other “Drug” as such term is defined in the Drug-Free Workplace Act.

5.3.7 Occupational Safety and Health Act (OSHA). Contractor warrants that all materials, equipment, services, etc., delivered or provided to the County shall conform in all respects to the standards set forth in the Occupational Safety and Health Act (OSHA) of 1970 as amended and the failure to comply will be considered a breach of this Contract. Contractor further certifies that if material, equipment, service, etc., delivered or provided to the County is subsequently found to be deficient in any OSHA requirement in effect on date of delivery or service fulfillment date, all costs necessary to bring the material, equipment, service, etc., into compliance with the aforementioned requirements shall be borne by Contractor.



### 5.3.8 Toxic Substances/Federal Hazard Communication “Right to Know and Understand” Regulations

The Federal “Right to Know and Understand” Regulation (also known as the Hazard Communication / Globally Harmonized System of Classification and Labeling of Chemicals (GHS) implemented by OSHA requires employers to inform their employees of any toxic substances to which they may be exposed in the workplace, and to provide training in safe chemical storage, labeling, handling practices and emergency procedures.

Accordingly, Contractor is required to provide completed Safety Data Sheets (SDS) for each hazardous substance provided to the County under this Contract. This includes hazardous substances that are not directly included in the Contract Documents, but are included in the goods or services provided by Contractor to the County. The SDS for each substance must be sent to the County’s Project Manager and must also be sent to:

St. Johns County, a political subdivision of the State of Florida  
500 San Sebastian View  
St. Augustine, FL 32084  
Attn: Risk Management

In the event that hazardous material is improperly handled or stored by Contractor, its subcontractors, any sub-subcontractors, or any employee or agent of any of the aforementioned which results in contamination of the Jobsite, Contractor shall immediately notify the County and the appropriate governmental authority and shall take whatever action is necessary or desirable to remediate the contamination at Contractor’s sole cost and expense. Further, Contractor shall indemnify and hold harmless the County from any and all cost, expense, action, or liability whatsoever resulting from such contamination and/or remedial activities. The indemnity provisions of this section shall survive the expiration or earlier termination of this Contract.

## ARTICLE VI PROJECT MANAGER

### 6.1 Project Manager Responsibilities

6.1.1 The County shall designate as its representative a Project Manager who shall be fully acquainted with the Project. The Project Manager shall be the County’s representative from the Effective Date of this Contract until final payment has been made. The Project Manager shall be authorized to act on behalf of the County only to the extent provided in this Article VI.

6.1.2 The County and Contractor shall communicate with each other in the first instance through the Project Manager.

6.1.3 The Project Manager shall be the initial interpreter of the requirements of the Drawings and Specifications and the judge of the performance there under by Contractor. The Project Manager shall render written or graphic interpretations necessary for the proper execution or progress of the Work with reasonable promptness on request of Contractor.

6.1.4 The Project Manager shall review Contractor’s Applications for Payment and shall confirm to the County for payment to Contractor, those amounts then due to Contractor as provided in this Contract.

6.1.5 The Project Manager shall have authority to reject Work, which is defective or does not conform to the requirements of this Contract. If the Project Manager deems it necessary or advisable, the Project Manager shall have authority to require additional inspection or testing of the Work for compliance with Contract requirements at Contractor’s expense.

6.1.6 The Project Manager shall review and accept, or take other appropriate action as necessary, concerning Contractor’s submittals including but not limited to Shop Drawings, Product Data and Samples. Such review, acceptance or other action shall be for the sole purpose of determining conformance with the design concept and information given through the Contract Documents.

6.1.7 The Project Manager may authorize minor changes in the Work by field order as provided elsewhere herein. The Project Manager does not have authority to approve adjustments to the Contract Price or Contract Time. If at any time Contractor believes that acts or omissions of the County constitute a change to the Work, Contractor shall submit a written notice in accordance with the requirements of Article VIII.

6.1.8 The Project Manager shall, upon written request from Contractor, conduct inspections to determine the date of Substantial Completion and the date of Final Completion, shall receive and forward to the County for the County's review and records, written warranties and related documents required by this Contract and shall issue a Final Certificate for Payment upon compliance with the requirements of this Contract.

6.1.9 The Project Manager's decision in matters relating to aesthetic effect shall be final if consistent with the intent of this Contract.

## **6.2 Field Orders**

The Project Manager shall have authority to order minor changes in the Work not involving a change in the Contract Price or Contract Time and not inconsistent with the intent of this Contract. Such changes shall be affected by written field order and shall be binding upon Contractor. Contractor shall carry out such field orders promptly.

## **ARTICLE VII SUBCONTRACTORS**

### **7.1 Award of Subcontracts**

7.1.1 Contractor shall be responsible for all Work performed under the Contract Documents. All persons engaged in the Work of the Project are the responsibility and under the control of Contractor. Contractor shall furnish the Project Manager, in writing, the names of persons or entities proposed by Contractor to act as a Subcontractor on the Project. The Project Manager shall promptly reply to Contractor, in writing, stating any objections the Project Manager may have to such proposed Subcontractor. Contractor shall not enter into a Subcontract with a proposed Subcontractor with reference to whom the Project Manager has made a timely objection.

7.1.2 Contractor shall give personal attention to fulfillment of the Contract and shall keep the Work under Contractor's control. When any Subcontractor fails to execute a portion of the Work in a manner satisfactory to the County, Contractor shall remove such Subcontractor immediately upon written request from the County, and the Subcontractor shall not again be employed on the Project. The County will not entertain requests to arbitrate disputes among Subcontractors or between Contractor and Subcontractor(s) concerning responsibility for performing any part of the Work.

## **ARTICLE VIII CONTRACT DISPUTES/CLAIMS**

### **8.1 Contract Claims**

8.1.1 If any dispute between the County and Contractor arises under this Contract and such dispute cannot be resolved by good faith negotiations at the field level between the Project Managers of the Contractor and County, such dispute shall be promptly escalated to the Senior Representatives of the Parties, upon request of either party, who shall meet as soon as conveniently possible, but in no case later than fourteen (14) calendar days after such a request is made, to attempt to resolve such dispute or disagreement. Five (5) calendar days prior to any meetings between the Senior Representatives, the parties will exchange relevant information that will assist the parties in resolving the dispute or disagreement.

8.1.1.1 The Senior Representative for the County shall be the Director, or designee, of the County's Public Works Department.

8.1.1.2 The Senior Representative for the Contractor shall be the supervisor of the Project Manager, or a principal of the Contractor.

8.1.2 If after meeting, the Senior Representatives determine that the dispute or disagreement cannot be resolved on terms satisfactory to both parties, the Contractor shall submit a Contract Claim as provided herein.

8.1.3 Prior to filing a Contract Claim, Contractor shall first exhaust all remedies set forth in the Contract Documents. Claims arising from this Contract shall be filed with the Assistant Director of Purchasing & Contracts within five (5) business days of exhausting all remedies set forth above. Pending final resolution of a dispute or claim, unless otherwise agreed in writing by both parties, the Contractor is required to proceed with performance of the Work and maintain effective progress to complete the Work within the Contract Time set forth herein. The Contract Claim shall include, at a minimum, the following:

- a) The name and address of the Contractor and any legal counsel; and

- b) The Contractor's address to which the County's rendered decisions shall be sent; and
- c) Identification, and a copy, of the final adverse decision or document that is the subject of the Contract Claim and any exhibits, evidence or documents which the Contractor deems applicable to the issues raised in the Claim; and
- d) Identification of the administrative remedies provided for in the Contract that were pursued prior to the Claim and the outcome; and
- e) A statement of the grounds for each issue raised in the Contract Claim to be reviewed and the applicable provisions of the Contract, as well as any applicable Laws, or other legal authorities which the Contractor deems applicable to the Claim.

8.1.4 During the Assistant Director of Purchasing & Contracts' review of the Contract Claim, the Assistant Director of Purchasing & Contracts may request additional information from the project team of both parties. The parties must provide the requested information within the time period set forth in the request. Failure of either party to timely comply may result in resolution of the Claim without consideration of the requested information.

8.1.5 The Assistant Director of Purchasing & Contracts shall render a decision on the Contract Claim within twenty-one (21) calendar days of the deadline for receipt of all requested information. The written decision of the Assistant Director of Purchasing & Contracts shall be sent to the Contractor at the address provided in the Contract Claim, or as otherwise agreed to by the parties.

8.1.6 The decision for any Contract Claim by the Assistant Director of Purchasing & Contracts may be appealed by the Contractor to the County Administrator. Contractor must submit their appeal to the County Administrator, including any and all information, documentation, backup data, or other supplemental facts or figures within five (5) business days of receipt of the Assistant Director of Purchasing & Contracts' decision. Failure by the Contractor to submit an appeal within the prescribed timeframe shall be a waiver of a right to appeal the rendered decision. The appeal shall include any and all information, documentation, and data relative to the Contract Claim and subsequent appeal. The County Administrator shall render a decision within thirty (30) calendar days of receipt of all information. The County Administrator's decision shall be considered final, unless Contractor takes legal action in Circuit Court.

## **ARTICLE IX CHANGES IN THE WORK**

### **9.1 General**

9.1.1 The County may, at any time, without invalidating this Contract and without notice to sureties, direct changes in the Work within the general scope of this Contract, consisting of additions, deletions, revisions, or any combination thereof, by Change Order or by field order. Contractor agrees to promptly comply with such orders and proceed with the Work, which shall be performed under the applicable requirements of the Contract Documents. Contract Time and Contract Price will be adjusted, in accordance with Sections 8.2 and 8.3 below, by written Change Order for changes which materially increase or decrease the cost of or time for performance of the Work.

9.1.2 If at any time Contractor believes that acts or omissions of the County constitute a change to the Work, Contractor shall submit a written notice to the Project Manager explaining in detail the basis for the change request. Contractor's written notice must be furnished within five (5) days of the commencement of the event giving rise to the claim or Contractor's knowledge of the claim, and the notice shall state the general nature and cause of the claim. Thereafter, within twenty (20) days after the termination of the event giving rise to the claim or Contractor's knowledge of the claim, Contractor shall submit written notice of the extent of the claim with supporting information and documentation to the Project Manager and County. **IT IS EXPRESSLY AND SPECIFICALLY AGREED THAT ANY AND ALL CLAIMS FOR CHANGES TO THE CONTRACT TIME OR CONTRACT PRICE SHALL BE WAIVED IF NOT SUBMITTED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THIS SECTION.** Pending final resolution of any such claim request, Contractor shall diligently proceed with performance of this Contract regardless of any dispute concerning performance of the Work or the amount Contractor is to be paid for such Work.

### **9.2 Changes in the Contract Time**

9.2.1 The Contract Time will be extended by Change Order in an amount equal to time lost on critical Work items due to delays beyond the control of and through no fault or negligence of Contractor if a claim for an extension is submitted in accordance with Section 8.1.2 above.

9.2.2 If Contractor is delayed in progressing any task which at the time of the delay is then critical or which during the

delay becomes critical, as a direct result of unusually adverse weather conditions not reasonably anticipated, or any other causes beyond Contractor's reasonable control and not attributable to Contractor or Contractor's Subcontractor's actions or failure to act, then the date for achieving Substantial Completion of the Work may be extended for such reasonable time as the Project Manager may determine. An extension of Contract Time shall be Contractor's sole and exclusive remedy for delay unless the delay is solely caused by fraud, bad faith or active interference on the part of the County or its representatives. In no event shall Contractor be compensated for interim delays that do not extend the Contract Time.

9.2.3 Extensions to the Contract Time for delays caused by the effects of inclement weather shall be submitted as a request for a change in the Contract Time pursuant to paragraph 8.1.2 above. Time extensions are justified only when rain, other inclement weather conditions, or related adverse soil conditions result in Contractor's inability to work at least fifty percent (50%) of the normal workday on controlling items of Work identified on the accepted schedule or updates to that schedule.

9.2.4 Contractor shall, at no cost to the County, take all precautions necessary to secure the Project Jobsite from any damage that may be caused by all threatened storm events, regardless of whether the County has given notice of same. Compliance with any specific storm event precautions will not constitute additional work. Suspension of the Work caused by a threatened or actual storm event, regardless of whether the County has directed such suspension, will entitle Contractor to additional Contract Time only and shall not give rise to a claim for a change in the Contract Price.

### **9.3 Changes in the Contract Price**

9.3.1 In connection with any claim by Contractor against the County for compensation in excess of the Contract Price, any liability of the County for Contractor's costs shall be strictly limited to direct costs incurred by Contractor and shall in no event include indirect costs or consequential damages of Contractor.

9.3.2 Any change in the Contract Price resulting from a Change Order shall be determined as follows:

- a) By mutual acceptance of a lump sum increase or decrease in costs. Upon the Project Manager's request, Contractor shall furnish a detailed estimate of increased or decreased costs, together with cost breakdowns and other support data as the Project Manager may reasonably request.
- b) By Unit Prices stated in the Contract Documents, or subsequently agreed upon payment.
- c) By a manner or method mutually agreed by the County and Contractor.

9.3.3 If no mutual agreement occurs between the County and Contractor, then the change in the Contract Price, if any, shall than be determined by the Project Manager on the basis of the reasonable expenditures or savings of those performing, deleting or revising the Work attributable to the change, including, in the case of an increase or decrease in the Contract Price, a reasonable allowance for direct job site overhead and profit. In such case, Contractor shall present, in such form and with such content as the County or the Project Manager requires, an itemized accounting of such expenditures or savings shall be limited to the following: reasonable costs of materials, supplies, or equipment including delivery costs, reasonable costs of labor, including social security, unemployment insurance, fringe benefits required by a pre-existing Contract or by custom, and workers' compensation insurance, reasonable costs of premiums for all bonds and insurance, permit fees, and sales, use or other taxes paid by Contractor that are directly attributable to the changed Work. In no event shall any expenditure or savings associated with Contractor's home office or other non-Jobsite overhead expenses be included in any change in the Contract Price. Pending final determination of reasonable expenditures or savings to the County, payments shall be made to Contractor based on the Project Manager's recommendation for payment.

9.3.4 Costs which will not be allowed or paid in Change Orders or other claims under this Contract include, but are not limited to, the costs of preparing or reviewing change request/claims or proposed Change Orders, change request/claim consulting costs; lost revenues; lost profits; lost income or earnings; interest cost of any type other than those mandated by statute; rescheduling costs; lost earnings; loss of other business; or the costs of Contractor representatives visiting the Jobsite or participating in meetings with the County. The County shall not be liable to Contractor for claims of third parties, including Subcontractors, unless and until liability of Contractor has been established therefore in a court of competent jurisdiction.

### **9.4 Acceptance of Change Orders**

Contractor's written acceptance of a Change Order shall constitute a final and binding Contract to the provisions thereof and a waiver of all claims in connection therewith, whether direct, indirect, or consequential in nature.

## 9.5 Notice to Sureties

Contractor shall notify and obtain the timely consent and approval of Contractor's surety with reference to all Change Orders if such notice, consent or approval is required by Contractor's surety or by law. Contractor represents and warrants to County that Contractor is solely liable and responsible to so notify and obtain any such consent or approval.

## 9.6 Differing Site Conditions

If during the course of the Work, Contractor encounters (1) subsurface or concealed conditions at the Project's Jobsite that differ materially from those shown in the Contract Documents and from those ordinarily encountered and generally recognized as inherent in work of the character called for in this Contract; or (2) unknown physical conditions of the Project's Jobsite, of an unusual nature, which differ materially from that ordinarily encountered and generally recognized as inherent in work of the character called for in this Contract, then Contractor, without disturbing the conditions and before performing any Work affected by such conditions, shall, within twenty-four (24) hours of their discovery, notify the Project Manager in writing of the existence of the aforesaid conditions. The Project Manager shall, within two (2) business days after receipt of Contractor's written notice, investigate the site conditions identified by Contractor. If, in the sole opinion of the Project Manager, the conditions do materially so differ and cause an increase or decrease in Contractor's cost of, or the time required for, the performance of any part of the Work, whether or not charged as a result of the conditions, the Project Manager may recommend an equitable adjustment to the Contract Price, or the Contract Time, or both. If Project Manager and Contractor cannot agree on an adjustment in the Contract Price or Contract Time, the adjustment shall be referred to the Assistant Director of Purchasing and Contracts for determination in accordance with the provisions of Paragraph 1.5. No request by Contractor for an equitable adjustment to this Contract under this provision shall be allowed unless Contractor has given written notice to the Project Manager in strict accordance with the provisions of this Article. **No request for an equitable adjustment or change to the Contract Price or Contract Time for differing site conditions shall be allowed if made after the date certified by the Project Manager as the date of Substantial Completion.**

The failure by Contractor to provide written notice as provided in this Paragraph 8.6 shall constitute a waiver by Contractor of any Claim arising out of or relating to such concealed or unknown condition.

## **ARTICLE X UNCOVERING WORK, STOPPING WORK, AND ACCEPTING DEFECTIVE OR NONCONFORMING WORK**

### 10.1 Uncovering Work

10.1.1 No Work or portion of Work shall be covered until inspected by the County as required by the Contract Documents. If any of the Work is covered contrary to the request or direction of the County or the Project Manager or contrary to the requirements of the Contract Documents, Contractor shall, upon written request, uncover it for the Project Manager's inspection and subsequently cover the Work in accordance with the Contract Documents without adjustment to the Contract Time or Contract Price. The provisions and obligations set forth herein shall apply even if the County ultimately determines (after uncovering and inspection) that the underlying Work in question conforms to the requirements of the Contract Documents.

10.1.2 Should the County wish to either (i) re-inspect a portion of the Work that has been covered by Contractor in compliance with Paragraph 9.1.1, above, or (ii) inspect a portion of the Work that has been covered by Contractor which is not required by the Contract Documents to be observed or inspected prior to its being covered and which the County did not specifically request to observe prior to its being covered, Contractor shall uncover the applicable portion of the Work upon written request. If the County determines that the Work uncovered conforms to the requirements of the Contract Documents, then the County will pay the costs of uncovering and replacement of the cover through a Change Order and will adjust the Contract Time by Change Order if the uncovering and replacement Work extends the most current Substantial Completion or Final Completion date, as applicable. If, however, the County determines that the Work uncovered does not conform to the requirements of the Contract Documents, then Contractor shall pay the costs of uncovering and replacement and shall not be entitled to an adjustment of the Contract Price.

### 10.2 Right to Stop Work

If the Work is defective, or Contractor fails to supply sufficient skilled workers, suitable materials, or equipment or fails to furnish or perform the Work in such a way that the completed Work will conform to the Contract Documents, the County, acting through the Project Manager, may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated. The County's right to stop Work, or any portion thereof, shall not give rise to any duty on the part of the County to exercise this right for the benefit of Contractor or any other party.



### **10.3 County May Accept Defective or Nonconforming Work**

If the County chooses to accept defective or nonconforming Work, the County may do so. In such events, the Contract Price shall be reduced by the greater of (a) the reasonable cost of removing and correcting the defective or nonconforming Work, and (b) the difference between the fair market value of the Work had it not been constructed in such manner as to include defective or nonconforming Work. If the remaining portion of the unpaid Contract Price, if any, is insufficient to compensate the County for its acceptance of defective or nonconforming Work, Contractor shall, pay the County such remaining compensation for accepting defective or nonconforming Work.

## **ARTICLE XI CONTRACT SUSPENSION AND TERMINATION**

### **11.1 Suspension**

The County may, by written notice, order Contractor to suspend, delay or interrupt Work, in whole or in part, for a period of time as the County may determine. If such suspension delays Contractor's ability to meet the authorized Contract Time, Contractor will be granted an extension of time as reasonably agreed by both parties. Contractor shall not be entitled to an adjustment to the Contract Time to the extent that performance is, was or would have been so suspended, delayed or interrupted by another cause, act or omission for which Contractor is responsible. Notwithstanding anything to the contrary in this Contract and, in the event any such suspension exceeds ninety (90) days, Contractor may, upon ten (10) days written notice to the County, terminate performance under this Contract and recover from the County an equitable adjustment in accordance with Section 8.3 above.

### **11.2 Termination**

11.2.1 The County may by written notice to Contractor terminate the Work under this Contract in whole or in part at any time for the County's convenience or for the default of Contractor.

11.2.2 The County may terminate this Contract, in whole or in part, for its convenience upon thirty (30) calendar days written notice to the Contractor. If the termination is for the convenience of the County, an equitable adjustment in the compensation to be paid to the Contractor may be made based upon the cost for completed Work, Work in progress, and the substantiated, reasonable and actually incurred costs associated with termination, including demobilization costs and amounts due in settlement of terminated contracts with Subcontractors. No amount shall be allowed for anticipated profit or unperformed work.

11.2.3 Contractor may terminate this Contract, for any reason up to sixty (60) calendar days written notice, provided that any outstanding Work is completed by Contractor, or Contractor's Subcontractors. Contractor further agrees to cooperate fully and assist the County, upon request, in order to complete any Work under this Project. In such event, the County shall compensate the Contractor as mutually agreed in writing for any such Work after termination.

11.2.4 The County may terminate this Contract, in whole or in part, for cause (or "default"). In the event of Contractor's default, the County shall issue a Notice of Default to the Contractor, articulating the items which the County finds to be in default of the requirements of this Agreement. Contractor shall have ten (10) calendar days from receipt of the Notice of Default to remedy deficiencies or submit, in writing, an acceptable plan for remedying the deficiencies identified in said notice. If Contractor fails to remedy such deficiencies, or to submit an acceptable plan for remedying such deficiencies, to the satisfaction of the County within the stated time period, the County shall issue a Notice of Termination, and take over and prosecute the Work to completion. In such case, Contractor shall be liable to the County for all reasonable additional costs incurred by the County in completion of the Work.

11.2.5 Upon receipt of such termination notice Contractor shall immediately stop all Work and shall immediately cause any and all of its Subcontractors and material suppliers at any tier, to immediately stop all work, leaving the construction Site in a safe and secured condition. Contractor shall not be paid for any work performed or costs incurred after the termination date that reasonably could have been avoided. The County may direct Contractor to assign Contractor's right, title and interest under terminated orders or subcontracts to its designee.

11.2.6 Contractor shall not remove from the construction Jobsite any materials, equipment, plant or tools that have been paid for by County pursuant to this Contract. Contractor hereby grants the County a free and unimpeded right of access to Contractor's facilities, which shall survive any termination of the Contract, for the purpose of permitting the County to take control of and remove any Work, including but not limited to any Work for which title has vested in the County.



11.2.7 For purposes of this Termination provision, Contractor shall be deemed in default if Contractor (1) persistently or repeatedly refuses or fails to perform the Work in a timely manner, (2) fails to supply enough properly skilled Workers, supervisory personnel or proper equipment or materials, (3) fails to make prompt payment to Subcontractors, or for materials or labor, (4) becomes insolvent or becomes the subject of voluntary or involuntary bankruptcy proceedings, (5) persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or (6) breaches or violates a material provision of this Contract. If the termination is attributable to the default of Contractor, the County shall have the right, without prejudice to any other right or remedy, to take possession of the construction Jobsite and of all materials, equipment, tools, construction equipment and machinery thereon owned by Contractor and may finish the Work by whatever methods it may deem expedient. In such case, Contractor shall not be entitled to receive any further payment until the Work is finished.

11.2.8 If the unpaid balance of the Contract Price less any liquidated damages due under this Contract, exceeds the cost of finishing the Work, including compensation for the Project Manager's additional services and expenses made necessary thereby, Contractor shall pay the difference to the County. This obligation for payment shall survive the termination of the Contract.

11.2.9 If, after termination by the County for Contractor's default, it is determined by a Court of competent jurisdiction that Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties, including adjustment of the Contract Price, will be the same as if the termination had been issued for the convenience of the County, as provided under Paragraph 10.2.4 above.

## **ARTICLE XII WARRANTY AND INDEMNITY**

### **12.1 Warranty**

12.1.1 Contractor warrants and guarantees to the County that all labor furnished to progress the Work under this Contract shall be competent to perform the tasks undertaken and that the product of such labor shall yield only first-class results and that all materials and equipment furnished under this Contract shall be of good quality, free from faults and defects and in strict conformance with the Contract Documents.

12.1.2 Contractor warrants all materials, equipment and labor it furnishes or performs under this Contract against all defects in design, materials and workmanship for a period of one year (or the period of time in any guarantee or warranty provided by any manufacturer or supplier of equipment or materials incorporated into the Work, whichever is later) from and after the date of Final Completion. Contractor shall within ten (10) Days after being notified in writing by the County of any defect in the Work or non-conformance of the Work (Warranty Work), commence and prosecute with due diligence all Work necessary to fulfill the terms of the warranty at its sole cost and expense. Contractor shall act sooner as requested by the County in response to an emergency. In addition, Contractor shall, at its sole cost and expense, repair and replace any portions of the Work (or work of other contractors) damaged by its Warranty Work or which becomes damaged in the course of repairing or replacing Warranty Work. For any Work so corrected, Contractor's obligation hereunder to correct Warranty Work shall be reinstated for an additional one-year period, commencing with the date of acceptance of such corrected Work.

12.1.3 Contractor shall perform such tests as the County may require to verify that any corrective actions, including, without limitation, redesign, repairs, and replacements comply with the requirements of the Contract Documents. All costs associated with such corrective actions and testing, including the removal, replacement, and reinstatement of equipment and materials necessary to gain access, shall be the sole responsibility of Contractor.

12.1.4 All warranties and guarantees of subcontractors, suppliers and manufacturers with respect to any portion of the Work, whether express or implied, are deemed to be obtained by Contractor for the benefit of the County, regardless of whether or not such warranties and guarantees have been transferred or assigned to the County by separate Contract and Contractor agrees to enforce such warranties and guarantees, if necessary, on behalf of the County.

12.1.5 In the event that Contractor fails to perform its obligations under this Warranty Section, or under any other warranty or guaranty under this Contract, to the reasonable satisfaction of the County, the County shall have the right to correct and replace any defective or non-conforming Work and any work damaged by such work or the replacement or correction

thereof at Contractor's sole expense. Contractor shall be obligated to fully reimburse the County for any expenses incurred hereunder upon demand.

12.1.6 Failure on the part of the County to reject defective, non-conforming or unauthorized Work shall not release Contractor from its contractual obligations, be construed to mean acceptance of such Work or material by the County, or, after Final Completion, bar the County from recovering damages or obtaining such other remedies as may be permitted by law.

12.1.7 No adjustment in the Contract Time or Contract Price will be allowed because of delays in the performance of the Work as a result of correcting defective, non-conforming or unauthorized Work.

12.1.8 County and Contractor agree that the provisions of Florida Statute Chapter 558 shall not apply to this Contract.

## **12.2 Indemnity**

12.2.1 Contractor shall indemnify and hold harmless the County and its officers and employees ("Indemnified Party"), from liabilities, damages, losses and costs, including, but not limited to, reasonable attorney's fees, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of Contractor and persons employed or utilized by Contractor in the performance of this Contract.

12.2.2 To the extent permitted by, and in accordance with Section 725.06 of the Florida Statutes, Contractor further agrees that "damages, losses and costs", includes fines, citations, court judgments, insurance claims, restoration costs or other liability, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of Contractor and persons employed or utilized by Contractor in the performance of this Contract.

12.2.3 To the extent permitted by, and in accordance with Section 725.06 of the Florida Statutes, for purposes of indemnity, the "persons employed or utilized by Contractor" shall be construed to include, but not be limited to, Contractor, its staff, employees, subcontractors, all deliverers, suppliers, furnishers of materials or services or anyone acting for, on behalf of, or at the request of Contractor.

12.2.4 In Claims against any person or entity indemnified hereunder by an employee of Contractor, any Subcontractor, or subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Section 11.2 shall not be limited by a limitation on the amount or type of damages, compensation or benefits payable by or for Contractor or any Subcontractor or subcontractor under any workers' compensation acts, disability benefits acts or other employee benefit acts.

12.2.5 Contractor's indemnity and hold harmless obligations hereunder shall extend to all Claims against the County by any third party or third-party beneficiary of this Contract and all liabilities, damages, losses and costs related thereto.

12.2.6 This indemnification will not be valid in the instance where the loss is caused by the gross negligence, or willful, wanton or intentional misconduct of any Indemnified Party.

12.2.7 If any provision(s), or portion(s) of a provision(s) of this Section, or the application thereof to any person or circumstance shall, to any extent, be held to be invalid, illegal or unenforceable for any reason whatsoever, the validity, legality and enforceability of the remaining provision(s), or part of the provision(s), shall not in any way be affected or impaired thereby; and shall be interpreted to the fullest extent possible to be enforceable and to give effect to the intent manifested by the provision(s), or portion(s) thereof, held invalid, illegal or unenforceable.

12.2.8 Contractor shall further indemnify and hold harmless the County its officers and employees from and against all Claims arising out of any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents and shall defend such Claims in connection with any alleged infringement of such rights.

12.2.9 The indemnification provisions of this Section 11.2 shall survive expiration or earlier termination of this Contract.

## **ARTICLE XIII INSURANCE AND BONDS**

### **13.1 Contractor's Insurance Requirements**

13.1.1 All insurance policies shall be satisfactory to the County and be issued by companies authorized and duly licensed to transact business in the State of Florida. Contractor shall furnish proof of insurance to the County prior to execution of this Contract. No Work shall commence under this Contract until Contractor has obtained all insurance coverages required under this section. Certificates of insurance shall clearly indicate Contractor has obtained insurance of the type, amount, and classification as required by this Contract. Required insurance coverage shall be maintained in force, including coverage for Additional Insureds, until Final Completion of all Work including Warranty Work.

13.1.2 No less than ten (10) days written notice shall be provided to the County prior to cancellation, non-renewal or any material change of required insurance policies. Yearly renewal certificates shall be provided to the County within thirty (30) days of expiration of the current policy.

13.1.3 The types and amounts of insurance required under this Contract do not in any way limit the liability of Contractor including under any warranty or indemnity provision of this Contract or any other obligation whatsoever Contractor may have to the County or others. Nothing in this Contract limits Contractor to the minimum required insurance coverages found in this Article XII.

### **13.2 Additional Insured Endorsements and Certificate Holder**

The term "Additional Insured", as used in this Contract, shall mean St. John's County, its elected officials, officers, employees, agents and representatives. Certificates of insurance shall specifically name each Additional Insured for all policies of insurance except Workers' Compensation and Professional Liability. A copy of the endorsement showing the required coverages must accompany the certificate of insurance.

Certificate Holder Address: St. Johns County, a political subdivision of the State of Florida  
500 San Sebastian View  
St. Augustine, FL 32084  
Attn: Purchasing Division

### **13.3 Workers Compensation**

Contractor shall procure and maintain during the life of this Contract, adequate Workers' Compensation Insurance in at least such amounts as is required by law for all of its employees per Florida Statute 440.02.

### **13.4 Commercial General Liability**

Contractor shall procure and maintain during the life of this Contract, Comprehensive General Liability Insurance with minimum limits of \$1,000,000 per occurrence, \$2,000,000 aggregate, including bodily injury (including wrongful death), property damage, products, personal & advertising injury, and completed operations. This insurance must provide coverage for all Claims that may arise from the services and/or operations completed under this Contract, whether such services or operations are by Contractor or anyone directly or indirectly employed by them. Such insurance(s) shall also be primary and non-contributory with regard to insurance carried by the Additional Insureds.

### **13.5 Automobile Liability**

Contractor shall procure and maintain during the life of this Contract, Comprehensive Automobile Liability Insurance with minimum limits of \$2,000,000 combined single limit for bodily injury and property damage liability and insuring liability arising out of or in any way related directly or indirectly to the ownership, maintenance or use of any owned, non-owned or rented/hired automobiles.

### **13.6 Additional Coverages**

**ONLY THE SUBSECTIONS CORRESPONDING TO ANY CHECKED BOX IN THIS PARAGRAPH 12.6 WILL APPLY TO THIS CONTRACT.**

13.6.1  Professional Liability.

13.6.1.1 Contractor shall procure and maintain, during the life of this Contract, Professional Liability or Errors and Omissions Insurance with minimum limits of \$1,000,000 with 10-year tail coverage starting upon Final Completion. Contractor's professional liability policy should not have an exclusion for environmental compliance management or construction management professionals.

13.6.1.2 In the event that Contractor employs professional engineering or land surveyor services for performing field engineering or preparing design calculations, plans, and specifications, Contractor shall require the retained engineers and land surveyors to carry professional liability insurance with limits not less than \$1,000,000 each claim with respect to negligent acts, errors, or omissions in connection with professional services to be provided under this Contract.

13.6.2  Builders Risk.

a. Contractor shall procure and maintain Builder's Risk ("all risk") insurance on a replacement cost basis. The amount of coverage shall be equal to the full replacement cost on a completed value basis, including periodic increases or decreases in values through change orders.

13.6.2.2 The Builder's Risk policy shall identify the County as the sole loss payee. The policy shall name as insured the County, Contractor and its subcontractors of every tier. Each insured shall waive all rights of subrogation against each of the other insured to the extent that the loss is covered by the Builder's Risk Insurance. The Builder's Risk policy shall be primary and any self-insurance maintained by the County in not contributory. The Builder's Risk policy shall not include a co-insurance clause. This coverage shall not be lapsed or cancelled because of partial occupancy by the County prior to Final Completion of the Work.

13.6.2.3 The Builder's Risk insurance shall:

- a. insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal including demolition as may be reasonably necessary; and water damage (other than that caused by flood).
- b. cover, as insured property, at least the following: (i) the Work and all appurtenances, materials, supplies, fixtures, machinery, apparatus, equipment and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work including County furnished or assigned property; (ii) spare parts inventory required within the scope of the Contract; and (iii) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Jobsite, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.
- c. extend to cover damage or loss to insured property (i) while in transit; and (ii) while in temporary storage at the Jobsite or in a storage location outside the Jobsite (but not including property stored at the premises of a manufacturer or supplier).
- d. include (i) performance/start-up and hot testing; (ii) soft costs (e.g. design and engineering fees, code updates, permits, bonds, insurances, and inspection costs); and (iii) costs of funding or financing when a covered risk causes delay in completing the Work.

13.6.3 The Builder's Risk Insurance may have a deductible clause. Contractor shall be responsible for paying any and all deductible costs. Notwithstanding anything to the contrary set forth above, the deductible for coverage of all perils and causes of loss enumerated in subparagraph 12.6.2.3 above shall not exceed \$250,000.

## 13.7 Other Requirements

The required insurance limits identified in Sections 12.4, 12.5, and 12.6 above may be satisfied by a combination of a primary policy and/or Umbrella or Excess Liability Insurance policy. Contractor shall require each lower-tier subcontractor to comply with all insurance requirements appropriate for its scope of work, and any deficiency shall not relieve Contractor of its responsibility herein. Upon written request, Contractor shall provide County with copies of lower-tier subcontractor certificates of insurance.

Providing and maintaining adequate insurance coverage is a material obligation of Contractor. County has no obligation or duty to advise Contractor of any non-compliance with the insurance requirements contained in this Section. If Contractor fails to obtain and maintain all of the insurance coverages required herein, Contractor shall indemnify and hold harmless

the Additional Insureds from and against any and all Claims that would have been covered by such insurance had Contractor complied with its obligations herein.

County reserves the right to adjust the above minimum insurance requirements or require additional insurance coverages to address other insurable hazards.

### **13.8 Payment and Performance Bonds**

Contractor shall execute, furnish the County with, and record in the public records of St. John's County, a Payment and Performance Bond in accordance with the provisions of Sections 255.05 and 287.0935 Florida Statutes, in an amount no less than the Contract Price. Such Payment and Performance Bond shall be conditioned upon the successful completion of all work, labor, services, equipment and materials to be provided and furnished hereunder, and the payment of all subcontractors, materialmen, and laborers. Said bond shall be subject to the approval of the Board of County Commissioners of St. John's County, Florida. In accordance with Section 255.05, F.S., the County may not make a payment to Contractor until Contractor has provided the County a certified copy of the recorded bond.

## **ARTICLE XIV MISCELLANEOUS**

### **14.1 Independent Contractor**

Contractor represents that it is fully experienced and properly qualified, licensed, equipped, organized, and financed to perform the Work under this Contract. Contractor shall act as an independent contractor and not as an agent in performing this Contract and shall maintain complete control over its employees and all of its Subcontractors and suppliers of any tier. Nothing contained in this Contract or any lower-tier subcontract or purchase order awarded by Contractor shall create any contractual relationship between any such subcontractor or supplier and the County. Contractor shall perform all Work in accordance with the requirements of this Contract and in accordance with its own methods subject to compliance with this Contract.

### **14.2 Examination of Contractor's Records**

The County or its authorized representative shall, until the expiration of five (5) years after final payment under this Contract, have access to, and the right to examine any directly pertinent books, documents, papers and records of Contractor involving transactions relating to this Contract, and to make copies, excerpts and transcriptions thereof. If any such examination reveals that Contractor has overstated any component of the Contract Price, Change Order, Claim, or any other County payment obligation arising out of this Contract, then Contractor shall, at the election of the County, either immediately reimburse to the County or offset against payments otherwise due Contractor, the overstated amount plus interest. The foregoing remedy shall be in addition to any other rights or remedies the County may have.

### **14.3 Backcharges**

Upon the County's notification to undertake or complete unperformed Work such as cleanup or to correct defective or non-conforming services, equipment, or material (Backcharge Work), if Contractor states or by its actions indicates it is unable or is unwilling to immediately proceed and/or complete the Backcharge Work in an agreed time; the County may perform such Backcharge Work by the most expeditious means available and backcharge Contractor for any and all costs thereby incurred by the County.

The County shall separately invoice or deduct and retain from payments otherwise due to Contractor the costs for Backcharge Work. The County's right to backcharge is in addition to any and all other rights and remedies provided in this Contract or by law. The County's performance of the Backcharge Work shall not relieve Contractor of any of its responsibilities under this Contract and Contractor shall be responsible for the Backcharge Work as if it were its own.

### **14.4 Applicable Law**

Contractor and the Work must comply with all Applicable Law and the requirements of any applicable grant agreements.

### **14.5 Governing Law & Venue**

The Contract shall be governed by the laws of the State of Florida. Venue for any administrative and/or legal action arising under the Contract shall be St. Johns County, Florida.

### **14.6 Assignment**



Contractor shall not sell, assign or transfer any of its rights, duties or obligations under the Contract, or under any Change Order issued pursuant to the Contract or make an assignment or transfer of any amounts payable to Contractor under the Contract, without the prior written consent of the County. In the event of any assignment, Contractor remains secondarily liable for performance of the Contract, unless the County expressly waives such secondary liability. The County may assign the Contract with prior written notice to Contractor of its intent to do so. This Contract may be assumed by and shall inure to the benefit of the County's successors and assigns without the consent of Contractor.

#### **14.7 Severability**

If a court deems any provision of the Contract void, invalid or unenforceable, that provision shall be enforced only to the extent that it is not in violation of law or is not otherwise unenforceable and all other provisions shall remain in full force and effect.

#### **14.8 Section Headings**

The section and other headings contained in this Contract are for reference purposes only and shall not affect the meaning or interpretation of this Contract.

#### **14.9 Disclaimer of Third-Party Beneficiaries**

This Contract is solely for the benefit of County and Contractor and no right or cause of action shall accrue to or for the benefit of any third party not a formal party hereto. Nothing in this Contract, expressed or implied, is intended or shall be construed to confer upon or give any person or entity other than County and Contractor, any right, remedy, or Claim under or by reason of this Contract or any provisions or conditions hereof; and all of the provisions, representations, covenants and conditions herein contained shall inure to the sole benefit of and shall be binding upon County and Contractor.

#### **14.10 Waiver; Course of Dealing**

The delay or failure by the County to exercise or enforce any of its rights or remedies under this Contract shall not constitute or be deemed a waiver of the County's right thereafter to enforce those rights or remedies, nor shall any single or partial exercise of any such right or remedy preclude any other or further exercise thereof or the exercise of any other right or remedy. The conduct of the parties to this Contract after the Effective Date shall not be deemed a waiver or modification of this Contract.

#### **14.11 No Waiver of Sovereign Immunity**

Nothing herein is intended to serve as a waiver of sovereign immunity by any agency or political subdivision to which sovereign immunity may be applicable or of any rights or limits to liability existing under Section 768.28, Florida Statutes. This section shall survive the termination of all performance and obligations under this Contract and shall be fully binding until such time as any proceeding brought on account of this Contract is barred by any applicable statute of limitations.

#### **14.12 Execution in Counterparts**

This Contract may be executed in counterparts, each of which shall be an original document, and all of which together shall constitute a single instrument. The parties may deliver executed counterparts by e-mail transmission, which shall be binding. In the event this Contract is executed through a County-approved electronic signature or online digital signature service (such as DocuSign), such execution shall be valid, effective and binding upon the party so executing. Execution and delivery of an executed counterpart of this Contract and/or a signature page of this Contract by electronic image scan transmission (such as a "pdf" file) or through a County approved electronic signature service will be valid and effective as delivery of a manually executed counterpart of this Contract.

#### **14.13 Entire Contract**

This Contract for the Work, comprised of the Contract Documents enumerated herein, constitutes the entire Contract between the Parties relating to the subject matter hereof and supersedes all prior or contemporaneous Contracts, negotiations, discussions and understandings, oral or written. This Contract may not be amended or modified except in writing, as provided herein and signed by authorized representatives of both parties.

#### **14.14 Survival**

The provisions of the Contract Documents which by their nature survive termination of the Contract, including without limitation all warranties, indemnities, insurance, payment obligations, and the County's right to audit Contractor's books and records, shall in all cases survive the expiration or earlier termination of this Contract.



#### **14.15 Employment Eligibility and Mandatory Use of E-Verify**

As a condition precedent to entering into this Contract, and in accordance with section 448.095, F.S., Contractor and its subcontractors shall register with and use the E-Verify system to verify the work authorization status of all employees hired on or after January 1, 2021.

- a. Contractor shall require each of its subcontractors to provide Contractor with an affidavit stating that the subcontractor does not employ, contract with, or subcontract with an unauthorized alien. Contractor shall maintain a copy of such affidavit for the duration of this Contract.
- b. The County, Contractor, or any subcontractor who has a good faith belief that a person or entity with which it is contracting has knowingly violated section 448.09(1), F.S. or these provisions regarding employment eligibility shall terminate the contract with the person or entity.
- c. The County, upon good faith belief that a subcontractor knowingly violated these provisions regarding employment eligibility, but Contractor otherwise complied, shall promptly notify Contractor and Contractor shall immediately terminate the contract with the subcontractor.
- d. The County and Contractor hereby acknowledge and mutually agree that, a contract terminated pursuant to these provisions regarding employment eligibility is not a breach of contract and may not be considered as such. Any contract terminated pursuant to these provisions regarding employment eligibility may be challenged in accordance with section 448.095(2)(d), F.S.
- e. Contractor acknowledges that, in the event that the County terminates this Contract for Contractor's breach of these provisions regarding employment eligibility, then Contractor may not be awarded a public contract for at least one (1) year after such termination. Contractor further acknowledges that Contractor is liable for any additional costs incurred by the County as a result of the County's termination of this Contract for breach of these provisions regarding employment eligibility.
- f. Contractor shall incorporate in all subcontracts made pursuant to this Contract the provisions contained herein regarding employment eligibility.

#### **14.16 Equal Employment Opportunity**

During the performance of this Contract, Contractor agrees as follows:

14.16.1 Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, disability, age, sex (including sexual orientation and gender identity/expression), national origin (including limited English proficiency), marital status, or familial status. Contractor will take affirmative action to ensure that applicants and employees are treated during employment without regard to their race, color, religion, disability, sex, age, national origin, ancestry, marital status, sexual orientation, gender identity or expression, familial status, genetic information or political affiliation. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertisement, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this non-discrimination clause.

14.16.2 Contractor will, in all solicitations or advertisements for employees placed for, by, or on behalf of Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, disability, sex, age, national origin, ancestry, marital status, sexual orientation, gender identity or expression, familial status, or genetic information.

14.16.3 Contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation,

proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with Contractor's legal duty to furnish information.

14.16.4 Contractor will send to each labor union or representatives of workers with which it has a collective bargaining Contract or other contract or understanding, a notice to be provided by the County, advising the labor union or workers' representative of Contractor's commitments under Section 202 of Executive Order 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

14.16.5 Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

14.16.6 Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the County and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

14.16.7 In the event of Contractor's noncompliance with the nondiscrimination clauses of this Contract or with any of such rules, regulations, or orders, this Contract may be cancelled, terminated or suspended in whole or in part and Contractor may be declared ineligible for further contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

14.16.8 Contractor will include the provisions of paragraphs 13.15.1 through 13.15.8 in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. Contractor will take such action with respect to any subcontractor or vendor as may be directed to the Secretary of Labor as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, Contractor may request the United States to enter into such litigation to protect the interest of the United States.

## **14.17 Public Records**

14.17.1 Contractor shall comply and shall require all of its Subcontractors to comply with the State of Florida's Public Records Statute (Chapter 119), specifically to:

- (1) Keep and maintain public records that ordinarily and necessarily would be required by the County in order to perform the Services;
- (2) Upon request from the County's custodian of public records, provide the County with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost as provided in Chapter 119, Florida Statutes, or as otherwise provided by Applicable Law;
- (3) Ensure that public records related to this Contract that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by Applicable Law for the duration of this Contract and following expiration of this Contract, or earlier termination thereof, if Contractor does not transfer the records to the County; and
- (4) Upon completion of this Contract, or earlier termination thereof, transfer, at no cost, to the County all public records in possession of Contractor or keep and maintain for inspection and copying all public records required by the County to perform the Work.

14.17.2 If Contractor, upon expiration of this Contract or earlier termination thereof i) transfers all public records to the County, Contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements; and ii) keeps and maintains public records, Contractor shall meet all Applicable Law and requirements for retaining public records. All records stored electronically must be provided to the County, upon request from the County's custodian of public records, in a format that is compatible with the County's information technology systems.

14.17.3 Failure by Contractor to comply with the requirements of this section shall be grounds for immediate, unilateral termination of this Contract by the County.

**IF CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO ITS DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT: (904) 209-0805, [PUBLICRECORDS@SJCFL.US](mailto:PUBLICRECORDS@SJCFL.US), [500 SAN SEBASTIAN VIEW, ST. AUGUSTINE, FLORIDA 32084](#)**

**14.18 Anti-Bribery**

Contractor and its Subcontractors shall at all times during the term of this Contract comply with all anti-bribery and corruption laws that are applicable to the performance of this Contract. Contractor represents that it has not, directly or indirectly, taken any action which would cause it to be in violation of Chapter 838 of the Florida Statutes. Contractor shall immediately notify the County of any violation (or alleged violation) of this provision.

**14.19 Convicted and Discriminatory Vendor Lists, and Scrutinized Companies**

14.19.1 Contractor warrants that neither it nor any Subcontractor is currently on the convicted vendor list or the discriminatory vendor list maintained pursuant to Sections 287.133 and 287.134 of the Florida Statutes, or on any similar list maintained by any other state or the federal government. Contractor shall immediately notify the County in writing if its ability to perform is compromised in any manner during the term of the Contract.

14.19.2 Section 287.135 of the Florida Statutes prohibits agencies from contracting with companies for goods or services that are on the Scrutinized Companies that Boycott Israel List, or with companies that are engaged in a boycott of Israel, and from contracting with companies for goods or services of \$1,000,000 or more that are on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, or are engaged in business operations in Cuba or Syria. The lists are created pursuant to §215.473 and §215.4725, F.S. By execution of this Contract, Contractor certifies that it is not listed on the Scrutinized Companies that Boycott Israel List, the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, and is not engaged in a boycott of Israel or engaged in business operations in Cuba or Syria, and understands that pursuant to §287.135, F.S., the submission of a false certification may subject Contractor to civil penalties, attorney’s fees, and/or costs. In accordance with §287.135, F.S., the County may terminate this Contract if a false certification has been made, or the Contractor is subsequently placed on any of these lists, or engages in a boycott of Israel or is engaged in business operations in Cuba or Syria.

**14.20 Written Notice**

Any and all notices, requests, consents, approvals, demands, determinations, instructions, and other forms of written communication under this Contract shall be validly given when delivered as follows:

- i. Hand delivered to Contractor’s Authorized Representative or hand delivered during normal business hours and addressed as shown below, or
- ii. Delivered by U.S. Mail, electronic mail or commercial express carrier, (postage prepaid, delivery receipt requested), to the following addresses:

St. Johns County  
500 San Sebastian View  
St. Augustine, FL 32084  
Attn: Leigh A. Daniels  
Email Address: [ldaniels@sjcfl.us](mailto:ldaniels@sjcfl.us)

Precon Corporation  
Address: 115 SW 140<sup>th</sup> Terrace  
Newberry, FL 32669  
Attn: Patrick J. Wheeler, Vice President  
Email Address: [mjv@precontanks.com](mailto:mjv@precontanks.com)

*With a copy to:*

St. Johns County  
Office of the County Attorney  
500 San Sebastian View  
St. Augustine, FL 32084  
Email Address: [jferguson@sjcfl.us](mailto:jferguson@sjcfl.us)

Notices shall be deemed to have been given on the date of delivery to the location listed above without regard to actual receipt by the named addressee. County and Contractor may each change the above addresses at any time upon prior written notice to the other party.

\*\*\*\*\*

The authorized representatives hereto have executed this Contract effective as of the Effective Date. Contractor's authorized representative executing this Contract represents that he or she is duly authorized to execute this Contract on behalf of Contractor.

**County:**

**St. Johns County** \_\_\_\_\_ (Seal)  
(Typed Name)

By: \_\_\_\_\_  
(Signature of Authorized Representative)

\_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Date of Execution)

**Contractor:**

\_\_\_\_\_ (Seal)  
(Typed Name)

By: \_\_\_\_\_  
(Signature of Authorized Representative)

\_\_\_\_\_  
(Printed Name)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Date of Execution)

**ATTEST:**  
**St. Johns County, FL**  
**Clerk of Circuit Court & Comptroller**

By: \_\_\_\_\_  
(Deputy Clerk)

\_\_\_\_\_  
(Date of Execution)

**Legally Sufficient:**

\_\_\_\_\_  
(Office of County Attorney)

\_\_\_\_\_  
(Date of Execution)



FORM 1  
**CERTIFICATION OF PAYMENTS TO SUBCONTRACTORS**

Contract No.	22-MCA-PRE-17352
Project Title:	23-11; CR 208 Water Booster Pump Station – Ground Storage Tank Work

The undersigned Contractor hereby swears under penalty of perjury that:

1. Contractor has paid all Subcontractors all undisputed contract obligations for labor, services, or materials provided on this Project within the time period set forth in Sections 218.73 and 218.735, Florida Statutes, as applicable.

2. The following Subcontractors have not been paid because of disputed contractual obligations; a copy of the notification sent to each, explaining the good cause why payment has not been made, is attached to this form:

Subcontractor Name and Address	Date of Disputed Invoice	Amount in Dispute

Contractor’s Authorized Representative executing this Certification of Payments to Subcontractors represents that he or she is duly authorized to execute this Certificate, or if executing on behalf of another, is authorized to do so and that such Authorized Representative is legally bound.

Dated \_\_\_\_\_, 20\_\_

Contractor \_\_\_\_\_

By: \_\_\_\_\_  
 (Signature)

By: \_\_\_\_\_  
 (Name and Title)

STATE OF \_\_\_\_\_ )  
 ) SS.  
 COUNTY OF \_\_\_\_\_ )

The foregoing instrument was acknowledged before me, by means of  physical presence or  online notarization, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_, by \_\_\_\_\_, who is personally known to me or who has produced \_\_\_\_\_ as identification and who did (did not) take an oath.

NOTARY PUBLIC:

Signature: \_\_\_\_\_

Print Name: \_\_\_\_\_

(NOTARY SEAL)

My commission expires:

FORM 2

**CONTRACTOR'S FINAL RELEASE AND WAIVER OF LIEN**

<b>Owner:</b> St. Johns County (hereafter "County")	<b>County Department/Division:</b>
<b>Contract No.:</b> 22-MCA-PRE-17352	<b>Contractor Name:</b> Precon Corporation
<b>Project:</b>	<b>Contractor Address:</b>
<b>Project Address:</b>	<b>Contractor License No.:</b>
<b>Payment Amount:</b>	<b>Amount of Disputed Claims:</b>

The undersigned has been paid in full for all labor, work, services, materials, equipment, and/or supplies furnished to the Project or to the County and does hereby waive and release any notice of lien, any right to mechanic's lien, any bond right, any claim for payment and any rights under any similar ordinance, rule or statute related to a claim or payment rights the undersigned has on the above described Project, except for the payment of Disputed Claims, if any, described below.

The undersigned warrants that he or she either has already paid or will use the monies received from this final payment to promptly pay in full all of its laborers, subcontractors, materialmen and suppliers for all labor, work, services, materials, equipment, or supplies provided for or to the above referenced Project.

Before any recipient of this document relies on it, the recipient should verify evidence of payment to the undersigned.

**Disputed Claims:** The following invoices, pay applications, retention, or extra work are reserved by undersigned from this final payment (if there are no Disputed Claims enter "**None**"):

*None*

Signed this \_\_ day of \_\_\_\_\_, 20\_\_

\_\_\_\_\_  
Contractor/Company Name

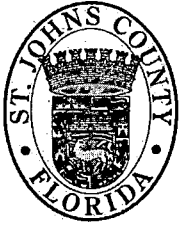
By:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Printed Name

\_\_\_\_\_  
Title

**NOTICE: THIS DOCUMENT WAIVES RIGHTS UNCONDITIONALLY AND STATES THAT YOU HAVE BEEN PAID FOR GIVING UP THOSE RIGHTS. THIS DOCUMENT IS ENFORCEABLE AGAINST YOU IF YOU SIGN IT TO THE EXTENT OF THE PAYMENT AMOUNT OR THE AMOUNT RECEIVED.**



# St. Johns County Board of County Commissioners

Purchasing Division

## NOTICE OF INTENT TO AWARD

December 8, 2022

### **Bid No: 23-11; CR 208 Water Booster Pump Station – Ground Storage Tank Work**

St. Johns County hereby issues this Notice of Intent to Award Precon Corporation as the lowest, responsive, responsible Bidder under the above referenced Invitation for Bids.

Any actual Bidder, Proposer or Supplier who is aggrieved in connection with the Notice of Intent to Award a Contract, where such grievance is asserted to be the result of a violation of the requirements of the St. Johns County Purchasing Policy and associated procedures, or any applicable provision of law by the officers, agents, or employees of the County, may file a Protest to the Assistant Director of Purchasing & Contracts. The Protest must be made in writing and filed by 4:00PM on the fifth business day following the date of the posting of the Notice of Intent to Award, and must be submitted in accordance with Section 13, SJC Purchasing Policy.

Should no Protest be received in response to this Notice the County will proceed with award of a Contract in accordance with SJC Purchasing Policy.

Please forward all correspondence, requests or inquiries directly to Bryan Matus, Senior Purchasing Coordinator, via email at [bmatus@sjcfl.us](mailto:bmatus@sjcfl.us) or phone at 904.209.0148.

**St. Johns County, FL**  
**Board of County Commissioners**  
**Purchasing Division**

A handwritten signature in black ink, appearing to read "Leigh A. Daniels", written over a horizontal line.

Leigh Daniels, CPPB  
Purchasing Manager  
[ldaniels@sjcfl.us](mailto:ldaniels@sjcfl.us)  
(904) 209-0154 - Direct

Date: \_\_\_\_\_

12/8/22



ST. JOHNS COUNTY, FL  
BID TABULATION

**BID NO./TITLE:** 23-11 – CR 208 WATER BOOSTER PUMP STATION  
– GROUND STORAGE TANK WORK

**OPENING DATE:** 12/7/2022  
**OPENED BY:** Bryan Matus  
**VERIFIED BY:** Justin Tahilramani  
**POSTING DATE:** 12/8/2022

BIDDERS	TOTAL BID PRICE						
Precon Corporation	\$2,309,900.00						
CROM, LLC	\$3,396,750.00						

Any actual Bidder who is aggrieved in connection with the Notice of Intent to Award, where such grievance is asserted to be the result of a violation of the requirements of the County's Purchasing Policy and associated procedures, or any applicable provision of law by the officers, agents, or employees of the County, may file a Protest with the Assistant Director of Purchasing & Contracts. The Protest must be submitted in writing, accompanied by a security in the form of a Protest Bond, by 4:00PM on the fifth business day following the date of the posting of the Notice of Intent to Award.

All public records shall become available for inspection and copying pursuant to Chapter 119, Florida Statutes.

**OFFICIAL COUNTY BID FORM  
WITH ATTACHMENTS**



BID NO: 23-11

OFFICIAL COUNTY BID FORM  
ST. JOHNS COUNTY, FLORIDA

TO: THE BOARD OF COUNTY COMMISSIONERS OF ST. JOHNS COUNTY, FLORIDA

DATE SUBMITTED: December 7, 2022

BID PROPOSAL OF

Precon Corporation

Full Legal Company Name of Bidder

115 SW 140th Terrace, Newberry, FL 32669

352-332-1299

352-332-1199

Mailing Address

Telephone Number

Fax Number

Bidders: Having become familiar with requirements of the project, and having carefully examined the Bid Documents entitled for **Bid No: 23-11, CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK** in St. Johns County, Florida, the undersigned proposes to furnish all materials, labor and equipment, supervision and all other requirements necessary to complete the required Work for the following Total Bid Price:

**LUMP SUM BID PRICE:** All cost for all labor, materials, equipment, supplies, taxes, other miscellaneous costs, profit, and overhead, both direct and indirect, for completion of all Work except for those Bid Items herein listed separately.

\$ 2,279,000.00

Lump Sum Bid Price (Written in Numerals)

\$ Two Million Two Hundred Seventy-Nine Thousand and Zero Hundredths

/Dollars

Lump Sum Bid Price (Written in Words)

**UNIT PRICE TOTAL COST:** Supplying, hauling, backfilling and compacting structural fill for GST. Payment will be based on actual quantities for the Unit Price item.

\$ 38.00

X

550 CY (Estimated)

=

\$ 20,900.00

**ALLOWANCE 1:** Allowance for Materials Testing

\$ 5,000.00

**ALLOWANCE 2:** Allowance for Permitting

\$ 5,000.00

**TOTAL BID PRICE:** Total amount calculated by adding the Lump Sum Bid Price, Unit Price Total Cost, Allowance 1, and Allowance 2 amounts together to determine the Total Bid Price for completion of this Project.

\$ 2,309,900.00

Total Bid Price (Written in Numerals)

\$ Two Million Three Hundred Nine Thousand Nine Hundred and Zero Hundredths

/Dollars

Total Bid Price (Written in Words)

Bidder shall insert the Lump Sum Bid Price and the Total Bid Price above, in numerals and in words. The Total Bid Price shall consist of the lump sum price for the project, unit pricing request, and allowances.

During the preparation of the Bid, the following addenda, if any, were received:

No.: <u>1</u>	Date Received: <u>11/22/22</u>	No.: _____	Date Received: _____
No.: <u>2</u>	Date Received: <u>11/29/22</u>	No.: _____	Date Received: _____
No.: _____	Date Received: _____	No.: _____	Date Received: _____

The Undersigned hereby declares that no person or persons, firm, or corporation, other than the undersigned are interested in this submitted Bid, as principals, and that this Bid is made without collusion with any person, firm, or corporation, and the undersigned has carefully examined, is thoroughly familiar with, and has incorporated the requirements and specifications of the Bid Documents in this submitted Bid.

The Undersigned certifies that a full examination of the locations of the required work and the sources of supply of materials has been completed, and agrees to furnish all necessary labor, equipment and materials, fully understanding that any quantities shown herein are approximate only, and will fully complete all work in accordance with all requirements specified in the Bid Documents.

The Undersigned declares that the statements and representations made in this Bid are true in every respect and that the Bid is, in all respects, fair and made without collusion or fraud, and that no member of the St. Johns County Board, or any other agent or employee of the County, directly or indirectly, is interested in this Bid or in any profits expected to accrue therefrom.

**CORPORATE/COMPANY**

Full Legal Company Name: Precon Corporation (Seal)

By: *Patrick J. Wheeler* Patrick J. Wheeler, Vice President  
 Signature of Authorized Representative (Name & Title typed or printed)

Address: 115 SW 140th Terrace, Newberry, FL 32669

Telephone No.: (352) 332-1200 Fax No.: (352) 332-1199

Email Address for Authorized Company Representative: mjv@precontanks.com

Federal I.D. Tax Number: 59-2045133 DUNS #: 03-241-9913  
(If applicable)

**INDIVIDUAL**

Name: \_\_\_\_\_  
 (Signature) (Name typed or printed) (Title)

Address: \_\_\_\_\_

Telephone No.: ( ) \_\_\_\_\_ Fax No.: \_\_\_\_\_

Email Address: \_\_\_\_\_

Federal I.D. Tax Number: \_\_\_\_\_

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

**ATTACHMENT "A"  
ST. JOHNS COUNTY AFFIDAVIT**

Bidder hereby issues the sworn statement below, which must be incorporated into the submitted Bid. This sworn statement shall be an affidavit in the following form, executed by an officer of the firm, association, or corporation submitting the Bid, and shall be sworn to before a person who is authorized by law to administer oaths.

STATE OF FLORIDA

COUNTY OF ALACHUA

The Undersigned authority, Deborah A. Dupree ("Affiant"), who being duly sworn, deposes and states that he/she is the Secretary (Title) of the firm of Precon Corporation (Full Legal Name of Bidder) submitting the attached Bid for the completion of work specified in the Bid Documents for Bid No: 23-11 CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK, in St. Johns County, Florida.

The Affiant further states that no more than one Bid will be submitted in response to the above IFB from the Affiant, the bidding firm, or corporation under the same or different name, and that such Bidder has no financial interest in any other bidding firm submitting a Bid in response to the above IFB. That neither the Affiant, his/her firm, association, nor corporation has either directly or indirectly entered into any agreement, participated in any collusion, nor otherwise taken any action in restraint of free competitive bidding in connection with this Bid. Furthermore, neither the Bidder nor any of its officers are barred from participating in public contract lettings in the State of Florida or any other state.

DATED this 5th day of December, 2022.

Deborah A. Dupree  
Signature of Affiant

Deborah A. Dupree, Secretary  
Printed Name & Title of Affiant

Precon Corporation  
Full Legal Name of Bidder

Sworn to (or affirmed) and subscribed before me by means of  physical presence or  online notarization, this 5th day of December, 2022, by Affiant who is personally known to me or has produced as identification. Type and number of I.D. produced: \_\_\_\_\_.

Terril G. Matchett

Notary Public  
My Commission Expires: \_\_\_\_\_



**BIDDER MUST EXECUTE AND ATTACH THIS AFFADAVIT TO SUBMITTED BID.**

**ATTACHMENT "B"**  
**CERTIFICATE AS TO CORPORATE PRINCIPAL**

I, Deborah A. Dupree, certify that I am the Secretary of the corporation named as Principal in the foregoing; that Patrick J. Wheeler, (Authorized Representative of Bidder) who signed the Bond(s) on behalf of the Bidder, was then Vice President (Title) of said corporation; that I know his/her signature; and his/her signature thereto is genuine; and that said bond(s) was duly signed, sealed, and attested to on behalf of said corporation by authority of its governing body.

Deborah A. Dupree  
Signature of Secretary Deborah A. Dupree

Precon Corporation  
Full Legal Name of Bidder

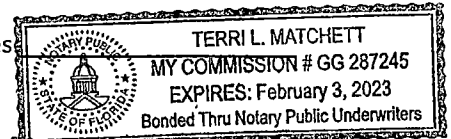
STATE OF FLORIDA

COUNTY OF ALACHUA

Before and by me, a Notary Public duly commissioned, qualified and acting personally, being duly sworn upon oath by means of  physical presence or  online notarization, Affiant states that he/she is authorized to execute the foregoing Bid Bond on behalf of the Bidder named therein in favor of St. Johns County, Florida.

Subscribed and sworn to me on this 5th day of December, 2022, by the Authorized Representative of Bidder, who is personally known to me or has produced \_\_\_\_\_ as identification. Type and Number of I.D. produced: \_\_\_\_\_.

Terril L. Matchett  
Notary Public  
My Commission Expires \_\_\_\_\_



(Attach Power of Attorney to original Bid Bond and Financial Statement of surety company)

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

**ATTACHMENT "C"**  
**LICENSE / CERTIFICATION LIST**

Bidder shall list all **current** licenses and certifications held by the firm and/or Key Personnel of the Bidder. Failure to demonstrate any required licenses or certifications which are stated as a minimum qualification, shall be grounds for disqualification and removal from further consideration. A copy of each license or associated document(s) shall be attached to this form and submitted with the Bid.

License Name	License #	Issuing Agency	Expiration Date
State of Florida Business License			
FL Certified General Contractor's License	CGC002671	State of Florida Construction Industry Licensing Board	8/31/24
FL Certified Underground Utility Contractor			





Ron DeSantis, Governor

Melanie S. Griffin, Secretary



**STATE OF FLORIDA  
DEPARTMENT OF BUSINESS AND PROFESSIONAL REGULATION**

**CONSTRUCTION INDUSTRY LICENSING BOARD**

THE GENERAL CONTRACTOR HEREIN IS CERTIFIED UNDER THE  
PROVISIONS OF CHAPTER 489, FLORIDA STATUTES

**MOORE, RICHARD G**

PRECON CORPORATION  
115 NW 140TH TER  
NEWBERRY FL 32669-9667

**LICENSE NUMBER: CGC002671**

**EXPIRATION DATE: AUGUST 31, 2024**

Always verify licenses online at [MyFloridaLicense.com](http://MyFloridaLicense.com)



Do not alter this document in any form.

This is your license. It is unlawful for anyone other than the licensee to use this document.

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

**ATTACHMENT "D"  
LIST OF PROPOSED SUB-CONTRACTORS / SUPPLIER LIST**

Bidder shall submit any and all proposed sub-contractors and major material suppliers below for review/approval by the County. Bidder shall attach any and all licenses or certifications required for the proposed sub-contractor to perform the intended portion of the Work as stated below. All subcontractors and major materials suppliers are subject to approval of County.

<b>Company Name</b>	<b>Division/Discipline</b>	<b>Primary Contact Name</b>	<b>Contact Number and Email Address</b>
Sims Trucking, Inc.	Site Work	Lee Sims	904-819-0375

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

**ATTACHMENT "E"**  
**CONFLICT OF INTEREST DISCLOSURE FORM**

Project (BID) Number/Description: Bid No: 23-11 CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK

The term "conflict of interest" refers to situations in which financial or other considerations may adversely affect, or have the appearance of adversely affecting a Bidder's professional judgment in completing work for the benefit of St. Johns County ("County"). The bias such conflicts could conceivably impart may inappropriately affect the goals, processes, methods of analysis or outcomes desired by the County.

Contractors are expected to safeguard their ability to make objective, fair, and impartial decisions when performing work for the benefit of the County. Contractors, therefore must there avoid situations in which financial or other considerations may adversely affect, or have the appearance of adversely affecting the consultant's/contractor's professional judgement when completing work for the benefit of the County.

The mere appearance of a conflict may be as serious and potentially damaging as an actual distortion of goals, processes, methods of analysis or outcomes. Reports of conflicts based upon appearances can undermine public trust in ways that may not be adequately restored even when the mitigating facts of a situation are brought to light. Apparent conflicts, therefore, should be disclosed and evaluated with the same vigor as actual conflicts.

It is expressly understood that failure to disclose conflicts of interest as described herein may result in immediate disqualification from evaluation or immediate termination from work for the County.

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Please check the appropriate statement:



I hereby attest that the undersigned Bidder has no actual or potential conflict of interest due to any other clients, contracts, or property interests for completing work on the above referenced project.



The undersigned Bidder, by attachment to this form, submits information which may be a potential conflict of interest due to other clients, contracts or property interests for completing work on the above referenced project.

Full Legal Name of Bidder:

Precon Corporation

Authorized Representative(s):

Patrick Wheeler

Signature

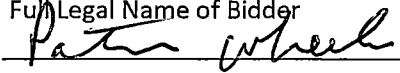
Patrick J. Wheeler, Vice President

Print Name/Title

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

**ATTACHMENT "F"**  
**CONTRACTOR'S QUALIFICATIONS FORM**

Bidder certifies, and has attached to the submitted Bid proof of current and valid licensure to perform the Work in the State of Florida and St. Johns County, and as specified in the Bid Documents. Any material misrepresentation, as determined by the County, shall result in disqualification.

By: Precon Corporation  
 Full Legal Name of Bidder  
  
 Authorized Representative Signature  
 Patrick J. Wheeler, Vice President

12/5/22  
 Date

**Contractor's Project Experience**

Bidder must be fully licensed to do business in the State of Florida and hold a current Certified General Contractor's or Certified Underground Utility Contractor's license at the time the bid is due. Bidders must have successfully completed, as a Prime Contractor or Sub-Contractor, at least three (3) projects, in the past seven (7) years, of similar type, size, with a similar scope and dollar value of the project described herein.

SEE ATTACHED REFERENCES

<b>Contractor's Project Experience Details</b>	
<b>Project No. 1</b>	
Name of Project:	
Project Manager Name:	
Superintendent Name:	
Project Description:	
<b>Owner Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	
<b>Engineer/Architect Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	
<b>Contract Dates</b>	

<b>Contractor's Project Experience Details</b>	
<b>Project No. 1</b>	
Started:	
Original Contractual Completion:	
Final Contractual Completion:	
Actual Completion:	
<b>Contract Value</b>	
Original Contract Value:	
Final Contract Value:	
Value of Change Orders to Date:	
Value of Outstanding Claims to Date:	
<b>Bonding Company Information - for all jobs</b>	
Name:	Florida Surety Bonds
Address:	620 N. Wymore Road, Suite 200
Contact Person:	Jeff Reich
Telephone Number:	407-786-7770
<b>Major Subcontractor Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	
Name:	
Address:	
Contact Person:	
Telephone Number:	
Name:	
Address:	
Contact Person:	
Telephone Number:	



<b>Contractor's Project Experience Details</b> <b>Project No. 2</b>	
Name of Project:	
Project Manager Name:	
Superintendent Name:	
Project Description:	
<b>Owner Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	
<b>Engineer/Architect Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	
<b>Contract Dates</b>	
Started:	
Original Contractual Completion:	
Final Contractual Completion:	
Actual Completion:	
<b>Contract Value</b>	
Original Contract Value:	
Final Contract Value:	
Value of Change Orders to Date:	
Value of Outstanding Claims to Date:	
<b>Bonding Company Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	

Contractor's Project Experience Details Project No. 2	
Major Subcontractor Information	
Name:	
Address:	
Contact Person:	
Telephone Number:	
Name:	
Address:	
Contact Person:	
Telephone Number:	
Name:	
Address:	
Contact Person:	
Telephone Number:	

<b>Contractor's Project Experience Details</b> <b>Project No. 3</b>	
Name of Project:	
Project Manager Name:	
Superintendent Name:	
Project Description:	
<b>Owner Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	
<b>Engineer/Architect Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	
<b>Contract Dates</b>	
Started:	
Original Contractual Completion:	
Final Contractual Completion:	
Actual Completion:	
<b>Contract Value</b>	
Original Contract Value:	
Final Contract Value:	
Value of Change Orders to Date:	
Value of Outstanding Claims to Date:	
<b>Bonding Company Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	

Contractor's Project Experience Details Project No. 3	
Major Subcontractor Information	
Name:	
Address:	
Contact Person:	
Telephone Number:	
Name:	
Address:	
Contact Person:	
Telephone Number:	
Name:	
Address:	
Contact Person:	
Telephone Number:	

**Ground Storage Tank Experience:** SEE ATTACHED REFERENCES

The Bidder shall provide evidence of successfully designing, constructing, and placing into operation a minimum of ten (10) wire wrapped prestressed concrete tanks conforming to ANSI/AWWA D110 with Type II core wall(s) that have been put into service within the last 10 years of similar size of that being proposed.

Ground Storage Tank Experience Details Tank No. 1:	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

Ground Storage Tank Experience Details Tank No. 2:	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

Ground Storage Tank Experience Details Tank No. 3:	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

Ground Storage Tank Experience Details Tank No. 4:	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

Ground Storage Tank Experience Details Tank No. 5:	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	



Ground Storage Tank Experience Details Tank No. 6:	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

Ground Storage Tank Experience Details Tank No. 7:	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

Ground Storage Tank Experience Details Tank No. 8:	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

Ground Storage Tank Experience Details Tank No. 9:	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

<b>Ground Storage Tank Experience Details</b> <b>Tank No. 10:</b>	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

**Staff Experience:**

As part of the minimum qualifications, the Bidder shall provide resumes of the following staff members:

- Full-time professional engineer registered in the state of Florida, having no less than five (5) years of experience in the design and field construction of circular prestressed composite tanks.
- Foreman supervising the placing of the shotcrete having no less than five (5) years of experience as a nozzleman.
- Shotcrete nozzleman having no less than five (5) years of experience on similar application.

Resumes should include any licenses, certificates and credentials along with a copy of each document that provide evidence of qualifications as stated in the minimum qualifications section of this Bid.

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

**ATTACHMENT "G"**  
**DRUG-FREE WORKPLACE FORM**

The undersigned firm, in accordance with Florida Statute 287.087 hereby certifies that

Precon Corporation does:  
Name of Firm

1. Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.
2. Inform employees about the danger of drug abuse in the workplace, the business' policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation, employee assistance programs and the penalties that may be imposed upon employees for drug abuse violations.
3. Give each employee engaged in providing the contractual services that are described in St. Johns County's request for proposals to provide bond underwriter services a copy of the statement specified in paragraph 1.
4. In the statement specified in paragraph 1, notify the employees that, as a condition of working on the contractual services described in paragraph 3, the employee will abide by the terms of the statement and will notify the employer of any conviction of, or plea of guilty or nolo contendere to, any violation of Florida Statute 893, as amended, or of any controlled substance law of the United States or any state, for a violation occurring in the workplace no later than five (5) days after such conviction or plea.
5. Impose a sanction on, or require the satisfactory participation in a drug abuse assistance or rehabilitation program if such is available in the employee's community by, any employee who is so convicted.
6. Consistent with applicable provisions with State or Federal law, rule, or regulation, make a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs 1 through 5.

As the person authorized to sign this statement, I certify that this firm complies fully with the above requirements.



Signature Patrick J. Wheeler, Vice President

December 5, 2022

Date

ATTACHMENT "H"  
**CLAIMS, LIENS, LITIGATION HISTORY**  
(Complete and Submit)

1. Within the past 7 years, has your organization filed suit or a formal claim against a project owner (as a prime or subconsultant) or been sued by or had a formal claim filed by an owner, subconsultant or supplier resulting from a construction dispute? Yes \_\_\_ No  If yes, please attach additional sheet(s) to include:

Description of every action Captions of the Litigation or Arbitration

Amount at issue: \_\_\_\_\_ Name (s) of the attorneys representing all parties:

Amount actually recovered, if any: \_\_\_\_\_

Name(s) of the project owner(s)/manager(s) to include address and phone number:

2. List all pending litigation and or arbitration.

Suit vs. Arch Insurance on payment bond where contractor went out of business. Agreement has been reached.

3. List and explain all litigation and arbitration within the past seven (7) years - pending, resolved, dismissed, etc.

Three suits against Sureties where contractor (same in all) went out of business. Settled or agreement in all three.

4. Within the past 7 years, please list all Liens, including Federal, State and Local, which have been filed against your Company. List in detail the type of Lien, date, amount and current status of each Lien.

None

5. Have you ever abandoned a job, been terminated or had a performance/surety bond called to complete a job?

Yes \_\_\_\_\_ No  If yes, please explain in detail:

6. For all claims filed against your company within the past five (5) years, have all been resolved satisfactorily with final judgment in favor of your company within 90 days of the date the judgment became final? Yes \_\_\_ No \_\_\_ If no, please explain why?

N/A

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7. List the status of all pending claims currently filed against your company:

N/A

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**Liquidated Damages**

1. Has a project owner ever withheld retainage, issued liquidated damages or made a claim against any Performance and Payment Bonds? Yes \_\_\_\_\_ No X If yes, please explain in detail:

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**(Use additional or supplemental pages as needed)**

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

**ATTACHMENT "I"**  
**E-VERIFY AFFIDAVIT**

STATE OF FLORIDA  
COUNTY OF ALACHUA

I, Patrick J. Wheeler ("Affiant"), being duly authorized by and on behalf of Precon Corporation ("Bidder") hereby swears or affirms as follows:

1. Bidder understands that E-Verify, authorized by Illegal Immigration Reform and Immigrant Responsibility Act of 1996 (IIRIRA), is a web-based system provided by the United States Department of Homeland Security, through which employers electronically confirm the employment eligibility of their employees.
2. For the duration of Contract No. Bid No. 23-11 (hereinafter "Agreement"), in accordance with section 448.095, F.S., Bidder shall utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired by the Bidder and shall expressly require any subcontractors performing work or providing services pursuant to the Agreement to likewise utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired by the subcontractor.
3. Bidder shall comply with all applicable provisions of section 448.095, F.S., and will incorporate in all subcontracts the obligation to comply with section 448.095, F.S.
4. Bidder understands and agrees that its failure to comply with all applicable provisions of section 448.095, F.S. or its failure to ensure that all employees and subcontractors performing work under the Agreement are legally authorized to work in the United States and the State of Florida constitute a breach of the Agreement for which St. Johns County may immediately terminate the Agreement without notice and without penalty. The Bidder further understands and agrees that in the event of such termination, Bidder shall be liable to the St. Johns County for any costs incurred by the St. Johns County resulting from Bidder's breach.

DATED this 5th day of December, 2022.

Patrick Wheeler

Signature of Affiant

Patrick J. Wheeler, Vice President  
Printed Name & Title of Affiant

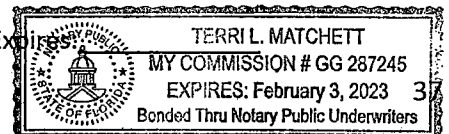
Precon Corporation  
Full Legal Name of Bidder

Sworn to (or affirmed) and subscribed before me by means of  physical presence or  online notarization, this 5th day of Dec., 2022, by Affiant, who is personally known to me or has produced as identification.

Terril L. Matchett

Notary Public

My Commission Expires





**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

**ATTACHMENT "J"**  
**LOCAL PREFERENCE**

Any Bidder that meets the criteria of a Local Business, in accordance with Section 16.3 of the SJC Purchasing Policy, must complete and sign this form to indicate their qualification to receive local preference. All required documentation to demonstrate that the Bidder meets all qualification criteria as a local business must be included in the submitted Bid.

In order to qualify for local preference Respondent must provide sufficient documentation to demonstrate:

- A physical, brick and mortar place of business located within the geographic boundaries of St. Johns County, with a valid mailing address, in an area zoned for the conduct of such business, from which the Supplier has operated or performed business on a day-to-day basis that is substantially similar to those specified in the solicitation for a period of at least one (1) calendar year prior to the issuance of the solicitation. No PO Boxes shall be accepted.
- Local address above must be registered as the Supplier's principal place of business with the Divisions of Corporations Florida Department of State for at least one (1) calendar year prior to the issuance of this BID.
- Submit current and valid Local Business Tax Receipt, and must have Local Business Tax Receipts issued by the St. Johns County Tax Collector from at least one (1) calendar year prior to issuance of this BID.
- Must qualify as a local business as shown above **AND** self-perform a minimum of fifty percent (50%) of all services under the awarded Contract, or must have a minimum of fifty percent (50%) of all services performed by qualified local businesses as sub-contractors or sub-consultants.

If qualifying for local preference through the use of qualified local sub-contractors, Bidder must submit all required documentation to demonstrate the above requirements of all proposed sub-contractors and sub-consultants for local preference consideration with the submitted proposal.

Bidder is a Local Business as defined in Section 16.3, SJC Purchasing Policy \_\_\_\_\_

Bidder is **not** a Local Business as defined in Section 16.3, SJC Purchasing Policy \_\_\_\_\_

X



Signature – Authorized Respondent Representative

Patrick J. Wheeler, Vice President

Printed Name & Title

December 5, 2022

Date of Signature



Prestressed Concrete Tanks

## PRECON CORPORATION

115 S.W. 140th Terrace  
Newberry, Florida 32669  
(352) 332-1200 Fax 332-1199

### REFERENCES

<u>YEAR</u>	<u>SCOPE</u>	<u>ENGINEER</u>	<u>OWNER</u>
2013	2,000,000 Gallon Reclaimed Storage Tank 100'-0" I.D. x 34'-1" W.H. 2 - 600,000 Gallon Clarifiers 75'-0" I.D. x 18'-1" W.H. 500,000 Gallon Sludge Holding Tank 65'-0" I.D. x 18'-9" W.H.	CDM Smith Jacksonville, FL Cecile Toupiol, PE 904-527-6720	St. Johns County St. Augustine, FL
2015	1,500,000 Gallon Reuse Storage Tank 100'-0" I.D. x 25'-6" W.D.	Precon Corporation Newberry, FL James Gravesen, PE 352-332-1200	St. Johns County St. Augustine, FL Scott Trigg 904-209-2622
2016	2,000,000 Gallon Ground Storage Tank 120'-0" I.D. x 23'-6" W.D.	Precon Corporation Newberry, FL James Gravesen, PE 352-332-1200	St. Johns County St. Augustine, FL Scott Trigg 904-209-2622
2017	2,000,000 Gallon Ground Storage Tank 125'-0" I.D. x 21'-9 1/2" W.D. 2 - 620,000 Gallon Clarifiers 75'-0" I.D. x 18'-8" W.H. 264,000 Gallon Sludge Tank 50'-0" I.D. x 20'-0" W.H.	Mott MacDonald Jacksonville, FL Leslie Samel, PE 704-249-6592	St. Johns County St. Augustine, FL Scott Trigg 904-209-2622
2017	3,000,000 Gallon Water Storage Tank 141'-0" I.D. x 25'-9" W.D.	Hazen & Sawyer Orlando, FL Derek Bieber, PE 407-367-2626	Orange County BOCC Orlando, FL Terra Reffitt 407-947-9802
2017	1,121,000 Gallon Oxidation Ditch 221'-0" L x 48'-0" W x 15'-0" H 423,000 Gallon Digester 56'-0" I.D. x 23'-0" W.H. 380,000 Gallon Clarifier 62'-0" I.D. x 16'-9" W.H.	Mott MacDonald Jacksonville FL Leslie Samel, PE 704-249-7592	City of Lake City, FL Jason Sparks, PE 386-719-5788
2017	4,000,000 Gallon EQ Tank 175'-0" I.D. x 21'-10" W.H.	CH2M Atlanta, GA Steve Ratzlaff, PE 770-604-9095	Forsyth County Cumming, GA Barry Lucas, PE 770-886-2793
2018	2,500,000 Gallon Ground Storage Tank 120'-0" I.D. x 30'-7 1/2" W.D.	Carollo Orlando, FL Tonya Kay, PE 407-377-4306	JEA Jacksonville, FL Hai X. Vu, PE 904-665-4028
2018	1,000,000 Gallon Ground Storage Tank 66'-0" I.D. x 40'-0" W.D.	Williams, Sweitzer & Barnum Rome, GA Robert Moss, PE 706-802-7896	Floyd County, GA Steve Hulsey 706-291-5130

<u>YEAR</u>	<u>SCOPE</u>	<u>ENGINEER</u>	<u>OWNER</u>
2018	2,000,000 Gallon Ground Storage Tank 125'-0" I.D. x 21'-9 1/2" W.D. 2 – 620,000 Gallon Clarifiers 75'-0" I.D. x 18'-8" W.H. 264,000 Gallon Sludge Tank 50'-0" I.D. x 20'-0" W.H.	Mott MacDonald Jacksonville, FL Leslie Samel, PE 904-203-1090	St. Johns County St. Augustine, FL Scott Trigg 904-209-2622
2018	950,000 Gallon SBR 85'-8 3/8" I.D. x 22'-0" W.H. 137,000 Gallon Digester 36'-0" I.D. x 18'-0" W.H.	Barge, Waggoner, Sumner & Cannon Nashville, TN 815-254-1500	City of McEwen, TN 931-582-6211
2019	3,000,000 Gallon Ground Storage Tank 118'-0" I.D. x 36'-0" W.D. 5,000,000 Gallon Ground Storage Tank 145'-0" I.D. x 40'-6" W.D.	Brown & Caldwell Atlanta, GA Scott Adams 770-394-2997	Forsyth County, GA Barry Lucas 770-886-2793
2019	2,000,000 Gallon Reservoir 92'-3" I.D. x 40'-0" W.D.	Peoples & Quigley, Inc. Sandy Springs, GA Robert Peoples 404-455-2650	City of Calhoun, GA David Burnett
2019	500,000 Gallon Wash Water Tank 56'-0" I.D. x 27'-0" W.D.	Wiedeman & Singleton, Inc. Norcross, GA Ahmed An-naim, PE 470-225-4004	City of Cartersville, GA Bob Jones 770-607-1148
2020	3,000,000 Gallon EQ Tank 110'-0" I.D. x 43'-9" W.D.	GRW, Inc. Louisville, KY Tyler Bridges, PE 502-484-8484	Paducah-McCracken Joint Paducah, KY Josh Webb, PE 270-575-0056
2020	2,000,000 Gallon Reclaimed Water Tank 100'-0" I.D. x 34'-1" W.D. 1,000,000 Gallon Reclaimed Water Tank 75'-0" I.D. x 30'-4" W.D.	Tetra Tech Orlando, FL Scott Smith 407-480-3961	City of Winter Garden, FL
2020	Two 2,000,000 Gallon Ground Storage Tanks 110'-0" I.D. x 28'-2" W.D.	Tetra Tech Orlando, FL Brenda Keenan 407-839-3955	Orange County FL Board of Co. Commissioners – Utility Dept.
2020	1,100,000 Gallon Ground Storage Tank 80'-0" I.D. x 30'-4" W.D.	CDM Smith Jacksonville, FL Yanni Polematidis, PE 904-527-6722	JEA Jacksonville, FL Allan Boree, PE 904-665-4468
2021	10,000,000 Gallon EQ Tank 238'-0" I.D. x 31'-0" W.D.	Hazen and Sawyer Fairfax, VA Diala Dandach 703-218-2034	Loudoun Water Ashburn, VA Rick Zaepfel, PE 571-291-6504
2021	5,000,000 Gallon Ground Storage Tank 186'-0" I.D. x 25'-0" W.D.		Regional Utilities Santa Rosa Beach, FL Dylan Laird, PE 850-231-5114
2021	1,380,000 Gallon Reclaimed Storage Tank 100'-0" I.D. x 23'-5 3/4" W.D.	Mott MacDonald Jacksonville, FL Leslie Samel 904-203-1081	JEA Jacksonville, FL Brian Gaines 904-654-9207
2021	1,250,000 Gallon Ground Storage Tank 80'-0" I.D. x 35'-3" W.D.	Gresham Smith & Partners Nashville, TN Sterling Brenneis 615-770-8100	Clarksville Gas, Waer & Sewer Clarksville, TN Mark Riggins 931-645-7400

PATRICK J. WHEELER, P.E.

- Project Manager
- Vice President, Precon Corporation

### Summary

EDUCATION: Bachelor of Science in Civil Engineering  
Rensselaer Polytechnic Institute, 1991

REGISTRATION: Professional Engineer  
FL, GA, NC, TN, VA

Mr. Wheeler has worked for Precon functioning as a Project Manager for over twenty years.

Mr. Wheeler completed four years in the U.S. Army Field Artillery upon graduation and was honorably discharged at the rank of Captain. In 1995 he started his employment with Precon and today holds the office of Vice President and serves as a Project Manager.

Typically, Mr. Wheeler manages those projects that are most complex and which involve extensive site preparation, piping, tank construction, and client relations.

Projects with applicability to the proposed project include:

- North Fulton County 4 MG Water Storage Tank, Fulton County, GA  
Project Manager responsible for the tank and project performance of tank and related work. Includes interaction with design engineer and owner.

Precon was the design, build lead on this project and contracted directly with the county. The project included a 4 MG reservoir along with interconnecting piping, valve vaults, extensive site work, landscaping, electrical, and paving at an undeveloped site. For the design phase of the project, Precon employed a local engineer and worked closely with him. The project involved a 4 MG reservoir 122' I.D. x 46' W.D. The project involved extensive excavation for the present tank and for a future tank in an environmentally sensitive area. The design involved working closely with the county and active citizen environmental groups. The project also included aesthetic fencing and interconnecting piping along with a valve vault with altitude valve controls and bypass piping. Much emphasis was placed on on-site landscaping to blend in and to hide the facility. All the work was self-performed with the exception of the electrical, instrumentation, and fencing. The project was finished timely with no disputes.

- Lanier Filter Plant Clearwell Improvements, Gwinnett County, GA  
Project Manager responsible for the tank and project performance of tank and related work. Includes interaction with design engineer and owner.

Precon constructed the 20 MG reservoir as a subcontract. The reservoir had dimensions of 290' I.D. and 41' W.D. The floor of the tank was cast in one pour. The walls were typical AWWA D-110 with wire prestressing and a diaphragm. The roof was a free span dome, 290' in diameter. The tank was finished timely with no disputes.

- Fiveash WTP Reservoir Addition, Ft. Lauderdale, FL  
Project Manager responsible for the tank and project performance of tank and related work. Includes interaction with design engineer and owner.

Precon was responsible for the entire project contracted as a general contractor directly with the city which included: 7,000,000 gallon reservoir, interconnecting piping, site work, landscaping, electrical, and paving at an existing water treatment plant.

The 7 MG reservoir had dimensions of 190' I.D. x 30' W.D. and was to match three others on the same site. The site preparation included dewatering, removal and replacement of 10' of excavated material. Piping included tying into existing lines and tanks, and consisted mostly of 30" D.I.P. but also included some up to 54". The work was self-performed except for landscape plants, electrical, asphalt paving, and some pipe installation. The project was finished timely with no disputes.

- Lithia WTP Expansion, Hillsborough County, FL  
Project Manager responsible for the tank and project performance of tank and related work. Includes interaction with design engineer and owner.

Precon was responsible for the entire project and functioned as a general contractor, contracting directly with the owner which included: 5,000,000 gallon reservoir, interconnecting piping, site work, landscaping, electrical, paving, instrumentation, valve and maintenance building, elevated aerator platforms at an existing water treatment plant.

The 5 MG reservoir had dimensions of 160' I.D. x 33' W.D. and was to match the two similar tanks on the same project. The site preparation was simple in that the tank was built close to the existing grade. The piping tie-ins involved reworking existing valve vaults, laying and tying in piping up to 54", steel and prestressed pipe. The work was self-performed except for the electrical and asphalt paving. The project was finished timely with no disputes.



Ron DeSantis, Governor

Melanie S. Griffin, Secretary



**FBPE**  
FLORIDA BOARD OF  
PROFESSIONAL ENGINEERS

## STATE OF FLORIDA

### BOARD OF PROFESSIONAL ENGINEERS

THE PROFESSIONAL ENGINEER HEREIN IS LICENSED UNDER THE  
PROVISIONS OF CHAPTER 471, FLORIDA STATUTES

**WHEELER, PATRICK JAY**

115 SW 140TH TERRACE  
NEWBERRY FL 32669

**LICENSE NUMBER: PE55554**

**EXPIRATION DATE: FEBRUARY 28, 2025**

Always verify licenses online at [MyFloridaLicense.com](http://MyFloridaLicense.com)



Do not alter this document in any form.

This is your license. It is unlawful for anyone other than the licensee to use this document.

ALAN WORKMAN  
- Superintendent

Mr. Workman has been building tanks for Precon for over 30 years.

Below is a partial list of tanks he has built per AWWA D-110 Type II:

5,000,000 Gallon Reclaimed Water Tank	Panama City Beach, FL
4,000,000 Gallon Ground Storage Tank	
2,000,000 Gallon Ground Storage Tank	Apopka, FL
3 – 2,000,000 Gallon Ground Storage Tanks	Brooksville, FL
EQ Tank	Key Largo, FL
Digester	
2 – SBR Tanks	
Two – 6,000,000 Gallon Reservoirs	Alcoa, TN
2,000,000 Gallon Ground Storage Tank	Seymour, TN
3,000,000 Gallon Ground Storage Tank	Schriever, LA
550,000 Gallon Permeate Storage Tank	Mulberry, FL
400,000 Gallon Thickened Sludge Tank	
200,000 Gallon UIC Mix Tank	
3,000,000 Gallon Reclaimed Water Tank	Clermont, FL
500,000 Gallon Sludge Holding Tank	St. Augustine, FL
2,000,000 Reclaimed Storage Tank	
3,000,000 Gallon Ground Storage Tank	Orlando, FL
3,000,000 Gallon Reclaimed Water Tank	Apopka, FL
15,000,000 Gallon Reject Water Storage Tank	St. Petersburg, FL



# Certificate of Completion

*This verifies that*

Alan Workman

is certified as a

Shotcrete Nozzleman

In Substantial Accordance with ACI 506R-16 and CP-60(15)



UNITED  
CONSULTING

United Consulting  
625 Holcomb Bridge Road  
Norcross, GA 30071  
(770) 209-0029

April 22, 2022

Exam Date

June 1, 2022

Certificate Date

Patrick J. Carr, P.E.  
Proctor

Timothy J. Beck, P.G.  
Proctor

# Certificate of Completion

*This verifies that*

Arsulio Laparra

is certified as a

Shotcrete Nozzleman

In Substantial Accordance with ACI 506R-16 and CP-60(15)



**UNITED  
CONSULTING**

United Consulting  
625 Holcomb Bridge Road  
Norcross, GA 30071  
(770) 209-0029

April 22, 2022

Exam Date

June 1, 2022

Certificate Date

Patrick J. Carr, P.E.  
Proctor

Timothy J. Beck, P.G.  
Proctor

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**  
Executed in 1 Counterpart

**BID BOND**

STATE OF Florida

COUNTY OF St. Johns

KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned Precon Corporation (Full Legal Name of Bidder) as Principal, at 115 SW 140th Terrace , Newberry, FL 32669 (Address) and Great American Insurance Company as Surety, hereby hold and firmly bind ourselves, our heirs, executors, administrators, and successors and assigns, jointly and severally, by these presents, unto St. Johns County, Florida, as Obligee, in the penal sum of five percent (5%) of the Total Bid Price, or one hundred fifteen thousand four hundred Dollars (\$ 115,495.00 ) lawful money of the United States. ninety five and 00 cents

WHEREAS, the Principal has submitted a Bid for **Bid No: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK** dated December 7th, 2022:

- (a) If the Principal shall not withdraw said Bid within ninety (90) days of the opening of Bids by the Owner, and shall enter into a written Contract with the County within ten (10) business days after prescribed forms are provided to Principal for signature, in accordance with the Bid Documents, and give Bond with good and sufficient Surety or Sureties, as may be required, for the faithful performance and proper fulfillment of such Contract, then the above obligations shall be void and of no effect, otherwise to remain in full force and effect.
- (b) In the event of the withdrawal of said Bid within the period specified, or the failure to enter into such Contract and give such Bond within the time specified, the Principal shall pay the County the lesser of the following amounts: 1) the amount of this bond as hereinabove set forth, of 2) the difference between the amount specified in the Principal's Bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid including the administrative costs to effect such contract, then this obligation shall be void and of no effect, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the above bound parties have signed and sealed this instrument under their several seals, on this 7th day of December, 2022, the name and corporate seal of Principal and Surety being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

WITNESSES:

Deborah A. Dupree

\_\_\_\_\_  
\_\_\_\_\_

**PRINCIPAL:**

Precon Corporation

Full Legal Name of Principal

Patrick Wheeler  
Signature of Authorized Officer



Patrick J. Wheeler, Vice President  
Printed Name & Title of Signing Officer

115 SW 140th Terrace

Mailing Address

Newberry, FL 32669

City, State, Zip Code

pjw@precontanks.com

Email Address of Signing Officer

**SURETY:**

Great American Insurance Company

301 E. Fourth Street, Cincinnati, OH 45202

Full Legal Name of Surety

Gloria A. Richards

Signature of Authorized Surety Agent  
Gloria A. Richards\*, FL Lic. Resident Agent

\*620 N. Wymore Rd., Suite 200

Mailing Address of Local Agency

\*Maitland, FL 32751

City, State, Zip Code

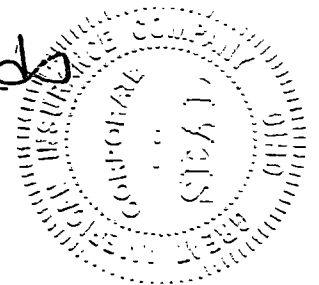
\*gloria@floridasuretybonds.com

Email Address of Surety Agent

Gloria A. Richards

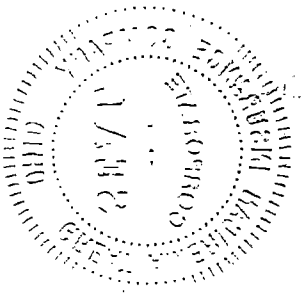
Attorney-In-Fact Signature  
Gloria A. Richards\*

\*Inquiries: 407-786-7770





Сектор оценки качества образования



Сектор оценки качества образования

**GREAT AMERICAN INSURANCE COMPANY®**

**Administrative Office: 301 E 4TH STREET • CINCINNATI, OHIO 45202 • 513-369-5000 • FAX 513-723-2740**

The number of persons authorized by this power of attorney is not more than **NINE**

No. 0 20377

**POWER OF ATTORNEY**

**KNOW ALL MEN BY THESE PRESENTS:** That the GREAT AMERICAN INSURANCE COMPANY, a corporation organized and existing under and by virtue of the laws of the State of Ohio, does hereby nominate, constitute and appoint the person or persons named below, each individually if more than one is named, its true and lawful attorney-in-fact, for it and in its name, place and stead to execute on behalf of the said Company, as surety, any and all bonds, undertakings and contracts of suretyship, or other written obligations in the nature thereof; provided that the liability of the said Company on any such bond, undertaking or contract of suretyship executed under this authority shall not exceed the limit stated below.

Name	Address	Limit of Power
JEFFREY W. REICH	ALL OF	ALL
SUSAN L. REICH	MAITLAND, FLORIDA	\$100,000,000
KIM E. NIV		
CHERYL A. FOLEY		
NATHAN K. REICH		

This Power of Attorney revokes all previous powers issued on behalf of the attorney(s)-in-fact named above.

IN WITNESS WHEREOF the GREAT AMERICAN INSURANCE COMPANY has caused these presents to be signed and attested by its appropriate officers and its corporate seal hereunto affixed this **23RD** day of **FEBRUARY**, 2022

Attest

GREAT AMERICAN INSURANCE COMPANY



*Atty L C. B.*

Assistant Secretary

*Mark V. Vicario*

Divisional Senior Vice President

STATE OF OHIO, COUNTY OF HAMILTON - ss:

MARK VICARIO (877-377-2405)

On this **23RD** day of **FEBRUARY**, 2022, before me personally appeared MARK VICARIO, to me known, being duly sworn, deposes and says that he resides in Cincinnati, Ohio, that he is a Divisional Senior Vice President of the Bond Division of Great American Insurance Company, the Company described in and which executed the above instrument; that he knows the seal of the said Company; that the seal affixed to the said instrument is such corporate seal; that it was so affixed by authority of his office under the By-Laws of said Company, and that he signed his name thereto by like authority.



**SUSAN A KOHORST**  
Notary Public  
State of Ohio  
My Comm. Expires  
May 18, 2025

*Susan A Kohorst*

This Power of Attorney is granted by authority of the following resolutions adopted by the Board of Directors of Great American Insurance Company by unanimous written consent dated June 9, 2008.

**RESOLVED:** That the Divisional President, the several Divisional Senior Vice Presidents, Divisional Vice Presidents and Divisional Assistant Vice Presidents, or any one of them, be and hereby is authorized, from time to time, to appoint one or more Attorneys-in-Fact to execute on behalf of the Company, as surety, any and all bonds, undertakings and contracts of suretyship, or other written obligations in the nature thereof; to prescribe their respective duties and the respective limits of their authority; and to revoke any such appointment at any time.

**RESOLVED FURTHER:** That the Company seal and the signature of any of the aforesaid officers and any Secretary or Assistant Secretary of the Company may be affixed by facsimile to any power of attorney or certificate of either given for the execution of any bond, undertaking, contract of suretyship, or other written obligation in the nature thereof, such signature and seal when so used being hereby adopted by the Company as the original signature of such officer and the original seal of the Company, to be valid and binding upon the Company with the same force and effect as though manually affixed.

**CERTIFICATION**

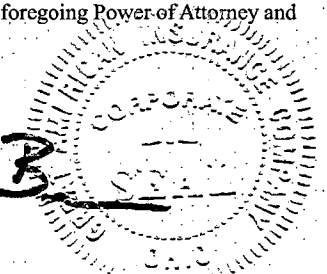
I, STEPHEN C. BERAHA, Assistant Secretary of Great American Insurance Company, do hereby certify that the foregoing Power of Attorney and the Resolutions of the Board of Directors of June 9, 2008 have not been revoked and are now in full force and effect.

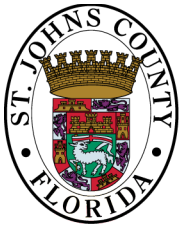
Signed and sealed this **7th** day of **December**, 2022



*Atty L C. B.*

Assistant Secretary





# St. Johns County Board of County Commissioners

Purchasing Division

November 29, 2022

## ADDENDUM #2

**To: Prospective Respondent**

**From: St. Johns County Purchasing Department**

**Subject: Bid No. 23-11 CR 208 Water Booster Pump Station – Ground Storage Tank Work**

This Addendum #2 is issued for further Respondent's information and is hereby incorporated into the Bid Documents. Each Respondent will ascertain before submitting a Proposal that he/she has received all Addenda, and **return an original copy of this signed Addendum with the submitted proposal** as provided in the Bid Documents

### Questions/Answers

1. Specification 13216-13, Section 2.02 shows the 4000 psi compressive strength for shotcrete. Specification 03300-11, Section 2.05 D shows 5000 psi strength for prestress elements. Please confirm that 4000 psi shotcrete shall be used for the prestressed concrete tank wall  
**Answer:** Section 13216 governs for the concrete requirements related to the tank, 4,000 psi is what should be used for the tank walls.
2. Specification 13216-19, Section 2.02 4.C states all metal surfaces including pipes and pipe supports are to be coated. Please confirm the 316 SS pipe supports do not need to be coated.  
**Answer:** Stainless steel piping is not coated.
3. Specification 13216-21, Section 2.03 H.12 states the tank design shall include buoyancy loads, if required due to seasonal high groundwater conditions as specified in the specs and the geotechnical report. Please confirm the tank does not need to be designed to resist hydrostatic uplift.  
**Answer:** The tank was raised on the site to avoid the buoyancy load calculation and is not required.
4. The drawings reference other drawings sheets that do not appear to be included in the bid documents. Please provide Drawings Sheets CD-3, M-4, M-6 and M-7.  
**Answer:** See attached drawings.
5. Please confirm if clearing and grubbing of the utility and drainage easement extending from the tank/pump station site to the CR 208 tie in is included in the Tank Contractor scope of work.



**Answer:** Clearing of the 20-ft SJCUD easement will NOT be by the Tank Contractor, however clearing of the drainage easement which is part of the property is included in the Tank Contractor's bid.

6. Please confirm if the highlighted pipes on the drawings represent Pre-Purchased Pipe.

**Answer:** Yes.

7. Please confirm this project does not have any Davis-Bacon, MBE/WBE, AIS or Buy American requirements.

**Answer:** Project does not have any Davis-Bacon, MBE/WBE, AIS or Buy American requirements.

#### **ATTACHMENTS**

1. Construction Drawings

**THE BID DUE DATE REMAINS: December 7, 2022 AT 2:00 P.M.**

#### **Respondent Acknowledgment**

\_\_\_\_\_  
Signature and Date

\_\_\_\_\_  
Printed Name/Title

\_\_\_\_\_  
Company Name (Print)

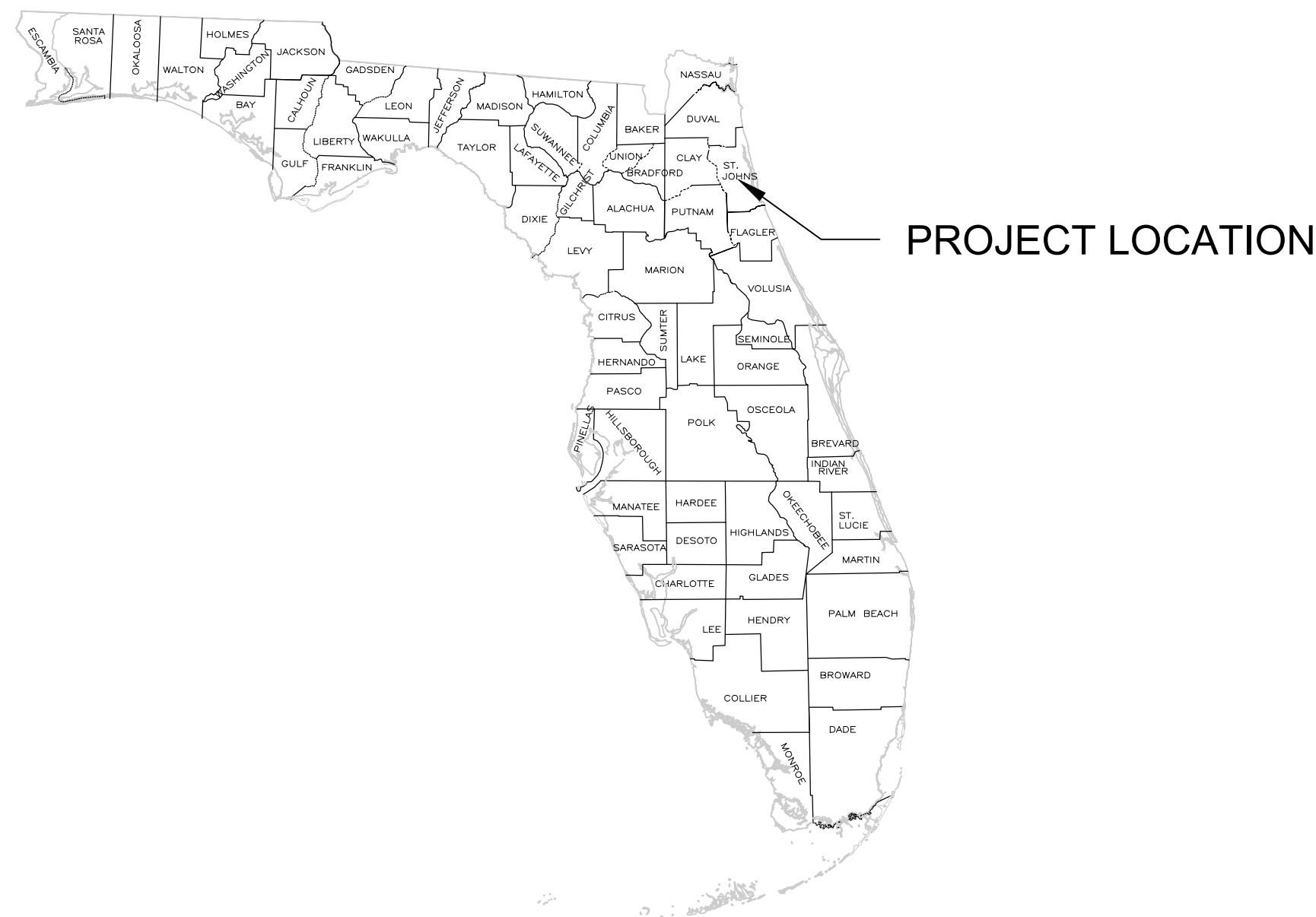
**END OF ADDENDUM NO. 2**

CONSTRUCTION DRAWINGS  
FOR  
CR-208 GROUND STORAGE TANK AND BOOSTER PUMP STATION  
ST. AUGUSTINE, FLORIDA

PREPARED FOR:

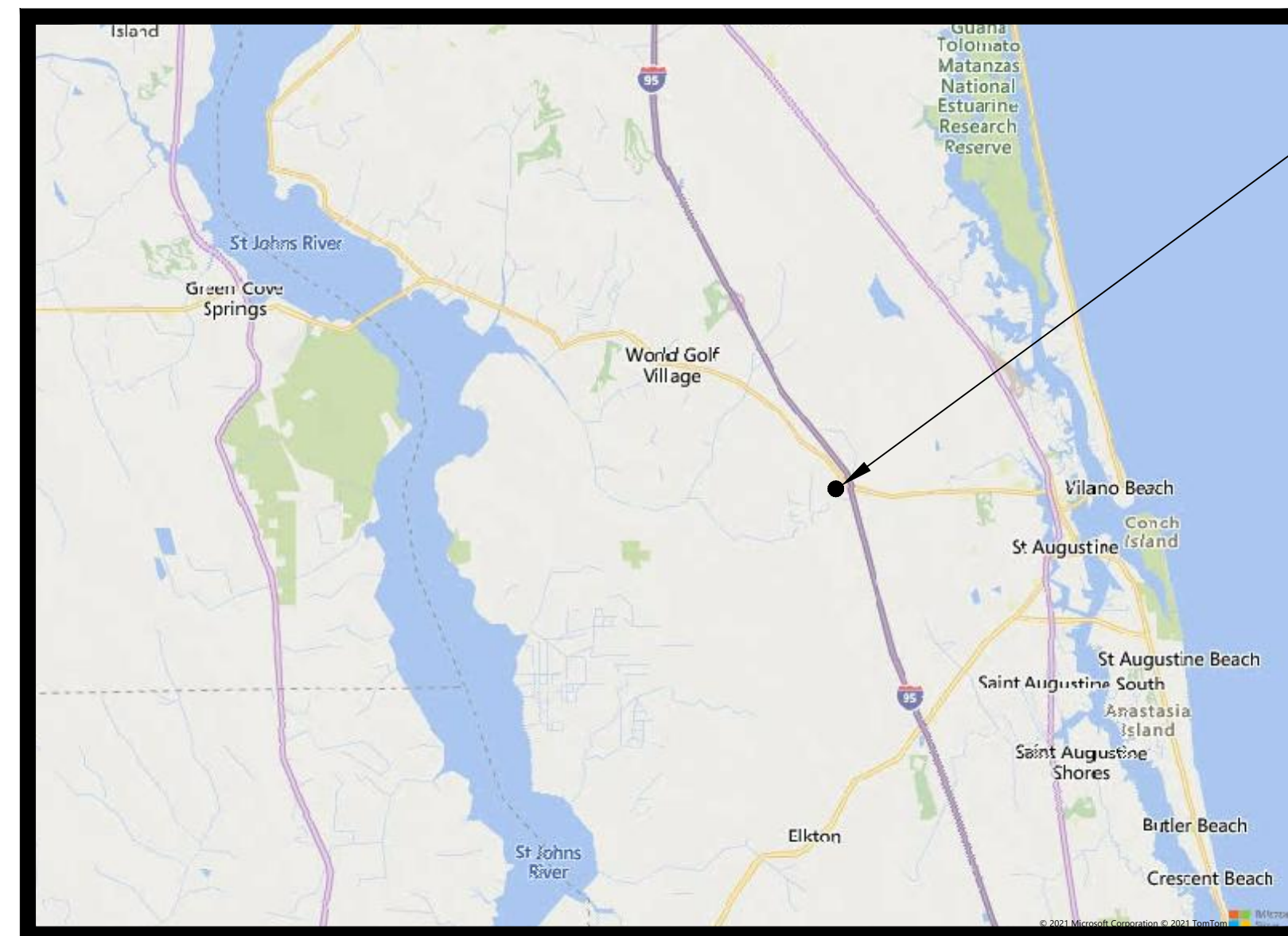
ST. JOHNS COUNTY UTILITY DEPARTMENT

PROJECT NO. 4488-56302-6264-56302  
OCTOBER 2022 – GST CONTRACTOR BID PACKAGE



VICINITY MAP

M.M. PROJECT  
NO. 502100379-007



LOCATION MAP  
SCALE: NTS

PROJECT LOCATION:  
3575 AGRICULTURAL CENTER DRIVE  
ST AUGUSTINE, FL 32092

**M**  
**M**  
**MOTT**  
**MACDONALD**  
Mott MacDonald Florida, LLC

Architects Engineers Surveyors  
AA - C0000035 EB - 0000155 LB - 0006783  
10245 Centurion Pkwy. N., Suite 320  
Jacksonville, Florida 32256  
Telephone: (904) 203-1090

**GENERAL NOTES:**

- DISTURBANCE SHALL BE LIMITED TO SJUCUD PROPERTY, RIGHT OF WAYS, AND UTILITY EASEMENT.
- THE CONTRACTOR IS RESPONSIBLE FOR PROCURING ALL MOBILIZATION, STORAGE, AND STAGING AREAS AS WELL AS ACCESS TO THE CONSTRUCTION SITES WITHIN THE RIGHT OF WAYS. EROSION CONTROL DEVICES AND BEST MANAGEMENT PRACTICES SHALL BE INSTALLED AND MAINTAINED AT ALL WORK SITES AND STAGING AREAS. THE CONTRACTOR SHALL FOLLOW ALL LOCAL GUIDELINES AND REGULATIONS REGARDING THE WORK, INCLUDING KEEPING MUD AND DIRT OFF PUBLIC ROADS AND PRIVATE ENTRANCES.
- ANY PUBLIC LAND CORNER, PROPERTY MONUMENTATION, OR BENCH MARK WITHIN THE LIMITS OF CONSTRUCTION SHALL BE PROTECTED. IF A MONUMENT IS IN DANGER OF BEING DESTROYED, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY. ANY CORNER MONUMENT OR LANDMARKS DISTURBED OR DESTROYED SHALL BE RESET BY A PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF FLORIDA AT NO ADDITIONAL COST TO THE OWNER.
- FOR ALL TIE-IN PIPING, CROSSINGS, OR VALVES THE CONTRACTOR SHALL VERIFY ALL EXISTING PIPELINE ELEVATIONS, LOCATIONS, DIAMETERS, AND MATERIALS PRIOR TO SHOP DRAWING SUBMITTALS, NOTIFYING THE ENGINEER OF ANY CONFLICTS.
- SUBMITTAL OF AS-BUILT SITE SURVEY, INCLUDING BENCHMARKS, IS REQUIRED PRIOR TO SCHEDULING FINAL INSPECTION. AS-BUILT SURVEY SHALL BE SIGNED AND SEALED BY A REGISTERED LAND SURVEYOR IN THE STATE OF FLORIDA AND SHALL INCLUDE COORDINATES OF ALL NEW STRUCTURES, ALL PIPE FITTINGS AND VALVES 3-INCH AND LARGER AND ELEVATIONS OF ALL NEW STRUCTURES AND PADS AND PIPES, VALVES AND FITTINGS 3-INCH AND LARGER.
- ELEVATIONS SHOWN HEREON ARE RELATIVE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 AND ARE BASED ON BENCHMARKS AS SHOWN ON THE SURVEY.
- LOCATIONS, ELEVATIONS, AND DIMENSIONS OF EXISTING UTILITIES, STRUCTURES, AND OTHER FEATURES ARE SHOWN ACCORDING TO THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION OF THESE PLANS, BUT DO NOT PURPORT TO BE ABSOLUTELY CORRECT. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY AND AGREE TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE CAUSED BY THEIR FAILURE TO EXACTLY LOCATE FEATURES AFFECTING THEIR WORK.
- PRIOR TO BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL PHYSICALLY VERIFY LOCATION OF ALL UTILITIES, ABOVE AND BELOW GROUND AND NOTIFY SJUCUD 72 HOURS PRIOR TO DIGGING IN ANY PORTION OF THE SITE.
- THE CONTRACTOR SHALL CONTACT THE ENGINEER'S OFFICE IMMEDIATELY UPON FINDING AND CONFLICTS DURING CONSTRUCTION ON ANY IMPROVEMENTS SHOWN ON THE DRAWINGS.
- THE CONTRACTOR SHALL NOTE ALL EXISTING UTILITIES ENCOUNTERED DURING EXCAVATION AND INCLUDE ON AS-BUILT DRAWINGS.
- THE CONTRACTOR SHALL, BY REPAIR OR REPLACEMENT, RETURN TO EQUAL OR BETTER CONDITION ALL PAVEMENT, SIDEWALK, LAWNS, UTILITIES AND OTHER ITEMS DAMAGED BY THE CONSTRUCTION ACTIVITY.
- ALL BRUSH, STRIPPING OR UNSUITABLE MATERIAL SHALL BE DISPOSED OF OFF-SITE AT THE CONTRACTOR'S EXPENSE.
- NO REPRESENTATION IS MADE REGARDING BALANCED EARTHWORK. ANY EXCESS MATERIAL, OR MATERIAL NOT SUITABLE FOR USE AS BACKFILL, SHALL BE HAULED AWAY TO AN APPROVED DISPOSAL AT THE CONTRACTOR'S EXPENSE, AND WHERE NECESSARY, SUITABLE FILL AND BACKFILL SHALL BE PROVIDED AND NO ADDITIONAL COMPENSATION SHALL BE ALLOWED.
- CONTRACTOR SHALL PERFORM IN THE PRESENCE OF SJUCUD AND THE ENGINEER A PRE-CONSTRUCTION VIDEO DOCUMENTING EXISTING CONDITIONS.
- ALL BURIED PIPING SHALL BE OF THE RESTRAINED JOINT TYPE.

**UTILITY CONTACTS:**

A. AT&T - GENERAL NUMBER	-----904-519-2529
B. AT&T - ADAM DUGAN - NORTH DISTRICT	-----904-781-0741
C. AT&T - BILL LAKE - SOUTH DISTRICT	-----904-303-8754
D. FLORIDA DEPT. OF TRANSPORTATION	-----904-360-5200
E. ST. JOHNS COUNTY - RIGHT-OF-WAY PERMITTING - RICK MAULDIN	-----904-209-0134
F. ST. JOHNS COUNTY - TRAFFIC SIGNALS - HANK MEIN	-----904-209-0173
G. COMCAST - EMERGENCY HOTLINE	-----904-380-6274
H. TECO/PEOPLES GAS - BEN MOBLEY	-----904-545-8958
I. SUNSHINE ONE CALL	-----811
J. FLORIDA POWER AND LIGHT - MIKE DEHAVEN	-----386-329-5102

**ABBREVIATIONS:**

AC	ASBESTOS CEMENT	H.C.	HIGH CURB
A.G.	ALLEY GRATE	INT.	INTERSECTION
B.	BASE LINE	INV.	INVERT
B.M.	BENCH MARK	I.P.	IRON PIPE
BC	BOTTOM OF CURVE	LT.	LEFT
C.B.	CATCH BASIN	MB	MAIL BOX
C.I.	CAST IRON	MES	MITERED END SECTION
C	CENTER LINE	MFR	MANUFACTURER
C.E.P.	CITY ELECTRIC POLE	M.H.	MANHOLE
CONC.	CONCRETE	N.T.S.	NOT TO SCALE
CONST.	CONSTRUCTION	O.E.	OVERHEAD ELECTRIC
C.M.P.	CORRUGATED METAL PIPE	O.T.	OVERHEAD TELEPHONE
C.M.P.A.	CORRUGATED METAL PIPE ARCH	P.R.M.	PERMANENT REFERENCE
CPP	CONCRETE POWER POLE	P.V.C.	POLYVINYL CHLORIDE
CULV.	CULVERT	R.C.P.	REINFORCED CONCRETE PIPE
C&G	CURB & GUTTER	RT	RIGHT
C	CUT	RWM	RECLAIMED WATER MAIN
D.B.I.	DITCH BOTTOM INVERT	R/W	RIGHT OF WAY
D.W. OR DR	DRIVEWAY	R.D.	ROOF DRAIN
D.I.	DUCTILE IRON	S/W	SIDE WALK
E.O.P.	EDGE OF PAVEMENT	STA	STATION
ELEV.	ELEVATION	TCP	TERRA COTTA PIPE
ERCP	ELLIPTICAL REINFORCED CONC. PIPE	T.O.P	TOP OF PIPE
EXP. JT.	EXPANSION JOINT	U.G.E.	UNDERGROUND ELECTRIC
F	FILL	U.G.T.	UNDERGROUND TELEPHONE
F.H.	FIRE HYDRANT	U.S.C. & G.S.	UNITED STATES COASTAL & GEODETIC SURVEY
FL	FLOW LINE	V.C.	VITRIFIED CLAY
FM	FORCE MAIN	WM	WATER MAIN
GALV./GLV	GALVANIZED	W.V.	WATER VALVE
G	GAS LINE	WLP	WOOD LIGHT POLE
G.V.	GAS VALVE	WPP	WOOD POWER POLE
HDPE	HIGH DENSITY POLYETHYLENE PIPE	WTP	WOOD TELEPHONE POLE
H.W.	HEAD WALL		

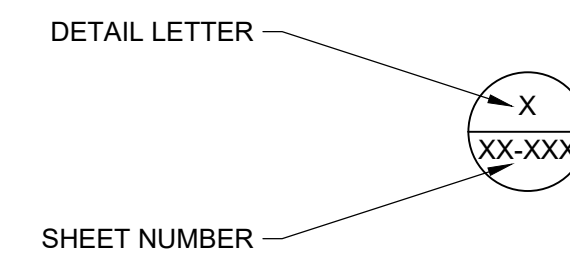
**GENERAL LEGEND AND SYMBOLS**

	EXISTING	PROPOSED
ASPHALT		
BENCH MARK		
BALL VALVE		
CHECK VALVE		
CONCRETE		
EDGE OF PAVEMENT		
ELECTRIC OVERHEAD		
ELECTRIC UNDERGROUND		
FENCE		
FIBER OPTIC		
FORCE MAIN		
GAS MAIN		
GATE VALVE		
GRAVEL		
MAIL BOX		
MANHOLE		
OVERHEAD POWER POLE		
RIGHT OF WAY		
SANITARY SEWER		
SILT FENCE		
TREE LINE		
TELEPHONE		
UNKNOWN UTILITY		
WASH HOSE STATION		
WATER MAIN		
WATER METER		
WOOD WALK		
SOIL BORING		
TEST HOLE		

**INDEX OF DRAWINGS**

SHEET NO.	DWG NO.	TITLE
-	-	COVER
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2	G-2	PROCESS FLOW DIAGRAM
3	C-1	EXISTING SITE, DEMOLITION & EROSION CONTROL PLAN
4	C-2	PROPOSED SITE LAYOUT PLAN
5	C-3	GRADING & DRAINAGE PLAN
6	C-4	YARD PIPING PLAN
7	C-5	WATER MAIN AND RECLAIMED WATER MAIN PLAN AND PROFILE
8	C-6	WATER MAIN AND RECLAIMED WATER MAIN PLAN AND PROFILE
9	C-7	WATER MAIN AND RECLAIMED WATER MAIN PLAN AND PROFILE
10	CD-1	EROSION CONTROL DETAILS
11	CD-2	CIVIL DETAILS
12	CD-3	CIVIL DETAILS
13	CD-4	CIVIL DETAILS
14	L-1	GENERAL LANDSCAPE NOTES
15	L-2	LANDSCAPE PLAN
16	L-3	LANDSCAPE SPECIFICATIONS
17	L-4	GENERAL IRRIGATION NOTES
18	L-5	IRRIGATION PLAN
19	A-0	CODE SUMMARY AND LIFE SAFETY PLAN
20	A-1	ARCHITECTURAL LEGENDS AND ABBREVIATIONS
21	A-2	FLOOR PLAN
22	A-3	EXTERIOR ELEVATIONS
23	A-4	BUILDING SECTIONS
24	A-5	ROOF PLAN
25	A-6	REFLECTED CEILING PLAN
26	A-7	WALL SECTIONS
27	A-8	DOOR AND WINDOW SCHEDULE AND DETAILS
28	A-9	ARCHITECTURAL MISC. DETAILS
29	S-1	STRUCTURAL GENERAL NOTES
30	S-2	STRUCTURAL GENERAL NOTES
31	S-3	BOOSTER PUMP STATION BUILDING PLANS
32	S-4	BOOSTER PUMP STATION BUILDING SECTIONS & DETAILS
33	S-5	SLAB AND FOUNDATION DETAILS
34	S-6	MASONRY DETAILS
35	S-7	GUARDRAIL DETAILS
36	M-1	BOOSTER PUMP ROOM PLAN
37	M-2	BOOSTER PUMP ROOM SECTIONS
38	M-3	GROUND STORAGE TANK SLAB PLAN
39	M-4	GROUND STORAGE TANK ROOF PLAN
40	M-5	GROUND STORAGE TANK SECTIONS
41	M-6	GROUND STORAGE TANK DETAILS
42	M-7	GROUND STORAGE TANK DETAILS
43	M-8	FILL VALVE, DISCHARGE FLOW METER, AND BYPASS PLANS AND SECTIONS
44	M-9	GROUND STORAGE TANK DRAIN AND OVERFLOW STRUCTURE PLAN AND SECTIONS
45	MD-1	MISCELLANEOUS MECHANICAL DETAILS
46	H-1	HVAC LEGEND, SYMBOLS, AND ABBREVIATIONS
47	H-2	BOOSTER PUMP STATION HVAC PLAN
48	H-3	HVAC CONTROL DIAGRAMS
49	H-4	HVAC DETAILS
50	H-5	HVAC SCHEDULES
51	E-1	ELECTRICAL LEGEND AND SCHEDULES
52	E-2	SINGLE LINE DIAGRAM
53	E-3	CONTROL WIRING DIAGRAMS
54	E-4	INSTRUMENTATION SCHEMATIC DIAGRAM
55	E-5	INSTRUMENTATION CONTROL PANEL DETAILS
56	E-6	INSTRUMENTATION RTU DETAILS
57	E-7	ELECTRICAL SITE PLAN
58	E-8	ELECTRICAL PLAN BOOSTER PUMP STATION
59	E-9	ELECTRICAL PLAN GROUND STORAGE TANK
60	ED-1	CONDUIT AND CABLE SCHEDULE
61	ED-2	ELECTRICAL DETAILS
62	ED-3	ELECTRICAL DETAILS

**DETAIL CALL OUT**



Wed Oct 12, 2022 - 12:30

Current Layout Tab = Layout1

C:\pwworking\hmm\water\_wastewater\lee79433\d0555385\G-1.dwg

Xrefs Attached= S:\CUD\_22X34\_BOR [ L:\d0555394\S\CUD\_22X34\_BOR.dwg]

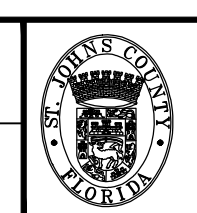
NO.	BY	DATE	SYMBOL	REVISIONS
1	MM	10/2022		GST CONTRACTOR BID PACKAGE

**M**  
MOTT  
MACDONALD  
Mott MacDonald Florida, LLC

Architects Engineers Surveyors  
AA - C0000035 EB - 0000155 LB - 0006783  
10245 Centurion Pkwy, N., Suite 320  
Jacksonville, Florida 32256  
Telephone: (904) 203-1090

DESIGNER: L. TRACEY  
DRAWN BY: B. LEE  
DATE: OCT 2022  
CHECKED BY: L. SAMEL  
DATE: OCT 2022

DESIGN ENGINEER  
LESLIE S. SAMEL, P.E.  
FLORIDA REGISTRATION NO.  
68763

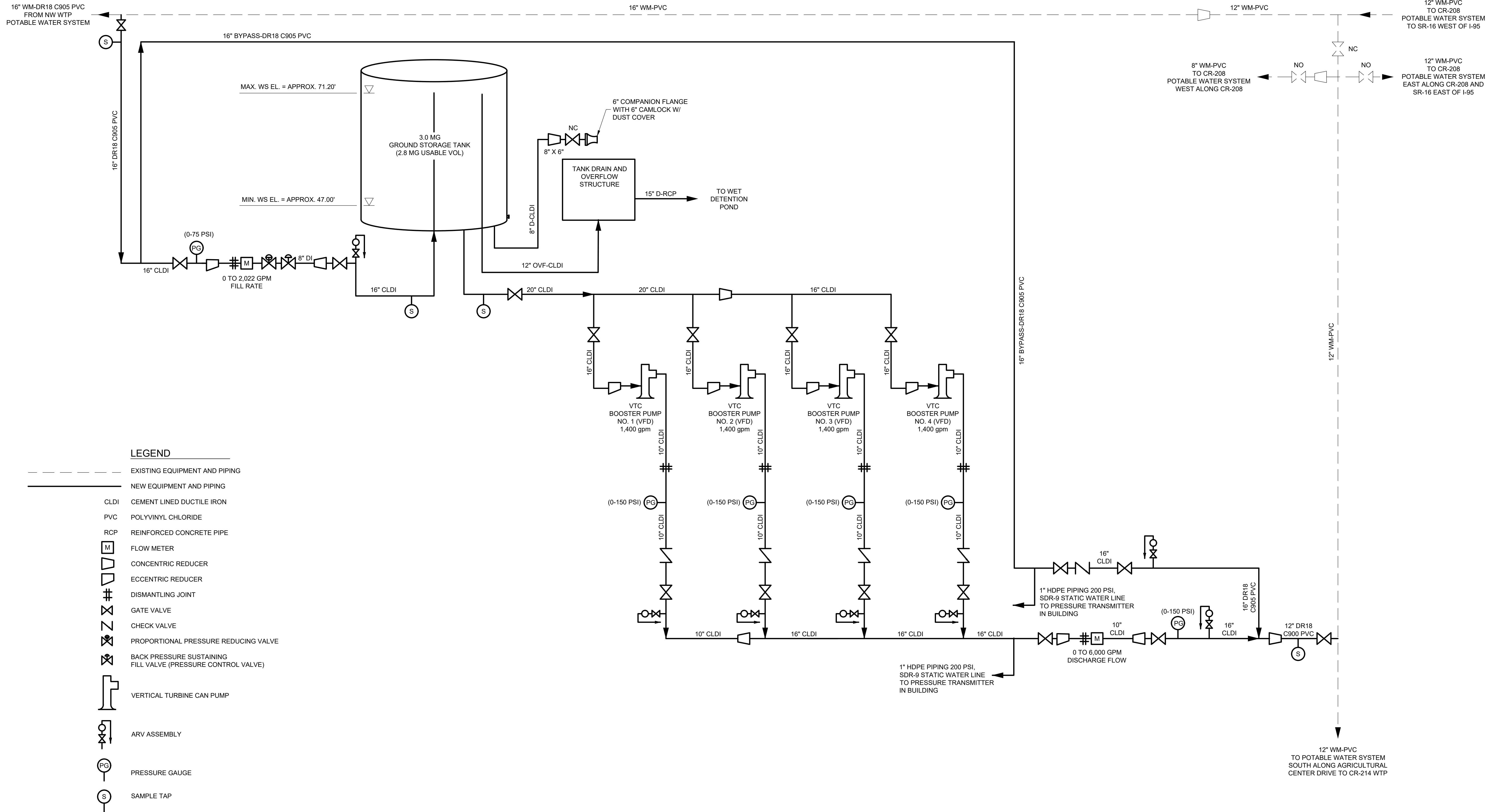


St. Johns County  
Utility Department  
1205 STATE ROAD 16  
ST. AUGUSTINE, FL 32084  
PHONE: (904) 209-2626 FAX: (904) 209-2627

CR-208 GROUND STORAGE TANK  
AND BOOSTER PUMP STATION

GENERAL NOTES, ABBREVIATIONS,  
LEGENDS, SYMBOLS AND  
INDEX OF DRAWINGS

SHEET NO.  
1  
DWG NO.  
G-1  
GST BID  
PACKAGE



**LEGEND**

- EXISTING EQUIPMENT AND PIPING
- NEW EQUIPMENT AND PIPING
- CLDI CEMENT LINED DUCTILE IRON
- PVC POLYVINYL CHLORIDE
- RCP REINFORCED CONCRETE PIPE
- [M] FLOW METER
- [C] CONCENTRIC REDUCER
- [E] ECCENTRIC REDUCER
- [#] DISMANTLING JOINT
- [V] GATE VALVE
- [Z] CHECK VALVE
- [P] PROPORTIONAL PRESSURE REDUCING VALVE
- [B] BACK PRESSURE SUSTAINING FILL VALVE (PRESSURE CONTROL VALVE)
- [T] VERTICAL TURBINE CAN PUMP
- [A] ARV ASSEMBLY
- [PG] PRESSURE GAUGE
- [S] SAMPLE TAP

C:\pwworking\hmm\water\_wastewater\lee79433\d0555385\G-2.dwg Wed Oct 12, 2022 12:30

NO.	BY	DATE	SYMBOL	REVISIONS
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**M**  
**MOTT MACDONALD**  
 Mott MacDonald Florida, LLC

Architects Engineers Surveyors  
 AA - C0000035 EB - 0000155 LB - 0006783  
 10245 Centurion Pkwy, N., Suite 320  
 Jacksonville, Florida 32256  
 Telephone: (904) 203-1090

DESIGNER: L. TRACEY  
 DRAWN BY: B. LEE  
 DATE: OCT 2022  
 CHECKED BY: L. SAMEL  
 DATE: OCT 2022

DESIGN ENGINEER  
**LESLIE S. SAMEL, P.E.**  
 FLORIDA REGISTRATION NO.  
 68763



St. Johns County  
 Utility Department  
 1205 STATE ROAD 16  
 ST. AUGUSTINE, FL 32084  
 PHONE: (904) 209-2626 FAX: (904) 209-2627

**CR-208 GROUND STORAGE TANK AND BOOSTER PUMP STATION**

**PROCESS FLOW DIAGRAM**

SHEET NO.	2
DWG NO.	G-2
GST BID PACKAGE	



Xrefs Attached: 502100379-007\_V-Survey-Xref.dwg  
ANSI-D-BOT-REF-SLICUD.dwg

**GENERAL NOTES:**

1. ALL ASPHALT AND CONCRETE SHALL BE SAW CUT IN SMOOTH NEAT LINES AT EDGES TO REMAIN.
2. ALL DEMOLITION DEBRIS SHALL BE REMOVED FROM SITE AND DISPOSED OF IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.
3. INLET PROTECTION SHALL BE INSTALLED AROUND ALL PROPOSED INLETS UNTIL FINAL STABILIZATION.
4. SITE CLEARING AND GRUBBING SHALL OCCUR ACROSS THE ENTIRE SITE WITHIN THE PROPERTY BOUNDARIES AND WITHIN AREAS OF THE EASEMENT. TREES CALLED FOR AS PROTECTED OR TO REMAIN SHALL BE PROTECTED AND NOT REMOVED.

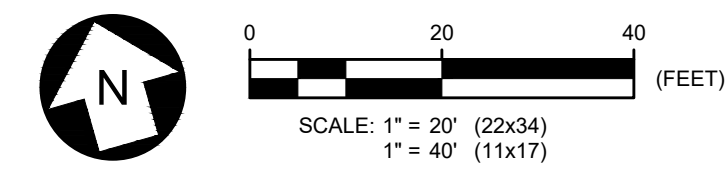
**EROSION CONTROL NOTES:**

1. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONTROL OF EROSION AND MAINTAINING SEDIMENT ON SITE. FAILURE TO ADEQUATELY CONTROL EROSION AND MAINTAIN SEDIMENT ON SITE MAY RESULT IN ENFORCEMENT ACTIONS AND/OR FINES. THE CONTRACTOR SHALL BEAR THE COSTS OF ANY ENFORCEMENT ACTIONS OR FINES.
2. EROSION CONTROL MEASURES SHOWN HEREIN SHALL BE CONSIDERED THE MINIMUM INSTALLATION REQUIREMENTS. CONTRACTOR SHALL PROVIDE ANY MATERIAL ITEM OR WORK EFFORT NECESSARY TO PREVENT EROSION AND MAINTAIN SEDIMENT ON SITE THROUGHOUT CONSTRUCTION AND UNTIL FINAL STABILIZATION HAS BEEN ACHIEVED.

**SURVEYORS NOTES:**

1. BEARING DATUM BASED ON STATE PLANE COORDINATES, FLORIDA EAST ZONE, IN UNITS OF US SURVEY FEET, REFERENCE TO THE NAD 83/2011. ST. JOHNS COUNTY GEODETIC NETWORK CONTROL POINTS 1309 AND 1310, S 49°51'59" E.
2. ELEVATIONS BASED ON NAVD 88, FEET, IF ANY.
3. BENCHMARK BASIS: NGS BENCHMARK ELLZEY ELEVATION = 45.35.

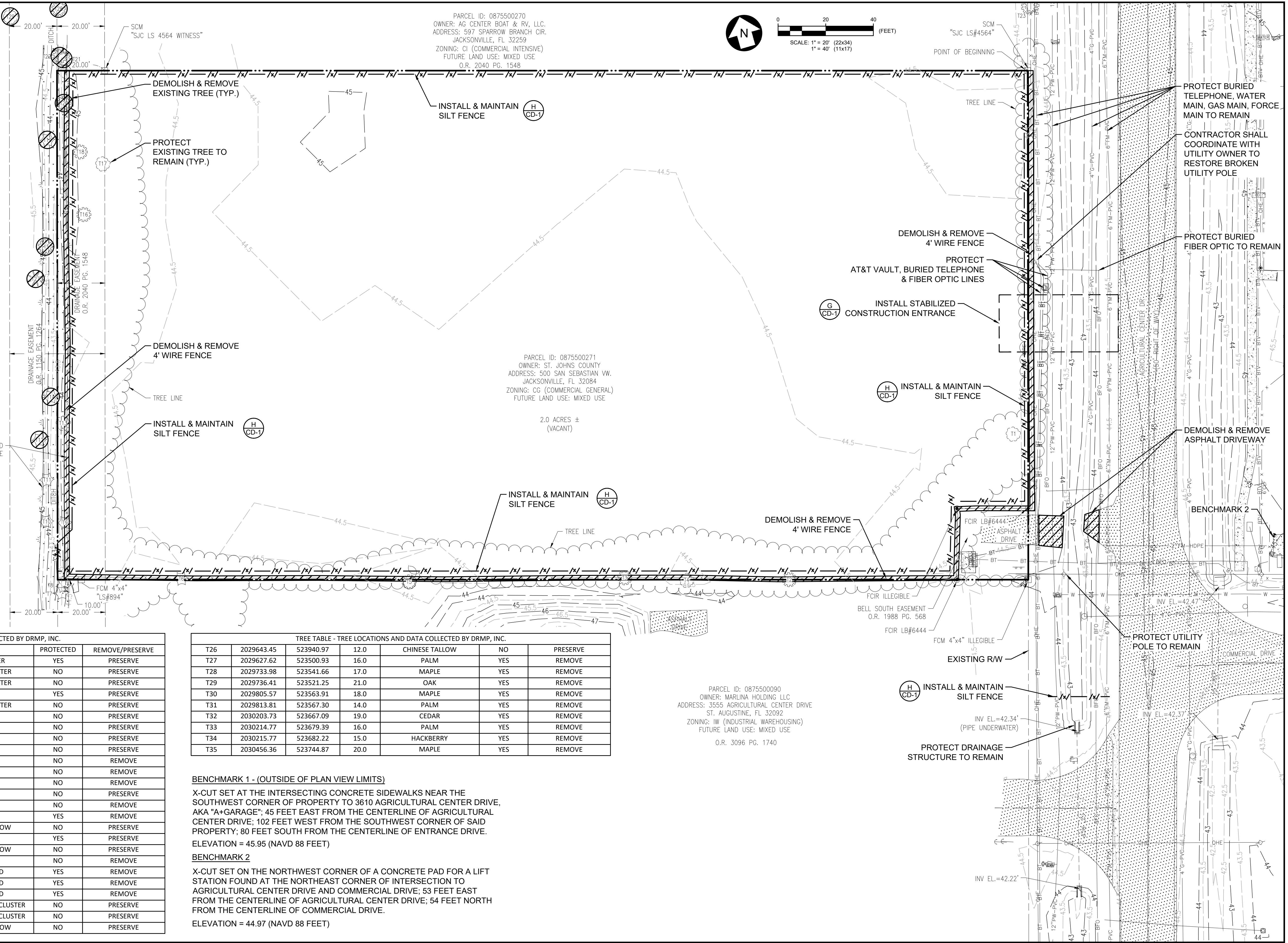
PARCEL ID: 0875500270  
OWNER: AG CENTER BOAT & RV, LLC.  
ADDRESS: 597 SPARROW BRANCH CIR.  
JACKSONVILLE, FL 32259  
ZONING: CI (COMMERCIAL INTENSIVE)  
FUTURE LAND USE: MIXED USE  
O.R. 2040 PG. 1548



PARCEL ID: 0875500000  
OWNER: USINA CHARLES R LIVING TRUST, USINA GABYE LEE  
ADDRESS: C/O WELLS FARGO BANK  
P.O. BOX 135  
ARLINGTON, TX 76094  
ZONING: OR (OPEN RURAL)  
FUTURE LAND USE: MIXED USE  
O.R. 2966 PG. 1088

PARCEL ID: 0875500271  
OWNER: ST. JOHNS COUNTY  
ADDRESS: 500 SAN SEBASTIAN VW.  
JACKSONVILLE, FL 32084  
ZONING: CG (COMMERCIAL GENERAL)  
FUTURE LAND USE: MIXED USE  
2.0 ACRES ±  
(VACANT)

PARCEL ID: 0875500090  
OWNER: MARLINA HOLDING LLC  
ADDRESS: 3555 AGRICULTURAL CENTER DRIVE  
ST. AUGUSTINE, FL 32092  
ZONING: IW (INDUSTRIAL WAREHOUSING)  
FUTURE LAND USE: MIXED USE  
O.R. 3096 PG. 1740



TREE TABLE - TREE LOCATIONS AND DATA COLLECTED BY DRMP, INC.

TREE NO.	NORTHING	EASTING	DIA. (IN.)	SPECIES	PROTECTED	REMOVE/PRESERVE
T1	2029451.35	523877.13	UNK	OAK CLUSTER	YES	PRESERVE
T2	2029418.61	523769.88	UNK	TALLOW CLUSTER	NO	PRESERVE
T3	2029438.50	523703.67	UNK	TALLOW CLUSTER	NO	PRESERVE
T4	2029430.35	523728.43	14.0	OAK	YES	PRESERVE
T5	2029461.94	523616.28	UNK	TALLOW CLUSTER	NO	PRESERVE
T6	2029489.70	523524.76	8.0	PINE	NO	PRESERVE
T7	2029497.97	523474.91	9.0	PINE	NO	PRESERVE
T8	2029500.51	523476.30	15.0	PINE	NO	PRESERVE
T9	2029525.83	523484.34	9.0	PINE	NO	PRESERVE
T10	2029528.43	523477.04	17.0	PINE	NO	REMOVE
T11	2029545.30	523482.05	14.0	PINE	NO	REMOVE
T12	2029562.22	523483.71	16.0	PINE	NO	REMOVE
T13	2029566.24	523495.17	10.0	OAK	NO	PRESERVE
T14	2029578.24	523493.31	15.0	PINE	NO	REMOVE
T15	2029639.52	523508.50	14.0	MAPLE	YES	REMOVE
T16	2029648.00	523527.84	9.0	CHINESE TALLOW	NO	PRESERVE
T17	2029666.34	523541.35	13.0	OAK	YES	PRESERVE
T18	2029673.72	523533.67	8.0	CHINESE TALLOW	NO	PRESERVE
T19	2029682.32	523521.87	18.0	PINE	NO	REMOVE
T20	2029695.24	523532.81	8.0	HARDWOOD	YES	REMOVE
T21	2029713.09	523537.72	9.0	HARDWOOD	YES	REMOVE
T22	2029714.71	523536.61	9.0	HARDWOOD	YES	REMOVE
T23	2029621.93	523933.06	11.0	CHINESE TALLOW CLUSTER	NO	PRESERVE
T24	2029622.09	523934.64	9.0	CHINESE TALLOW CLUSTER	NO	PRESERVE
T25	2029633.80	523939.00	8.0	CHINESE TALLOW	NO	PRESERVE

TREE TABLE - TREE LOCATIONS AND DATA COLLECTED BY DRMP, INC.

TREE NO.	NORTHING	EASTING	DIA. (IN.)	SPECIES	PROTECTED	REMOVE/PRESERVE
T26	2029643.45	523940.97	12.0	CHINESE TALLOW	NO	PRESERVE
T27	2029627.62	523500.93	16.0	PALM	YES	REMOVE
T28	2029733.98	523541.66	17.0	MAPLE	YES	REMOVE
T29	2029736.41	523521.25	21.0	OAK	YES	REMOVE
T30	2029805.57	523563.91	18.0	MAPLE	YES	REMOVE
T31	2029813.81	523567.30	14.0	PALM	YES	REMOVE
T32	2030203.73	523667.09	19.0	CEDAR	YES	REMOVE
T33	2030214.77	523679.39	16.0	PALM	YES	REMOVE
T34	2030215.77	523682.22	15.0	HACKBERRY	YES	REMOVE
T35	2030456.36	523744.87	20.0	MAPLE	YES	REMOVE

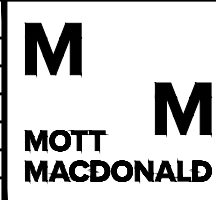
**BENCHMARK 1 - (OUTSIDE OF PLAN VIEW LIMITS)**

X-CUT SET AT THE INTERSECTING CONCRETE SIDEWALKS NEAR THE SOUTHWEST CORNER OF PROPERTY TO 3610 AGRICULTURAL CENTER DRIVE, AKA "A+GARAGE"; 45 FEET EAST FROM THE CENTERLINE OF AGRICULTURAL CENTER DRIVE; 102 FEET WEST FROM THE SOUTHWEST CORNER OF SAID PROPERTY; 80 FEET SOUTH FROM THE CENTERLINE OF ENTRANCE DRIVE. ELEVATION = 45.95 (NAVD 88 FEET)

**BENCHMARK 2**

X-CUT SET ON THE NORTHWEST CORNER OF A CONCRETE PAD FOR A LIFT STATION FOUND AT THE NORTHEAST CORNER OF INTERSECTION TO AGRICULTURAL CENTER DRIVE AND COMMERCIAL DRIVE; 53 FEET EAST FROM THE CENTERLINE OF AGRICULTURAL CENTER DRIVE; 54 FEET NORTH FROM THE CENTERLINE OF COMMERCIAL DRIVE. ELEVATION = 44.97 (NAVD 88 FEET)

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Mott MacDonald  
10245 Centurion Pkwy, N., Suite 320  
Jacksonville, Florida 32256  
Telephone: (904) 203-1090  
Architects Engineers Surveyors  
AA - C0000035 EB - 0000155 LB - 0006783

DESIGNER: S. WHITE  
DRAWN BY: C. RILEY  
DATE: OCTOBER 2022  
CHECKED BY: S. WHITE  
DATE: OCTOBER 2022

DESIGN ENGINEER  
STEVEN D. WHITE  
FLORIDA REGISTRATION NO.  
58809



St. Johns County  
Utility Department  
1205 STATE ROAD 16  
ST. AUGUSTINE, FL 32084  
PHONE: (904) 209-2626 FAX: (904) 209-2627

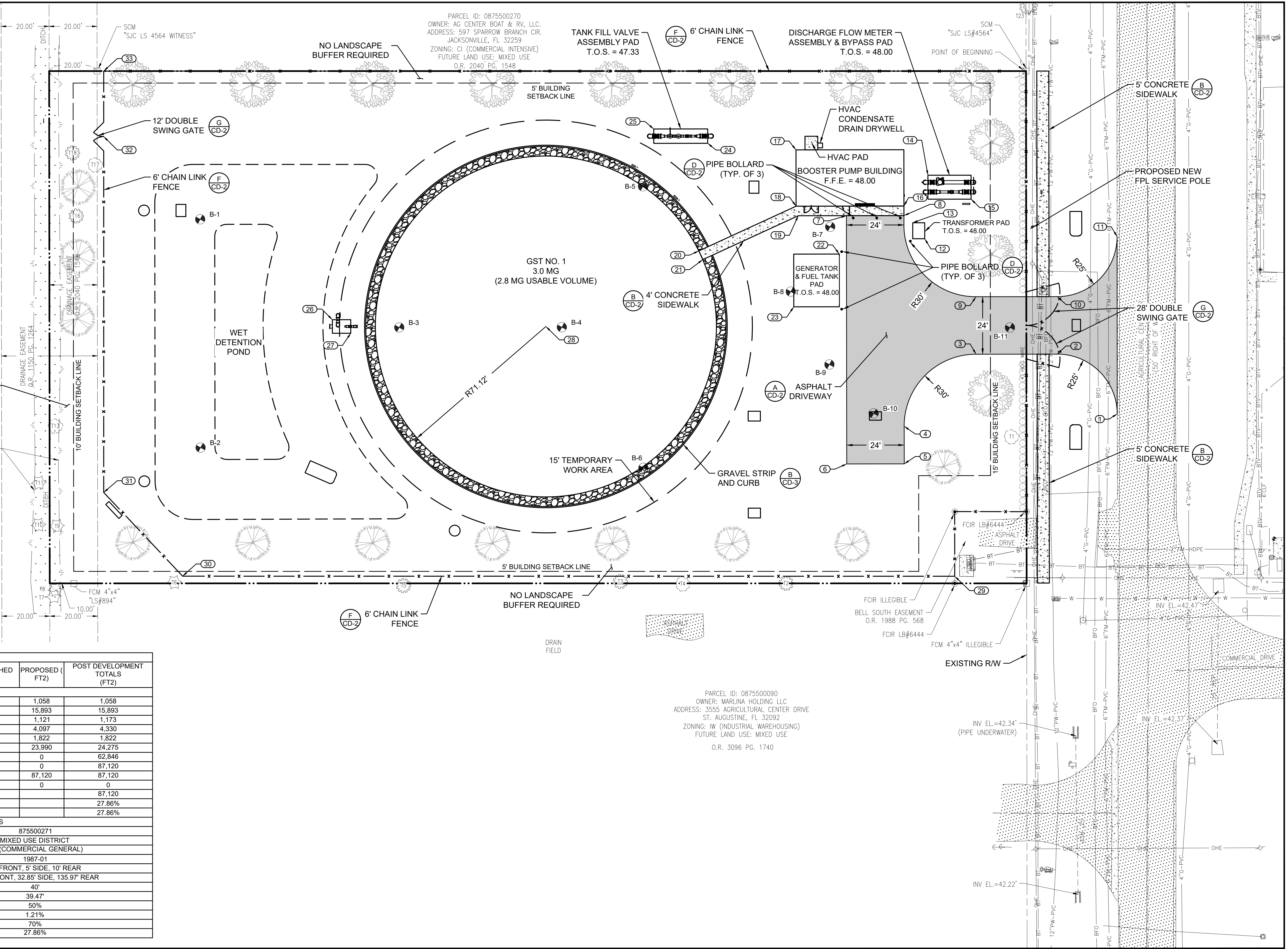
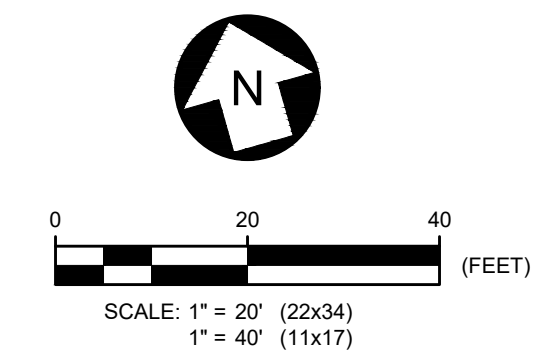
CR-208 GROUND STORAGE TANK  
AND BOOSTER PUMP STATION

EXISTING SITE, DEMOLITION  
& EROSION CONTROL PLAN

SHEET NO.	3
DWG NO.	C-1
GST BID PACKAGE	

User Name: RL136256 10/20/2022  
 Drawing Name: Proposed Site Layout Plan.dwg  
 Drawing Path: C:\pwworking\mhw\water\wastewater\136256\proposed\136256.dwg  
 Xrefs Attached: 502100379-007\_V-Survey-Xref.dwg  
 502100379-007\_C-Layout-Xref.dwg  
 502100379-007\_SJC-DWG.dwg  
 502100379-007\_C-Subarea-Xref.dwg

POINT TABLE		
NO.	NORTHING	EASTING
1	N: 2029448.17	E: 523922.22
2	N: 2029479.07	E: 523905.08
3	N: 2029488.42	E: 523872.54
4	N: 2029467.87	E: 523835.42
5	N: 2029452.77	E: 523831.08
6	N: 2029459.39	E: 523808.01
7	N: 2029558.96	E: 523836.61
8	N: 2029552.33	E: 523859.68
9	N: 2029511.49	E: 523879.16
10	N: 2029502.13	E: 523911.75
11	N: 2029519.26	E: 523942.68
12	N: 2029540.67	E: 523865.34
13	N: 2029548.46	E: 523862.38
14	N: 2029565.78	E: 523873.96
15	N: 2029551.18	E: 523888.48
16	N: 2029556.18	E: 523860.78
17	N: 2029591.19	E: 523824.02
18	N: 2029568.60	E: 523817.53
19	N: 2029564.52	E: 523817.31
20	N: 2029561.92	E: 523773.35
21	N: 2029557.96	E: 523773.95
22	N: 2029544.41	E: 523829.31
23	N: 2029528.51	E: 523804.98
24	N: 2029604.03	E: 523789.39
25	N: 2029616.01	E: 523769.42
26	N: 2029576.72	E: 523618.55
27	N: 2029569.15	E: 523624.35
28	N: 2029549.30	E: 523703.36
29	N: 2029401.87	E: 523838.32
30	N: 2029491.19	E: 523528.87
31	N: 2029533.88	E: 523506.92
32	N: 2029676.58	E: 523548.10
33	N: 2029702.84	E: 523555.67

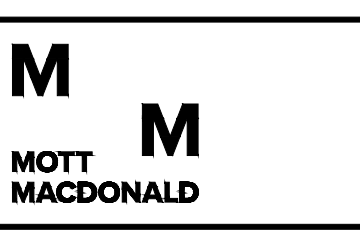


PARCEL ID: 0875500000  
 OWNER: USINA CHARLES R LIVING TRUST, USINA GABYE LEE  
 ADDRESS: C/O WELLS FARGO BANK  
 P.O. BOX 135  
 ARLINGTON, TX 76094  
 ZONING: OR (OPEN RURAL)  
 FUTURE LAND USE: MIXED USE  
 O.R. 2966 PG. 1088

PARCEL ID: 0875500090  
 OWNER: MARLINA HOLDING LLC  
 ADDRESS: 3555 AGRICULTURAL CENTER DRIVE  
 ST. AUGUSTINE, FL 32092  
 ZONING: IW (INDUSTRIAL WAREHOUSING)  
 FUTURE LAND USE: MIXED USE  
 O.R. 3096 PG. 1740

SITE CHARACTERISTICS				
COVERAGE TYPE	EXISTING (FT2)	DEMOLISHED (FT2)	PROPOSED (FT2)	POST DEVELOPMENT TOTALS (FT2)
PROJECT PARCEL				
BUILDINGS	0	0	1,058	1,058
TANK	0	0	15,893	15,893
CONCRETE	52	0	1,121	1,173
ASPHALT	233	0	4,097	4,330
GRAVEL	0	0	1,822	1,822
TOTAL IMPERVIOUS AREA	285	0	23,990	24,275
OPEN AREA	86,835	0	0	86,835
TOTAL AREA	87,120	0	0	87,120
PROPOSED DEVELOPMENT AREA	0	0	87,120	87,120
WETLANDS	0	0	0	0
TOTAL AREA EXCLUDING WETLANDS	87,120	0	0	87,120
% IMPERVIOUS COVERAGE	0.33%	0	0	27.86%
% IMPERVIOUS COVERAGE EXCLUDING WETLANDS	0.33%	0	0	27.86%
SITE DEVELOPMENT REGULATIONS				
PARCEL NUMBER	875500271			
FUTURE LAND USE DESIGNATION	MIXED USE DISTRICT			
ZONING DISTRICT	CG (COMMERCIAL GENERAL)			
PUD/ORDINANCE #	1987-01			
REQUIRED BUILDING SETBACKS	15' FRONT, 5' SIDE, 10' REAR			
PROPOSED SETBACKS	51.01' FRONT, 32.85' SIDE, 135.97' REAR			
MAXIMUM BUILDING HEIGHT	40'			
PROPOSED BUILDING HEIGHT	39.47'			
MAXIMUM FAR	50%			
PROPOSED FAR	1.21%			
MAXIMUM IMPERVIOUS SURFACE RATIO	70%			
PROPOSED IMPERVIOUS SURFACE RATIO	27.86%			

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Mott MacDonald  
 10245 Centurion Pkwy, N., Suite 320  
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 Telephone: (904) 203-1090  
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DESIGNER: S. WHITE  
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 DATE: OCTOBER 2022

DESIGN ENGINEER  
 STEVEN D. WHITE  
 FLORIDA REGISTRATION NO.  
 58809



**St. Johns County**  
**Utility Department**  
 1205 STATE ROAD 16  
 ST. AUGUSTINE, FL 32084  
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CR-208 GROUND STORAGE TANK  
 AND BOOSTER PUMP STATION

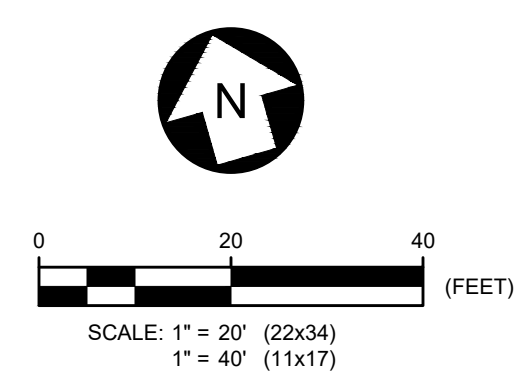
PROPOSED SITE LAYOUT  
 PLAN

SHEET NO.	4
DWG NO.	C-2
GST BID PACKAGE	

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Xrefs Attached: 502100379-007\_V-Survey-Xref.dwg  
 502100379-007\_C-Layout-Xref.dwg  
 502100379-007\_S-CD.dwg  
 502100379-007\_C-Catchment-Xref.dwg



**S-5**  
 INSTALL FDOT TYPE D INLET  
 15" SLOT INV. (E) = 45.00  
 1.4" Ø ORIFICE INV. (E) = 44.00  
 N: 2029638.02  
 E: 523570.50  
 RIM EL. = 45.50  
 SUMP EL. = 42.00  
 INV. (OUT) = 43.00 (P-4)

**S-9**  
 INSTALL FDOT TYPE D INLET  
 N: 2029581.10  
 E: 523802.87  
 RIM EL. = 46.25  
 INV. (OUT) = 43.50 (P-8)

EL. 44.25  
 N: 2029682.36  
 E: 523540.12

**P-4**  
 CONST. 15 LF OF  
 18" RCP @ 0.11%

**S-4**  
 INSTALL FDOT TYPE 7 MANHOLE  
 N: 2029642.28  
 E: 523555.69  
 RIM EL. = 46.50  
 INV. (IN) = 42.98 (P-4)  
 INV. (OUT) = 42.98 (P-3)

**P-3**  
 CONST. 113 LF OF  
 18" RCP @ 0.11%

EL. 44.11  
 N: 2029594.65  
 E: 523518.73

**C-3**  
 CONSTRUCT  
 SWALE

**S-3**  
 INSTALL FDOT TYPE 7 MANHOLE  
 N: 2029533.66  
 E: 523524.51  
 RIM EL. = 46.50  
 INV. (IN) = 42.86 (P-3)  
 INV. (OUT) = 42.86 (P-2)

**P-2**  
 CONST. 18 LF OF  
 18" RCP @ 0.11%

**S-1**  
 INSTALL 18" STRAIGHT CONCRETE ENDWALL  
 N: 2029525.64  
 E: 523508.91  
 INV. (IN) = 42.84 (P-2)

**C-2**  
 INSTALL 18" STRAIGHT CONCRETE ENDWALL

EL. 44.00  
 N: 2029527.85  
 E: 523499.55

**H**  
 INSTALL 36 SY  
 OF RIP RAP

PARCEL ID: 0875500000  
 OWNER: USINA CHARLES R LIVING TRUST, USINA GABYE LEE  
 ADDRESS: C/O WELLS FARGO BANK  
 P.O. BOX 135  
 ARLINGTON, TX 76094  
 ZONING: OR (OPEN RURAL)  
 FUTURE LAND USE: MIXED USE  
 O.R. 2966 PG. 1088

**B**  
 CONSTRUCT  
 SWALE

EL. 43.65  
 N: 2029498.04  
 E: 523519.94

EL. 43.56  
 N: 2029507.93  
 E: 523507.79

**C**  
 INSTALL 24" MES (1:4)  
 N: 2029514.26  
 E: 523599.33  
 INV. (IN) = 41.00 (P-5)

**P-5**  
 CONST. 57 LF OF  
 24" RCP @ 2.41%

**S-7**  
 INSTALL FDOT TYPE 7 MANHOLE  
 N: 2029477.99  
 E: 523643.19  
 RIM EL. = 47.00  
 INV. (IN) = 42.37 (P-6)  
 INV. (OUT) = 42.37 (P-5)

EL. 44.25  
 N: 2029465.89  
 E: 523631.33

**C-3**  
 CONSTRUCT  
 SWALE

EL. 44.20  
 N: 2029431.58  
 E: 523750.18

**A**  
 CONSTRUCT  
 SWALE

EL. 44.30  
 N: 2029412.82  
 E: 523815.18

BELL SOUTH EASEMENT  
 O.R. 1988 PG. 568

EL. 44.34  
 N: 2029421.65  
 E: 523837.81

**S-8**  
 INSTALL FDOT TYPE D INLET  
 N: 2029450.39  
 E: 523765.32  
 RIM EL. = 46.25  
 INV. (IN) = 43.20 (P-7)  
 INV. (OUT) = 42.65 (P-6)

PARCEL ID: 0875500090  
 OWNER: MARLINA HOLDING LLC  
 ADDRESS: 3555 AGRICULTURAL CENTER DRIVE  
 ST. AUGUSTINE, FL 32092  
 ZONING: IW (INDUSTRIAL WAREHOUSING)  
 FUTURE LAND USE: MIXED USE

**S-11**  
 INSTALL FDOT TYPE F INLET  
 N: 2029475.30  
 E: 523825.07  
 RIM EL. = 47.25  
 INV. (OUT) = 44.50 (P-9)

PARCEL ID: 0875500270  
 OWNER: AG CENTER BOAT & RV, LLC.  
 ADDRESS: 597 SPARROW BRANCH CIR.  
 JACKSONVILLE, FL 32259  
 ZONING: CI (COMMERCIAL INTENSIVE)  
 FUTURE LAND USE: MIXED USE  
 O.R. 2040 PG. 1548

**TANK FILL VALVE ASSEMBLY PAD**  
 T.O.S. = 47.33

**DISCHARGE FLOW METER ASSEMBLY & BYPASS PAD**  
 T.O.S. = 48.00

**BOOSTER PUMP BUILDING**  
 F.F.E. = 48.00  
 EL. 47.98 EL. 47.98  
 EL. 47.90 EL. 47.90

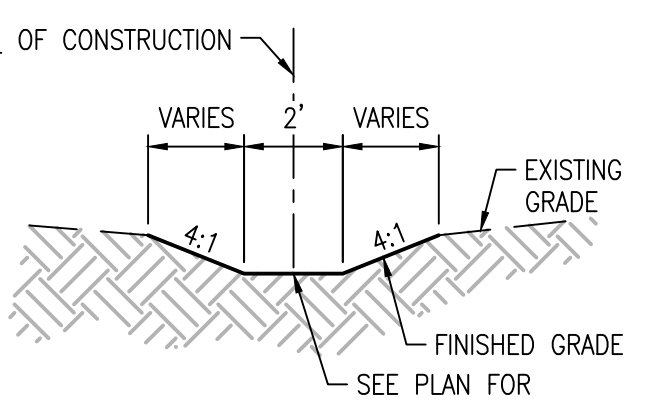
**GENERATOR & FUEL TANK PAD**  
 T.O.S. = 48.00

**TRANSFORMER PAD**  
 T.O.S. = 48.00

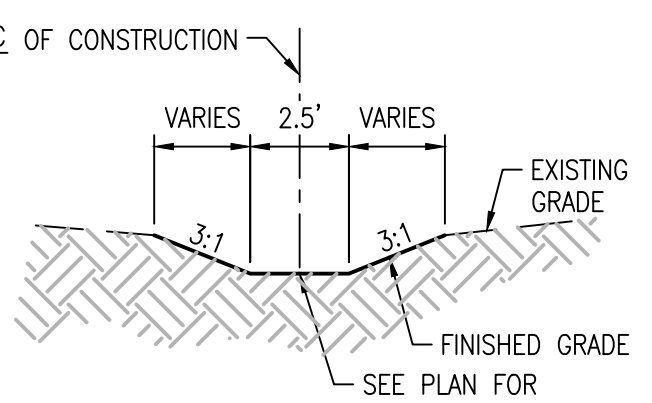
**GST NO. 1**  
 3.0 MG  
 (2.8 MG USABLE VOLUME)

**WET DETENTION POND**  
 POND TOP EL. = 46.50  
 PERM. POOL EL. = 44.00  
 POND BOTTOM EL. = 39.00  
 25-YR., 24-HR. PEAK EL. = 45.85

**15' TEMPORARY WORK AREA**



**A** SWALE DETAIL



**B** SWALE DETAIL

NO.	BY	DATE	SYMBOL	REVISIONS
1	MM	10/2022		GST CONTRACTOR BID PACKAGE

**M M**  
**MOTT MACDONALD**  
 10245 Centurion Pkwy, N., Suite 320  
 Jacksonville, Florida 32256  
 Telephone: (904) 203-1090  
 Architects Engineers Surveyors  
 AA - C000035 EB - 0000155 LB - 0006783

DESIGNER: S. WHITE  
 DRAWN BY: C. RILEY  
 DATE: OCTOBER 2022  
 CHECKED BY: S. WHITE  
 DATE: OCTOBER 2022

DESIGN ENGINEER  
**STEVEN D. WHITE**  
 FLORIDA REGISTRATION NO.  
 58809



**St. Johns County Utility Department**  
 1205 STATE ROAD 16  
 ST. AUGUSTINE, FL 32084  
 PHONE: (904) 209-2626 FAX: (904) 209-2627

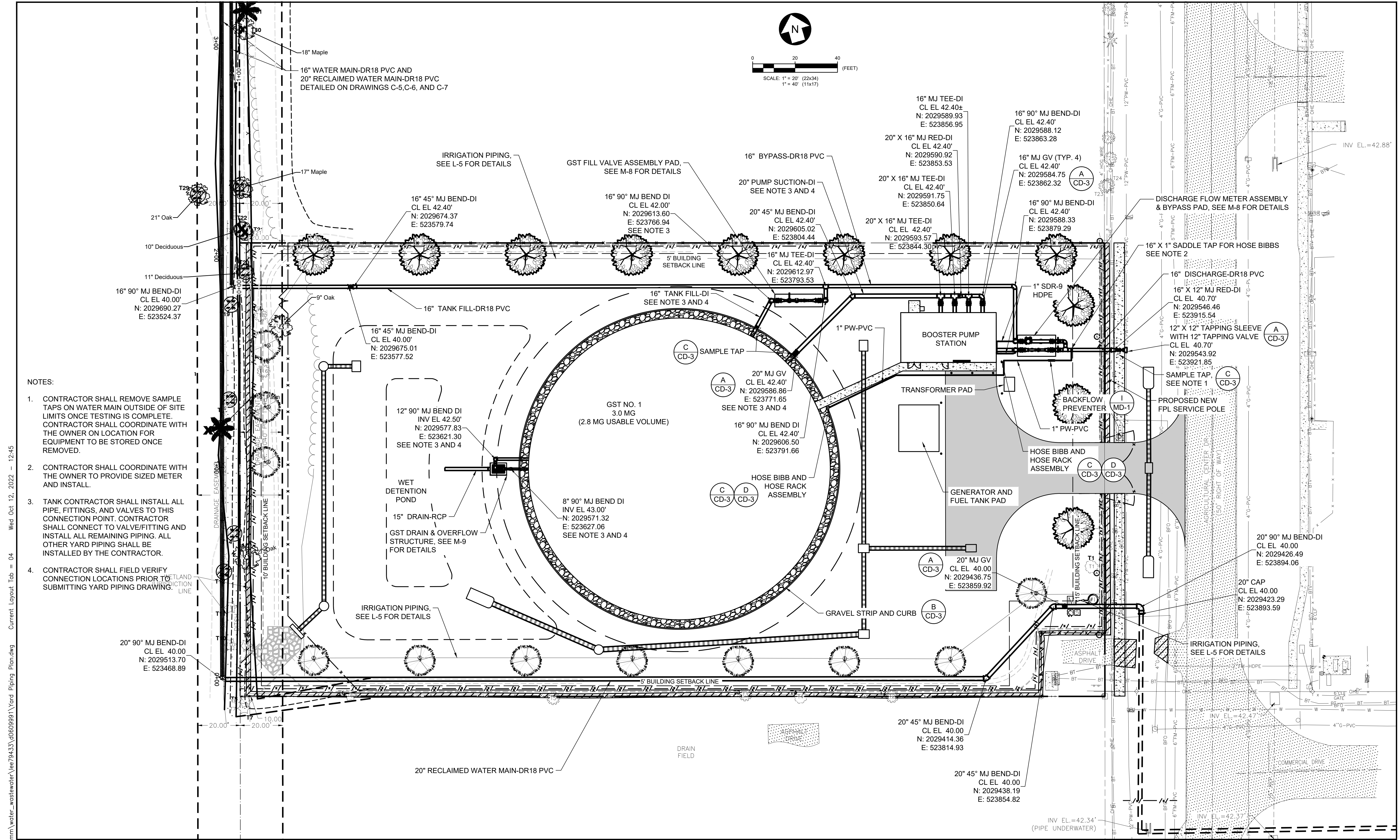
**GR-208 GROUND STORAGE TANK AND BOOSTER PUMP STATION**

**GRADING & DRAINAGE PLAN**

SHEET NO. 5  
 DWG NO. C-3  
 GST BID PACKAGE

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- NOTES:**
- CONTRACTOR SHALL REMOVE SAMPLE TAPS ON WATER MAIN OUTSIDE OF SITE LIMITS ONCE TESTING IS COMPLETE. CONTRACTOR SHALL COORDINATE WITH THE OWNER ON LOCATION FOR EQUIPMENT TO BE STORED ONCE REMOVED.
  - CONTRACTOR SHALL COORDINATE WITH THE OWNER TO PROVIDE SIZED METER AND INSTALL.
  - TANK CONTRACTOR SHALL INSTALL ALL PIPE, FITTINGS, AND VALVES TO THIS CONNECTION POINT. CONTRACTOR SHALL CONNECT TO VALVE/FITTING AND INSTALL ALL REMAINING PIPING. ALL OTHER YARD PIPING SHALL BE INSTALLED BY THE CONTRACTOR.
  - CONTRACTOR SHALL FIELD VERIFY CONNECTION LOCATIONS PRIOR TO SUBMITTING YARD PIPING DRAWING.

C:\pwworking\hmm\water\_wastewater\lee79433\d0609991\Yard Piping Plan.dwg  
 Current Layout Tab = 04  
 Wed Oct 12, 2022 - 12:45

NO.	BY	DATE	SYMBOL	REVISIONS
1	MM	10/2022		GST CONTRACTOR BID PACKAGE

**MOTT MACDONALD**  
 Mott MacDonald Florida, LLC

Architects Engineers Surveyors  
 AA - C0000035 EB - 0000155 LB - 0006783  
 10245 Centurion Pkwy, N., Suite 320  
 Jacksonville, Florida 32256  
 Telephone: (904) 203-1090

DESIGNER: D. JACOBS  
 DRAWN BY: S. HANKE  
 DATE: OCT 2022  
 CHECKED BY: L. SAMEL  
 DATE: OCT 2022

DESIGN ENGINEER  
**LESLIE S. SAMEL, P.E.**  
 FLORIDA REGISTRATION NO.  
 68763

**St. Johns County Utility Department**  
 1205 STATE ROAD 16  
 ST. AUGUSTINE, FL 32084  
 PHONE: (904) 209-2626 FAX: (904) 209-2627

**CR-208 GROUND STORAGE TANK AND BOOSTER PUMP STATION**

**YARD PIPING PLAN**

SHEET NO.	6
DWG NO.	C-4
GST BID PACKAGE	



**GENERAL NOTES FOR SOIL EROSION AND SEDIMENT CONTROL:**

- ALL EROSION AND SEDIMENT CONTROL PRACTICES TO BE INSTALLED PRIOR TO ANY MAJOR SOIL DISTURBANCE, OR IN THEIR PROPER SEQUENCE, AND MAINTAINED UNTIL PERMANENT PROTECTION IS ESTABLISHED.
- ANY DISTURBED AREAS THAT WILL BE LEFT EXPOSED MORE THAN 30 DAYS, AND NOT SUBJECT TO CONSTRUCTION TRAFFIC, WILL IMMEDIATELY RECEIVE A TEMPORARY SEEDING. IF THE SEASON PREVENTS THE ESTABLISHMENT OF A TEMPORARY COVER, THE DISTURBED AREAS WILL BE MULCHED WITH STRAW, OR EQUIVALENT MATERIAL, AT A RATE OF TWO (2) TONS PER ACRE, ACCORDING TO STATE STANDARDS.
- PERMANENT VEGETATION TO BE SEEDED OR SODDED ON ALL EXPOSED AREAS WITHIN TEN (10) DAYS AFTER GRADING. MULCH TO BE USED AS NECESSARY FOR PROTECTION UNTIL SEEDING IS ESTABLISHED.
- ALL WORK AND MATERIALS TO BE IN ACCORDANCE WITH THE FDOT "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION", LATEST EDITION, SECTIONS 104, 570, AND 981 TO 987.
- A BITUMINOUS CONCRETE BASE COURSE WILL BE APPLIED IMMEDIATELY FOLLOWING ROUGH GRADING AND INSTALLATION OF IMPROVEMENTS IN ORDER TO STABILIZE STREETS, ROADS, DRIVEWAYS AND PARKING AREAS. IN AREAS WHERE NO UTILITIES ARE PRESENT, THE BITUMINOUS CONCRETE BASE SHALL BE INSTALLED WITHIN 15 DAYS OF THE PRELIMINARY GRADING.
- IMMEDIATELY FOLLOWING INITIAL DISTURBANCE OR ROUGH GRADING, ALL CRITICAL AREAS SUBJECT TO EROSION (I.E. STEEP SLOPES AND ROADWAY EMBANKMENTS) WILL RECEIVE A TEMPORARY SEEDING IN COMBINATION WITH STRAW MULCH OR A SUITABLE EQUIVALENT, AT A THICKNESS OF TWO (2) TO FOUR (4) INCHES MIXED WITH THE TOP TWO (2) INCHES OF SOIL, ACCORDING TO STATE STANDARDS.
- ANY STEEP SLOPES RECEIVING PIPELINE INSTALLATION WILL BE BACKFILLED AND STABILIZED DAILY, AS THE INSTALLATION PROCEEDS (I.E. SLOPES GREATER THAN 3:1).
- UNFILTERED DEWATERING IS NOT PERMITTED. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS DURING ALL DEWATERING OPERATIONS TO MINIMIZE SEDIMENT TRANSFER.
- SHOULD THE CONTROL OF DUST AT THE SITE BE NECESSARY, THE SITE WILL BE SPRINKLED UNTIL THE SURFACE IS WET, TEMPORARY VEGETATION COVER SHALL BE ESTABLISHED OR MULCH SHALL BE APPLIED IN ACCORDANCE WITH STATE STANDARDS FOR EROSION CONTROL.
- ALL SOIL WASHED, DROPPED, SPILLED OR TRACKED OUTSIDE THE LIMIT OF DISTURBANCE OR ONTO PUBLIC RIGHTS-OF-WAY WILL BE REMOVED IMMEDIATELY.
- ALL SOIL STOCKPILES ARE TO BE TEMPORARILY STABILIZED IN ACCORDANCE WITH SOIL EROSION AND SEDIMENT CONTROL NOTE NUMBER 2 (ABOVE).
- ALL SEDIMENTATION STRUCTURES SHALL BE INSPECTED AND MAINTAINED REGULARLY.
- THE CONTRACTOR SHALL PREPARE A PLAN FOR THE PROPER DEWATERING AND DOWNSTREAM SILTATION PROTECTION OF EACH STREAM CROSSING PRIOR TO EXCAVATING THE STREAM BED. PLAN SHALL BE FORWARDED TO THE ENGINEER FOR APPROVAL. THE ENGINEER SHALL BE NOTIFIED FOR INSPECTION PRIOR TO EACH STREAM CROSSING CONSTRUCTION.
- ANY AREAS USED FOR THE CONTRACTOR'S STAGING, INCLUDING BUT NOT LIMITED TO, TEMPORARY STORAGE OF STOCKPILED MATERIALS (E.G. CRUSHED STONE, QUARRY PROCESS STONE, SELECT FILL, EXCAVATED MATERIALS, ETC.), SHALL BE ENTIRELY PROTECTED BY A SILT FENCE ALONG THE LOW ELEVATION SIDE TO CONTROL SEDIMENT RUNOFF.

• WHERE APPLICABLE

**TEMPORARY SEEDING DETAILS**

**SEED BED PREPARATION**

SOIL TO BE THOROUGHLY PULVERIZED BY DISK-HARROWING AND BE LOOSE AND REASONABLY SMOOTH. APPLY FERTILIZER AT A RATE OF 260 LBS./ACRE OF 16-16-16 OR EQUIVALENT, APPLY DOLOMITIC LIMESTONE AT A RATE OF 800 TO 1000 LBS./ACRE TO PROVIDE A SOIL pH OF 5.5 TO 6.5, LIME & FERTILIZER TO BE WORKED INTO THE TOPSOIL TO A DEPTH OF 4". ADD SANDY LOAM TOPSOIL TO A MINIMUM OF TWO (2) INCHES WHERE DIRECTED BY ENGINEER.

**SEED MIXTURE**

CONSISTING OF ANNUAL RYE (LOLIUM MULTIFLORUM) AT A RATE OF 174 LBS./ACRE.

**PERMANENT SEEDING DETAILS**

**SEED BED PREPARATION**

SOIL TO BE THOROUGHLY PULVERIZED BY DISK-HARROWING AND BE LOOSE AND REASONABLY SMOOTH. APPLY FERTILIZER AT A RATE OF 260 LBS./ACRE OF 16-16-16 OR EQUIVALENT, APPLY DOLOMITIC LIMESTONE AT A RATE OF 800 TO 1000 LBS./ACRE TO PROVIDE A SOIL pH OF 5.5 TO 6.5, LIME & FERTILIZER TO BE WORKED INTO THE TOPSOIL TO A DEPTH OF 4".

SEED MIXTURE CONSISTING OF	RATE	PURITY	GERMINATION
ARGENTINE BAHIA	260 LBS./AC.	95%	80%
PENSACOLA BAHIA	260 LBS./AC.	95%	40%(MIN.)-80%(TOTAL)

**SODDING**

SOD SHALL BE WELL ROOT MATTED ARGENTINE BAHIA GRASS COMMERCIAL CUT TO A MINIMUM DIMENSION OF 12" x 24" A MAXIMUM OF 72 HOURS PRIOR TO PLACEMENT. SOD SHALL BE LIVE, FRESH AND UNINJURED, REASONABLY FREE OF WEEDS AND OTHER GRASSES, WITH A HEAVY SOIL MAT ADHERING TO THE ROOT SYSTEM. SOD SHALL BE GROWN, CUT, AND SUPPLIED BY A STATE CERTIFIED GROWER.

**TREE PROTECTION**

- DAMAGED TRUNKS OR EXPOSED ROOTS WILL BE PAINTED IMMEDIATELY WITH A COMMERCIAL GRADE OF "TREE PAINT".
- TREE LIMB REMOVAL, WHERE NECESSARY, WILL BE DONE FLUSH TO TRUNK OR MAIN BRANCH AND THAT AREA PAINTED IMMEDIATELY WITH A COMMERCIAL GRADE OF TREE PAINT.

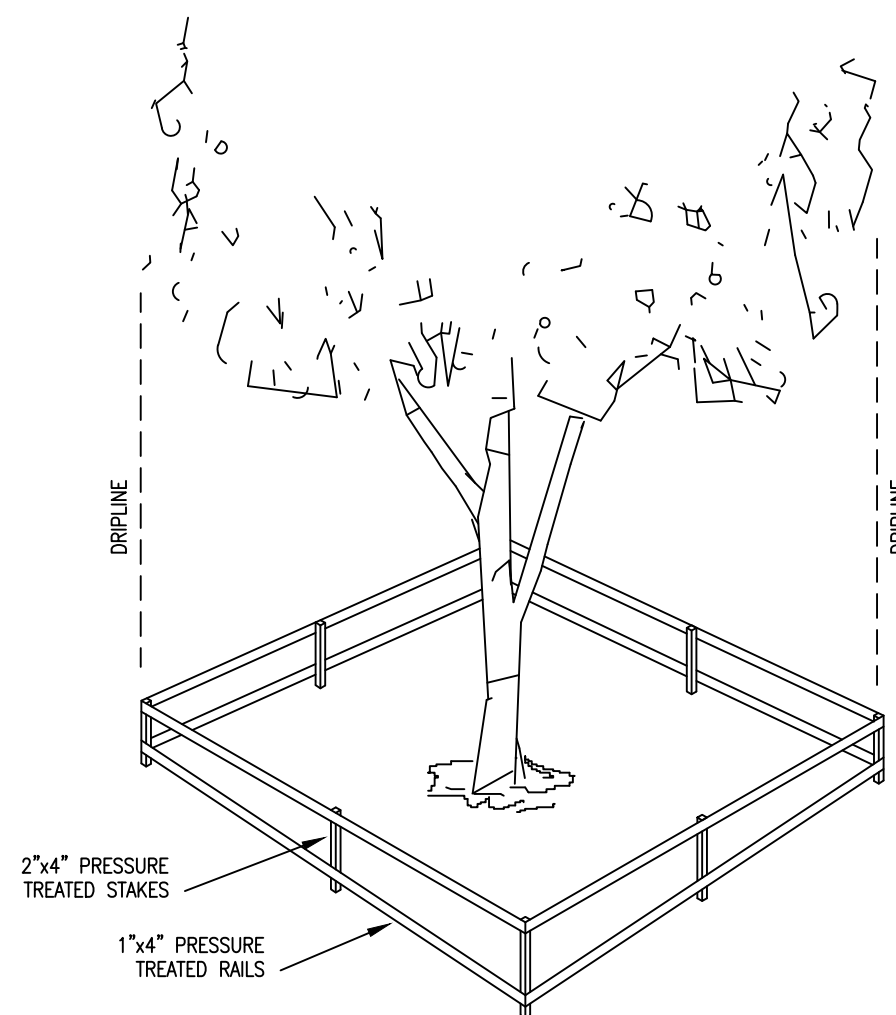
**DUST CONTROL**

- ALL AREAS OF CLEARING AND EMBANKMENT AS WELL AS CONSTRUCTION HAUL ROADS SHALL BE TREATED AND MAINTAINED IN SUCH A MANNER AS TO MINIMIZE ANY DUST GENERATION.
- DISTURBED AREAS SHALL BE MAINTAINED IN A ROUGH GRADED CONDITION AND TEMPORARILY SEEDED AND/OR MULCHED UNTIL PROPER WEATHER CONDITIONS EXIST FOR THE ESTABLISHMENT OF PERMANENT VEGETATION COVER.
- IN EVENT OF EMERGENCY CONDITIONS, TILLAGE WILL BE SATISFACTORY FREE BEFORE SOIL BLOWING STARTS.

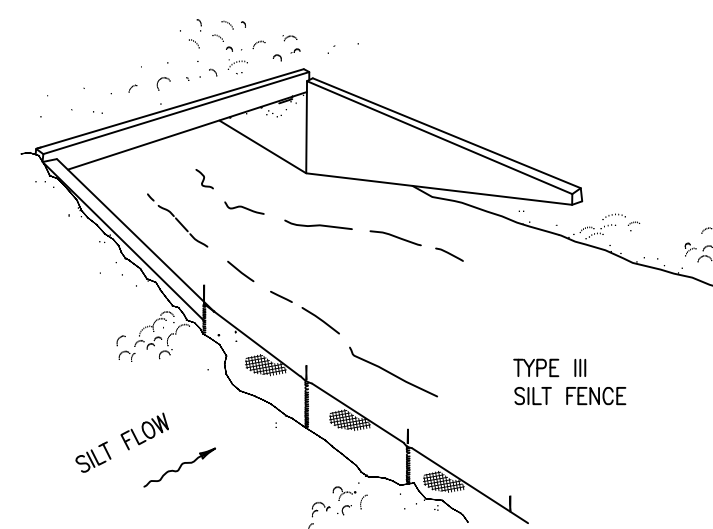
**PROPOSED SEQUENCE OF CONSTRUCTION**

CONSTRUCTION SHOULD PROCEED IN THE FOLLOWING MANNER:

- INSTALL SILT FENCE, HAYBALE BARRIERS AND/OR TURBIDITY BARRIERS AS SHOWN.
- ROUGH GRADE STORMWATER POND.
- CLEAR AND GRUB.
- CONSTRUCT PROPOSED INFRASTRUCTURE.
- REMOVE ACCUMULATED SEDIMENT FROM POND AND SWALE, FINAL DRESS AND STABILIZE.
- ONCE SILTATION AND SEDIMENTATION CONTROL MEASURES ARE WELL ESTABLISHED REMOVE EROSION CONTROL DEVICES.



**E TREE BARRICADE**  
NTS

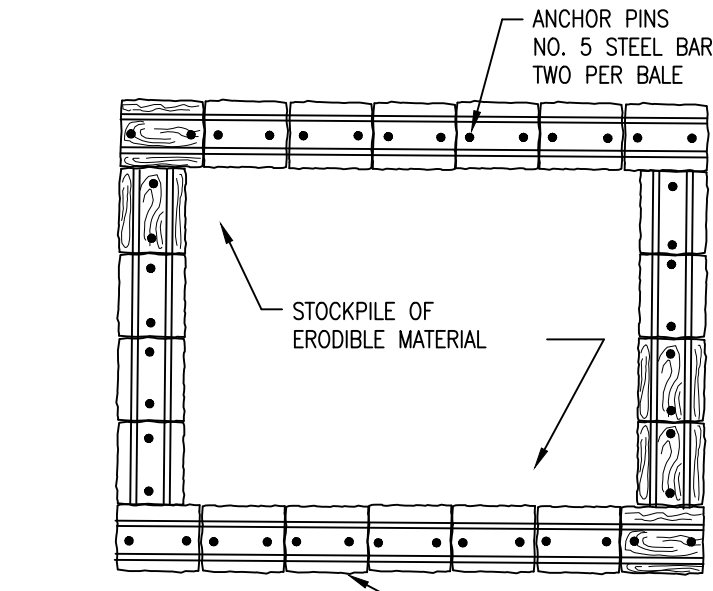


**A TYPE III SILT FENCE**  
NTS

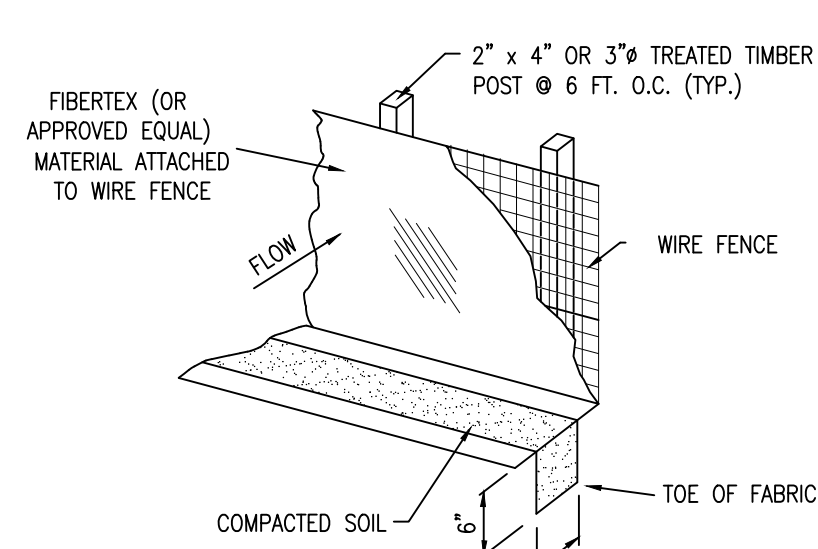


**C SILT FENCE APPLICATIONS**  
NTS

DO NOT DEPLOY IN A MANNER THAT SILT FENCES WILL ACT AS A DAM ACROSS PERMANENT FLOWING WATERCOURSES. SILT FENCES ARE TO BE USED AT UPLAND LOCATIONS AND TURBIDITY BARRIERS AT PERMANENT BODIES OF WATER.



**F MATERIAL STOCKPILE DETAIL**  
NTS



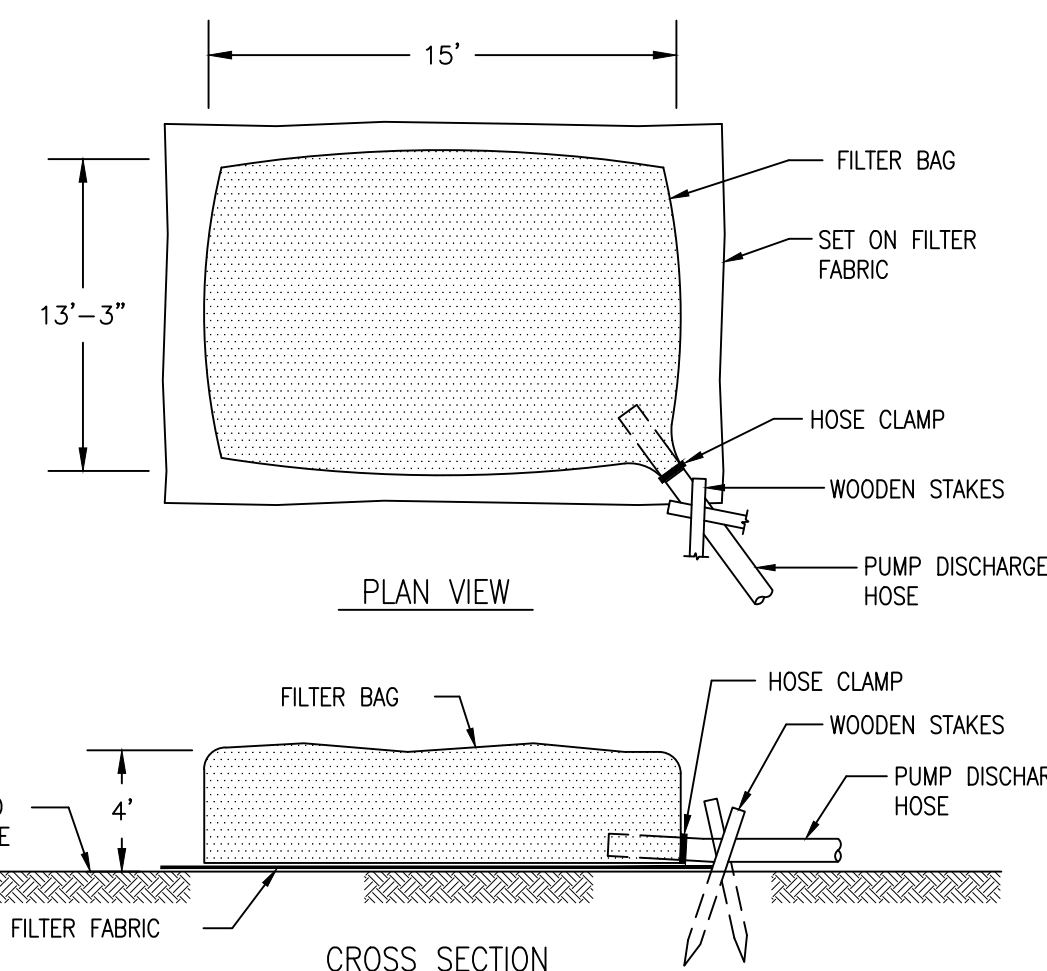
**H SILT FENCE DETAIL**  
NTS

**DESCRIPTION:**  
FILTER BAGS WILL BE USED AS AN EFFECTIVE FILTER MEDIUM TO CONTAIN SAND, SILT AND FINES WHEN TRENCH DEWATERING. THE WETLAND FILTER BAG CONTAINS THESE MATERIALS WHILE ALLOWING THE WATER TO FLOW THROUGH THE FABRIC.

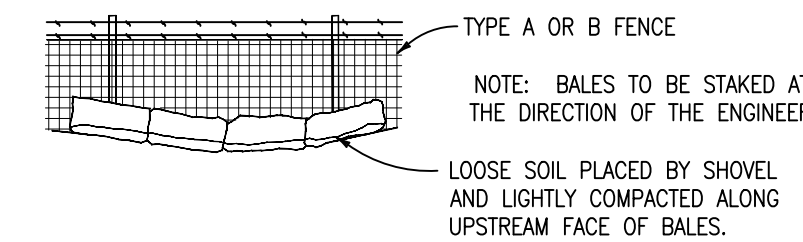
**INSTALLATION:**  
WETLAND FILTER BAGS MAY REPLACE HAY BALE CORRALS DURING TRENCH DEWATERING, AT THE DISCRETION OF THE ENGINEER INSPECTOR. TO INSURE PROPER INSTALLATION, FILTER BAGS WILL BE PLACED ON RELATIVELY FLAT TERRAIN FREE OF BRUSH AND STUMPS TO AVOID RUPTURES AND PUNCTURES. PROPER INSTALLATION REQUIRES CUTTING A SMALL HOLE IN THE CORNER OF THE BAG, INSERTING THE PUMP DISCHARGE HOSE, AND THEN SECURING THE DISCHARGE HOSE TO THE BAG WITH A HOSE CLAMP. FILTER BAGS WILL BE PLACED AS FAR AWAY FROM FLOWING STREAMS AND WETLANDS AS POSSIBLE.

**MAINTENANCE:**  
PRIOR TO REMOVING A BAG FROM THE HOSE, THE BAG WILL BE TIED OFF BELOW THE END OF THE HOSE ALLOWING THE BAG TO DRAIN. DRAINAGE WILL NOT BE ALLOWED THROUGH THE INLET HOLE. TO AVOID RUPTURE, THE BAGS WILL BE ATTENDED AND PUMPING RATES MONITORED. ONCE THE BAG IS INFLATED TO A HEIGHT OF 4 FEET, PUMPING WILL STOP TO AVOID RUPTURE. FILTER BAGS USED DURING CONSTRUCTION WILL BE BUNDLED AND REMOVED FOR PROPER DISPOSAL.

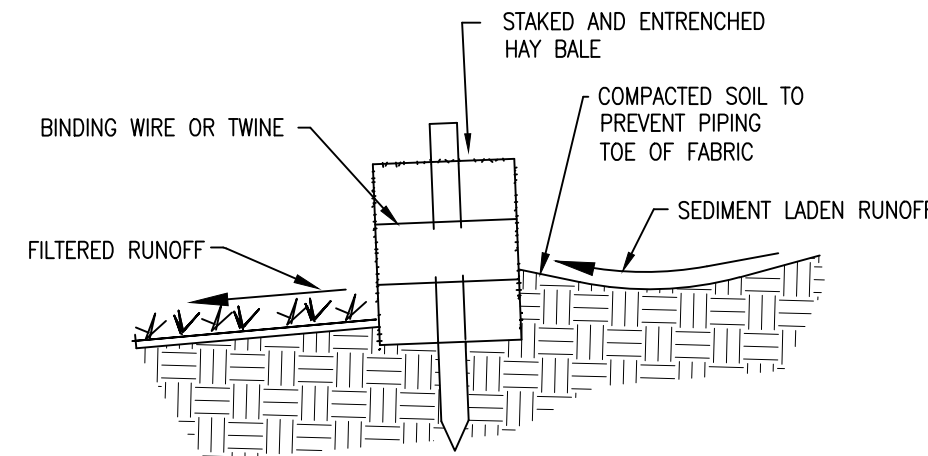
**SPECIFICATION:**  
FILTER BAGS ARE CONSTRUCTED OF NON-WOVEN GEOTEXTILE FABRIC. A MAXIMUM OF ONE SIX INCH DISCHARGE HOSE WILL BE ALLOWED PER FILTER BAG. BAG CAPACITY WILL BE EXCEEDED BEYOND 2,000 GALLONS PER MINUTE. TYPICAL BAG DIMENSIONS ARE 15 FEET BY 13.25 FEET. TO HELP PREVENT PUNCTURES, GEOTEXTILE FABRIC WILL BE PLACED BENEATH THE FILTER BAG WHEN USED IN WOODED LOCATIONS. UNATTENDED FILTER BAGS WILL BE ENCIRCLED WITH A HAY BALE OR SILT FENCE CORRAL. HOSE CLAMPS WILL BE USED TO SECURE THE DISCHARGE HOSE, WIRE OR STRING WILL NOT BE USED.



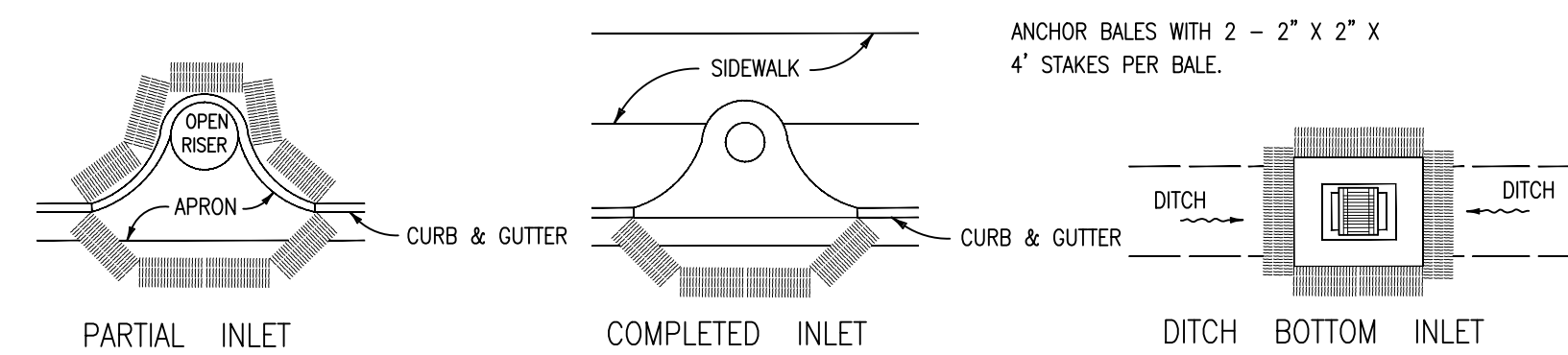
**J FILTER BAG DETAILS FOR TRENCH DEWATERING OPERATIONS**  
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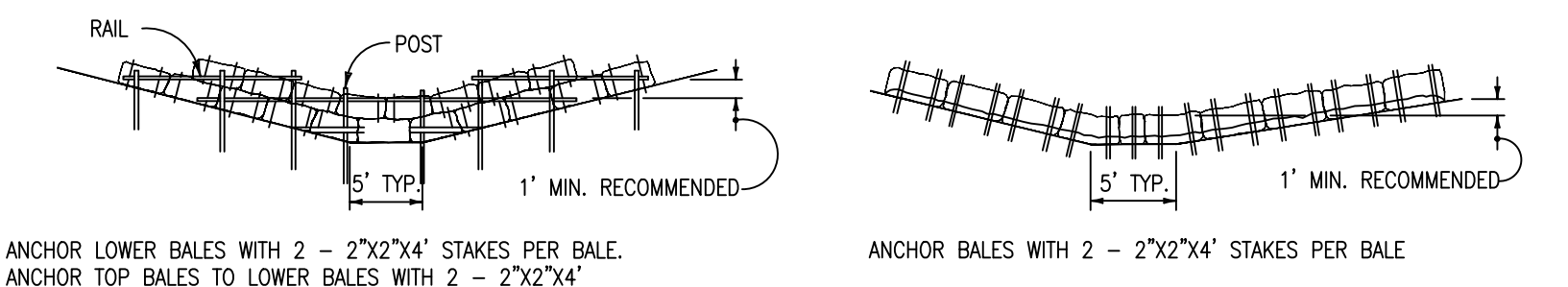
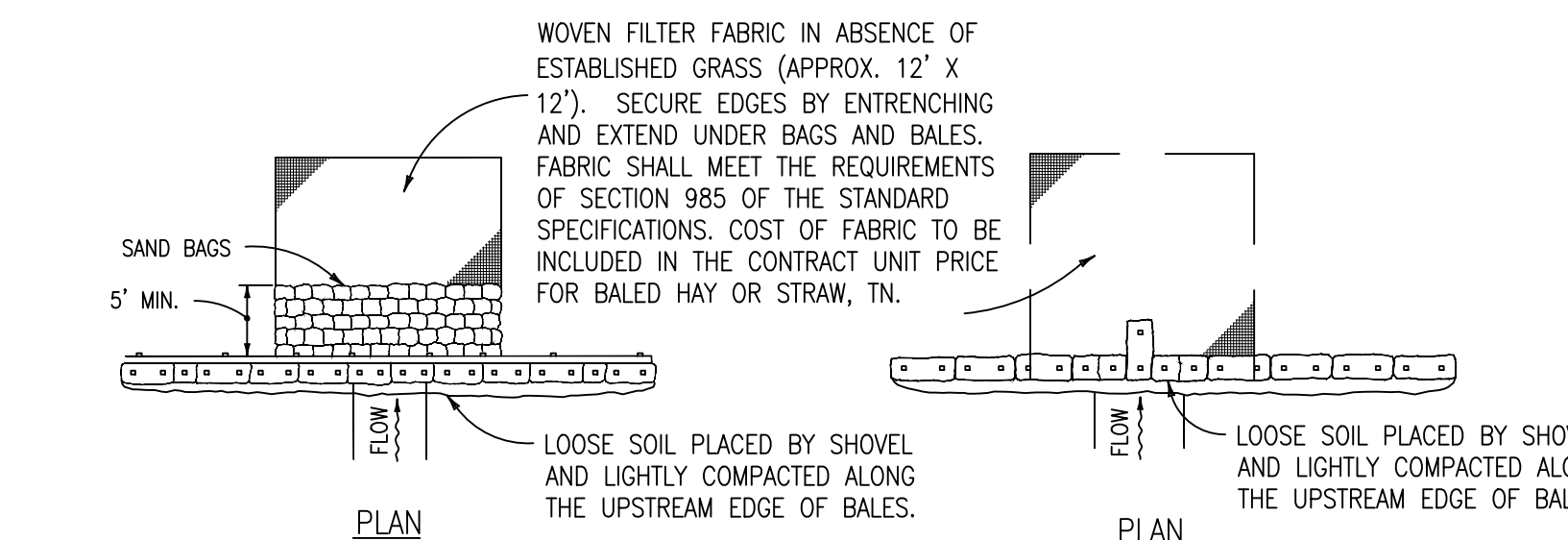
**B BALES BACKED BY FENCE**  
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**D DETAIL OF PROPERLY INSTALLED HAY BALE**  
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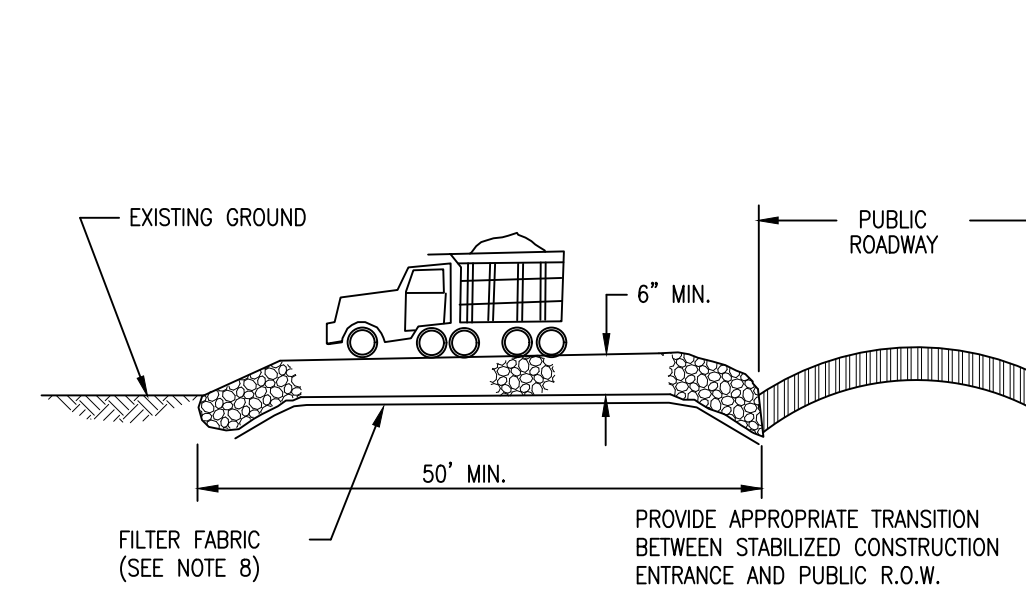


**D PROTECTION AROUND INLETS OR SIMILAR STRUCTURES**  
NTS



**K BARRIER FOR UNPAVED DITCHES**  
NTS

**K BARRIER FOR UNPAVED DITCHES**  
NTS



**G STABILIZED CONSTRUCTION ENTRANCE DETAIL**  
NTS

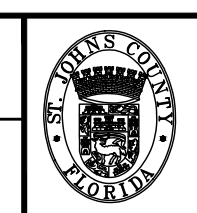
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5				
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3				
2	MM	10/2022		GST CONTRACTOR BID PACKAGE

**M M**  
**MOTT MACDONALD**

Mott MacDonald  
10245 Centurion Pkwy, N., Suite 320  
Jacksonville, Florida 32256  
Telephone: (904) 203-1090  
Architects Engineers Surveyors  
AA - C0000035 EB - 0000155 LB - 0006783

DESIGNER: S. WHITE  
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DESIGN ENGINEER  
**STEVEN D. WHITE**  
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58809

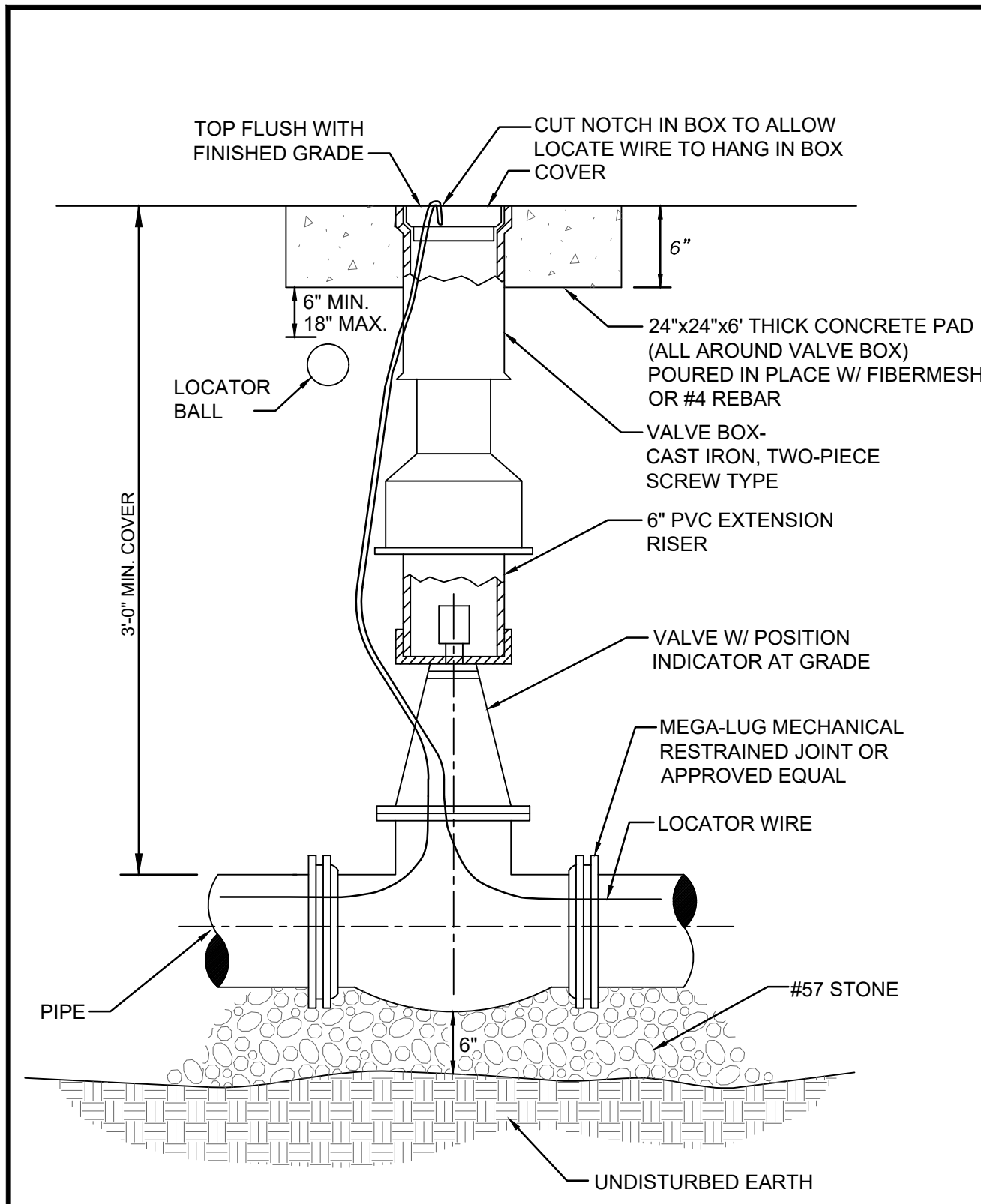


**St. Johns County**  
**Utility Department**  
1205 STATE ROAD 16  
ST. AUGUSTINE, FL 32084  
PHONE: (904) 209-2626 FAX: (904) 209-2627

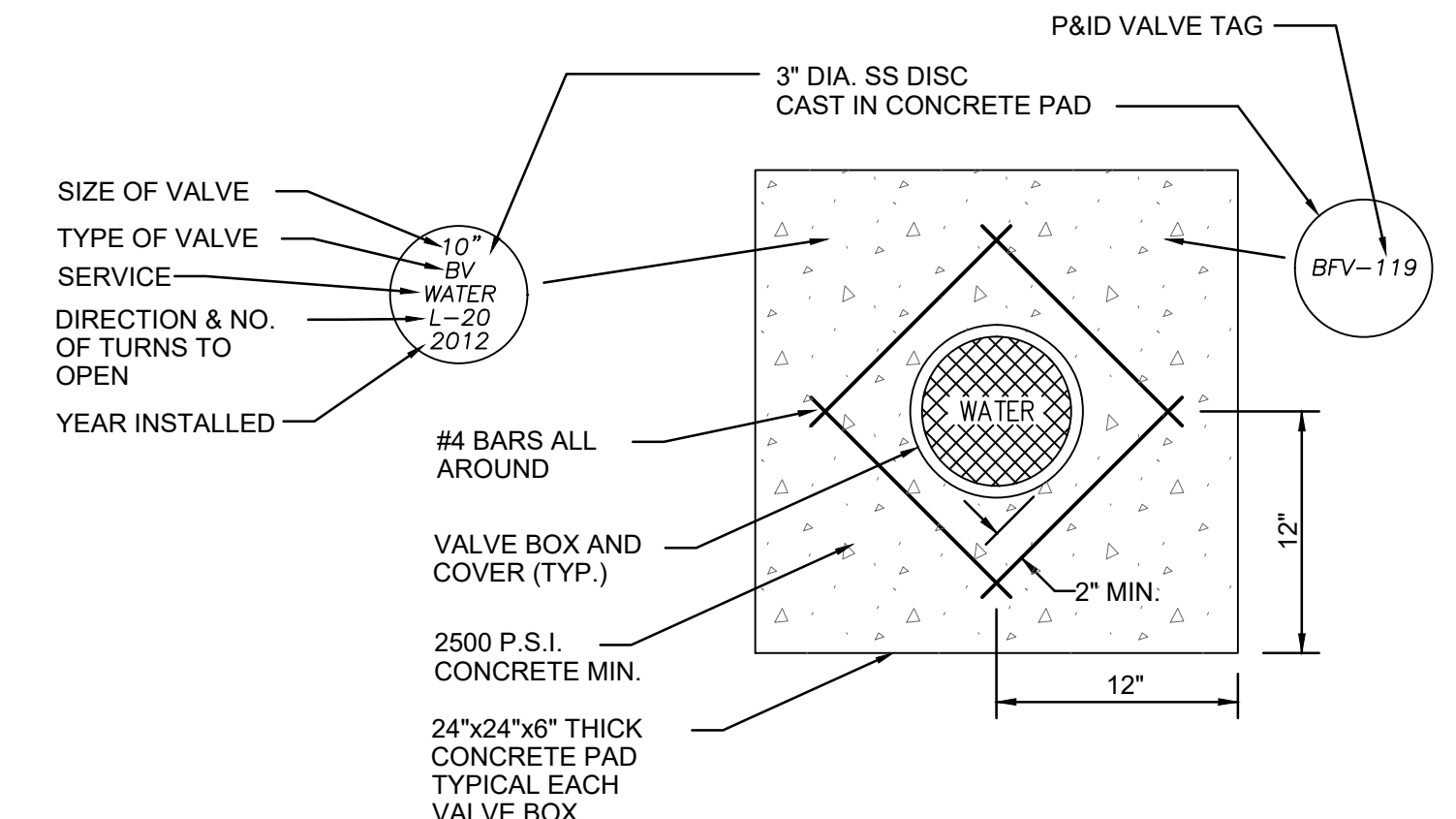
**GR-208 GROUND STORAGE TANK AND BOOSTER PUMP STATION**

**EROSION CONTROL DETAILS**

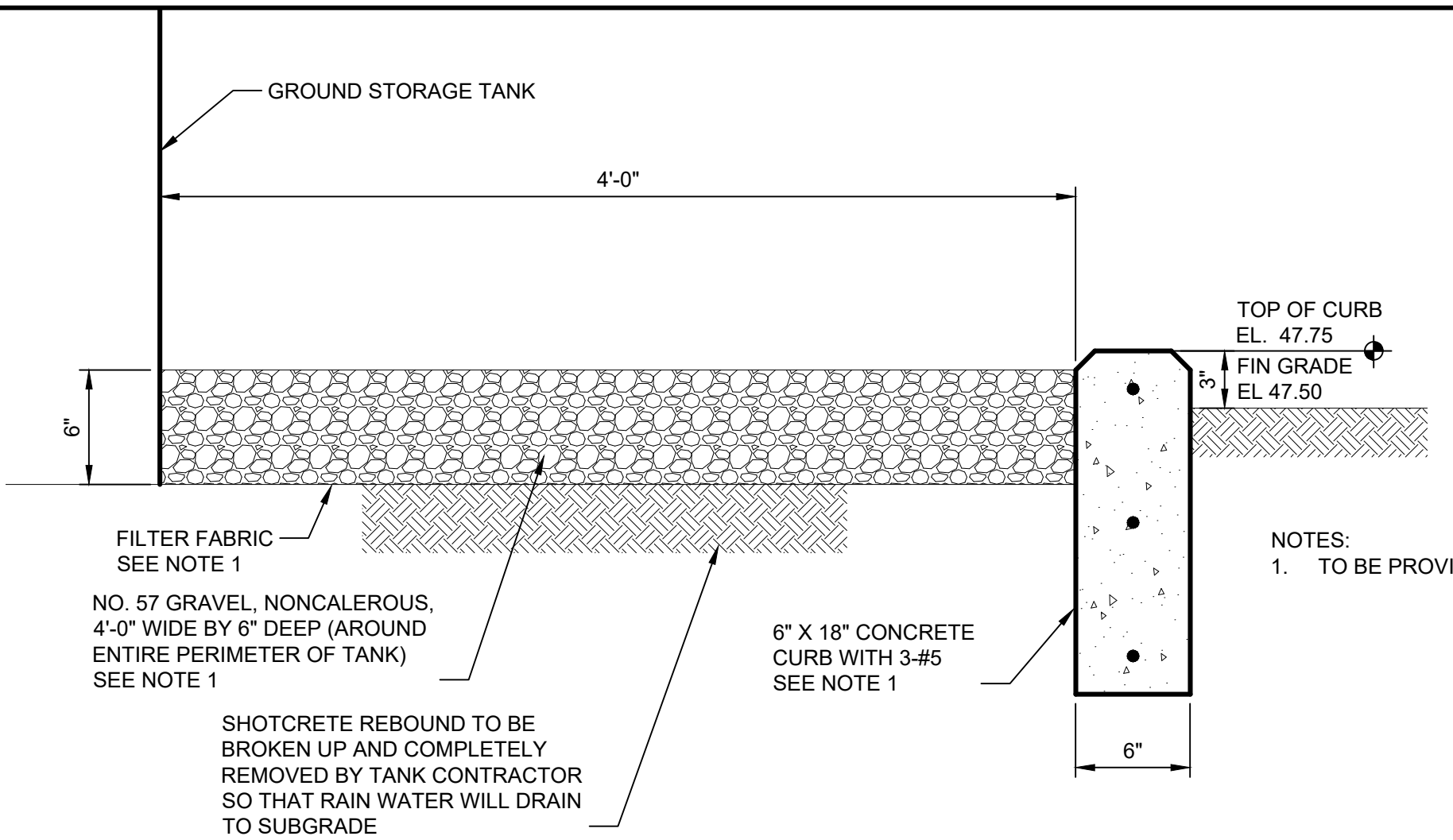
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DWG NO. CD-1  
GST BID PACKAGE



**A VALVE AND VALVE BOX**  
- NTS

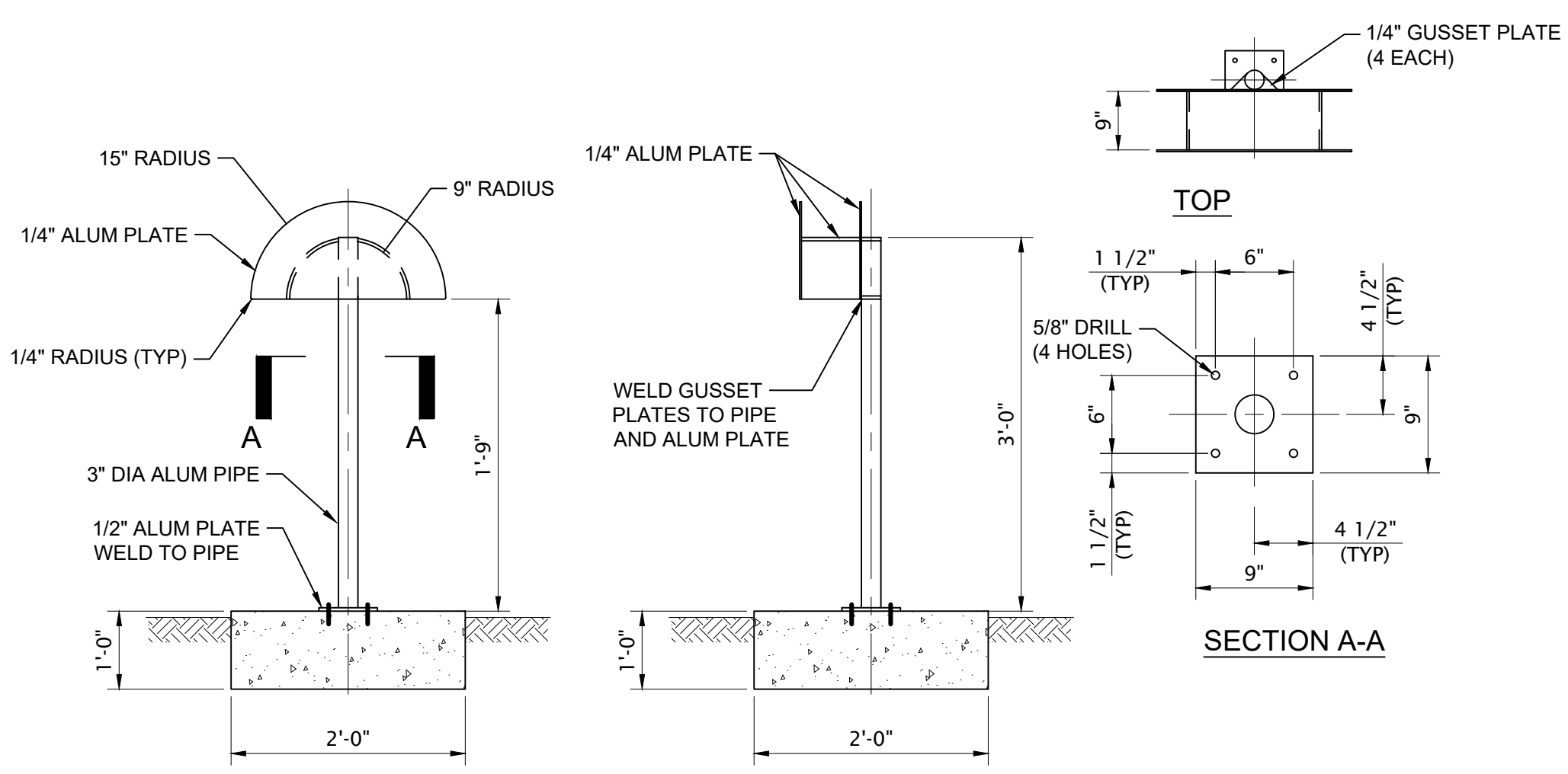


**B GRAVEL STRIP AND CURB**  
- NTS



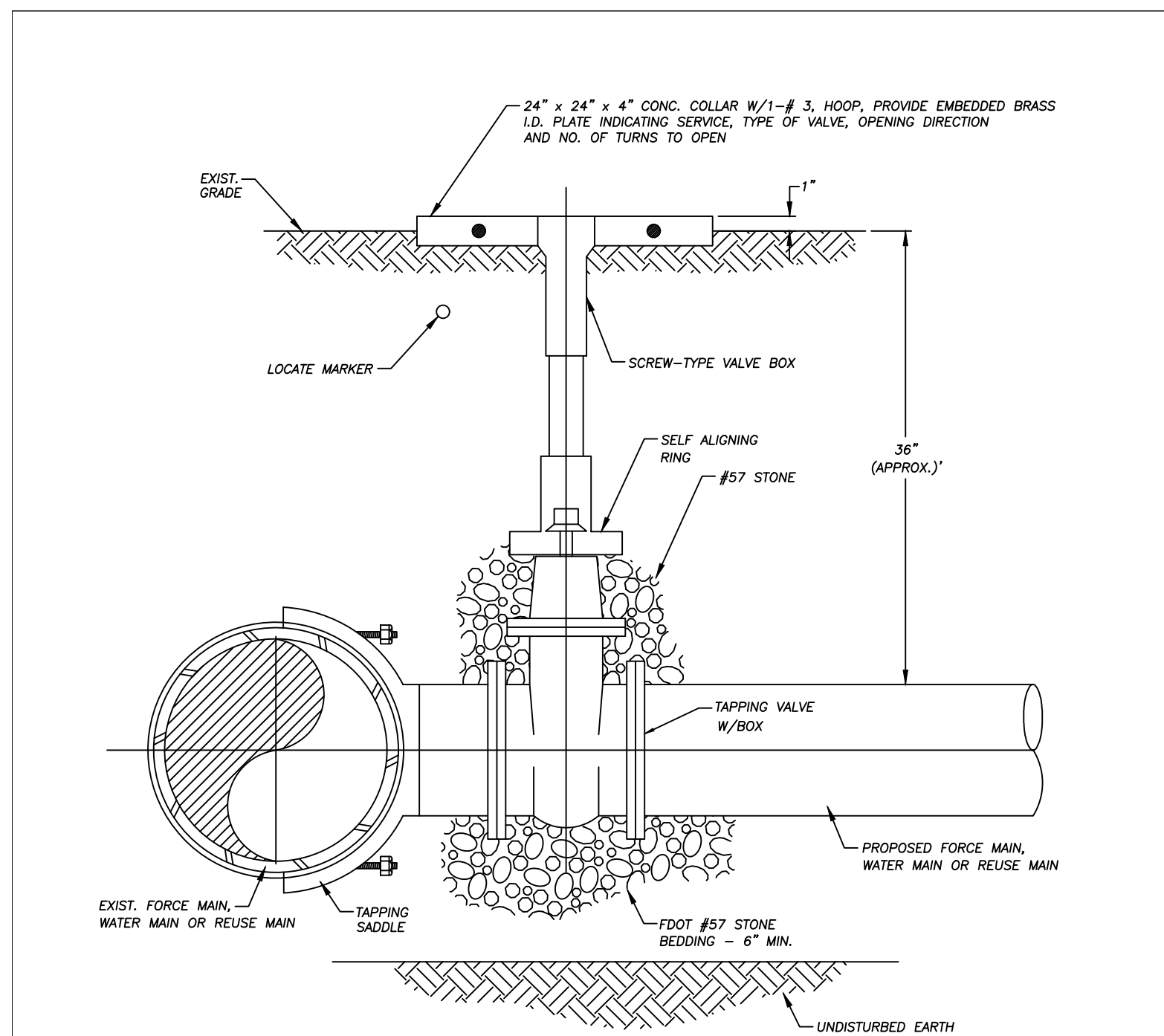
**C DISINFECTION SAMPLE TAP/HOSE BIBB**  
- NTS

- NOTES:**
1. NUT EXTENSION REQUIRED IF VALVE NUT IS DEEPER THAN 3' BELOW GRADE.
  2. SST I.D. FOR ALL SIZES.
  3. CORE 1/2" DEEP GROOVE IN CONCRETE PAD TO DENOTE ORIENTATION OF PIPE.
  4. LOCATION OF VALVE TO BE MARKED BY LETTER "V" SCRIBED A MINIMUM OF 4" HIGH AND 1/4" DEEP IN CURB AND CURB PAINTED BLUE FOR WATER AND PANTONE PURPLE 522C FOR REUSE. VALVE BOX COVERS SHALL BE PAINTED BLUE IF MAIN LINE VALVE; PAINTED YELLOW IF SERVING FIRE HYDRANT ONLY.
  5. VALVE BOX COVERS SHALL INCLUDE SERVICE DESIGNATION: WATER OR REUSE.
  6. NEW VALVE PADS AND VALVE TAGGING SHALL BE INSTALLED FOR ALL EXISTING VALVES.



**D YARD HOSE BIBB RACK**  
- NTS

- NOTES:**
1. PROVIDE 50'-0" HOSE AT EACH HOSE BIBB RACK LOCATION.



- NOTES:**
1. RESILIENT WEDGE GATE VALVE SHALL BE EPOXY COATED.
  2. TAPPING SADDLE SHALL BE STAINLESS STEEL.
  3. SELF-CENTERED ALIGNMENT RING.

REVISIONS	DATE	COMMENTS
2020		REVISION 1

**ST. JOHNS COUNTY UTILITY DEPARTMENT**  
1205 STATE ROAD 16  
ST. AUGUSTINE, FLORIDA 32084  
Phone (904) 209-2700 • Fax (904) 209-2802

**TAPPING SADDLE & TAPPING VALVE DETAIL**

SCALE: N.T.S.

PLATE: W-26

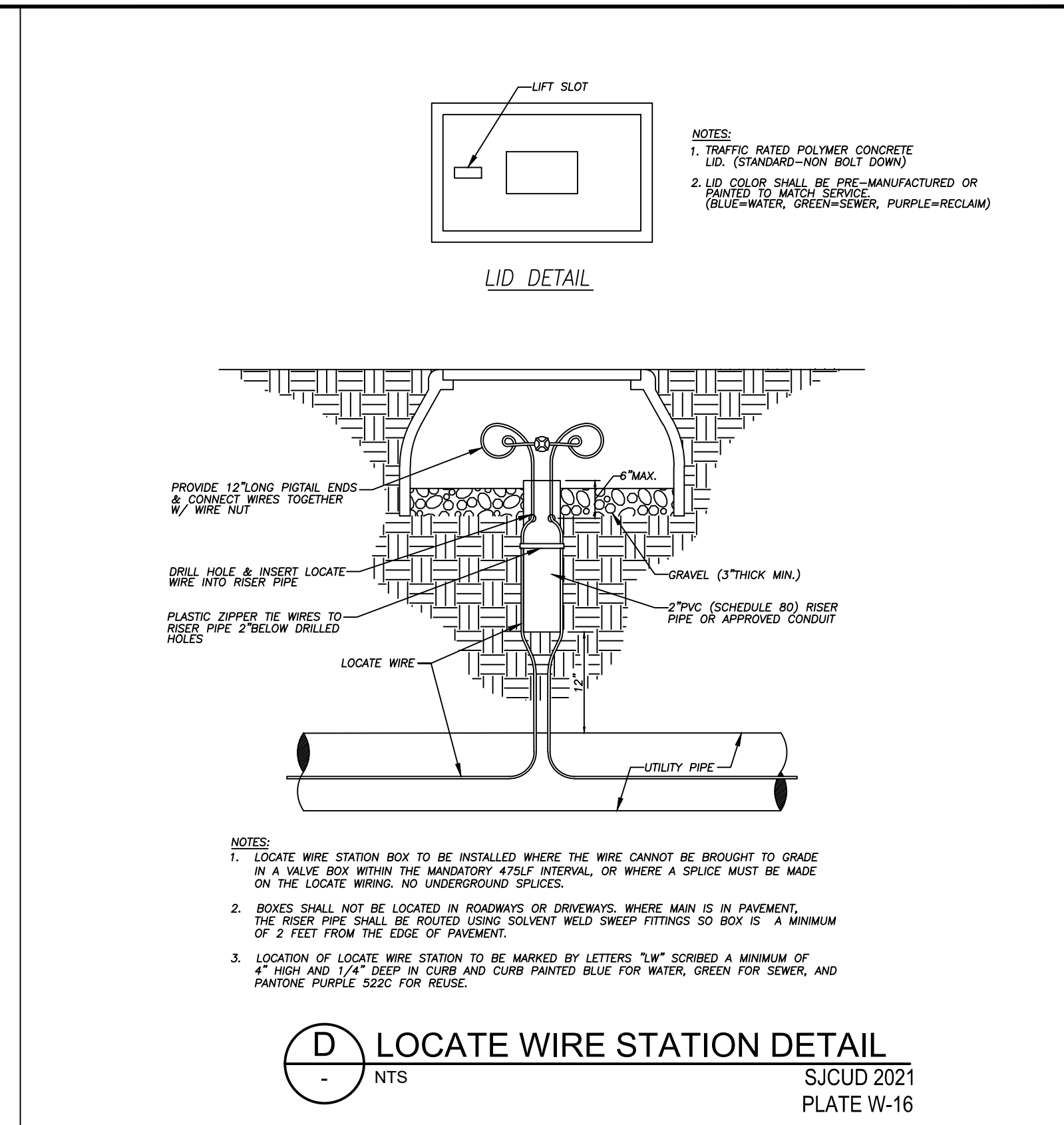
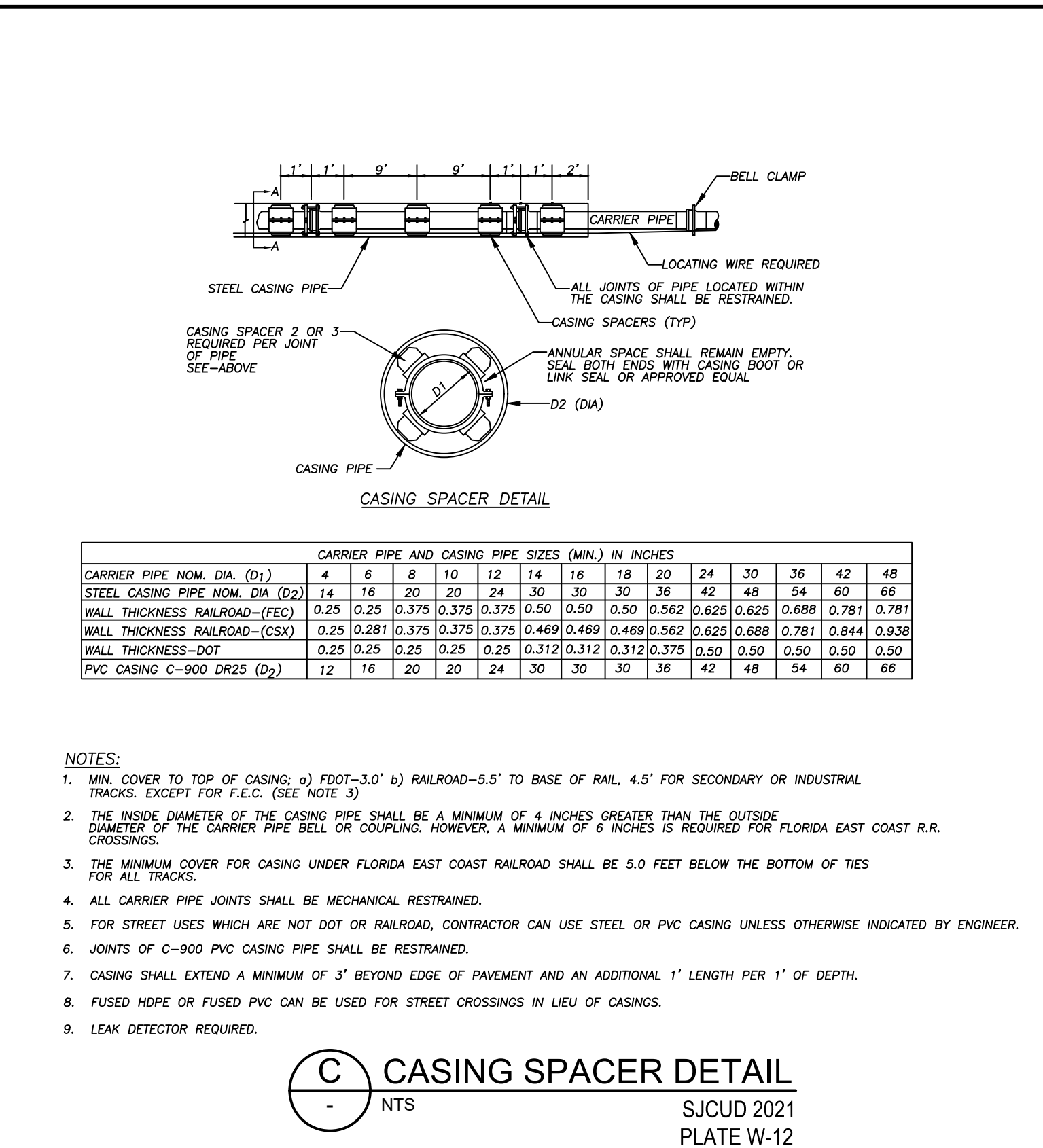
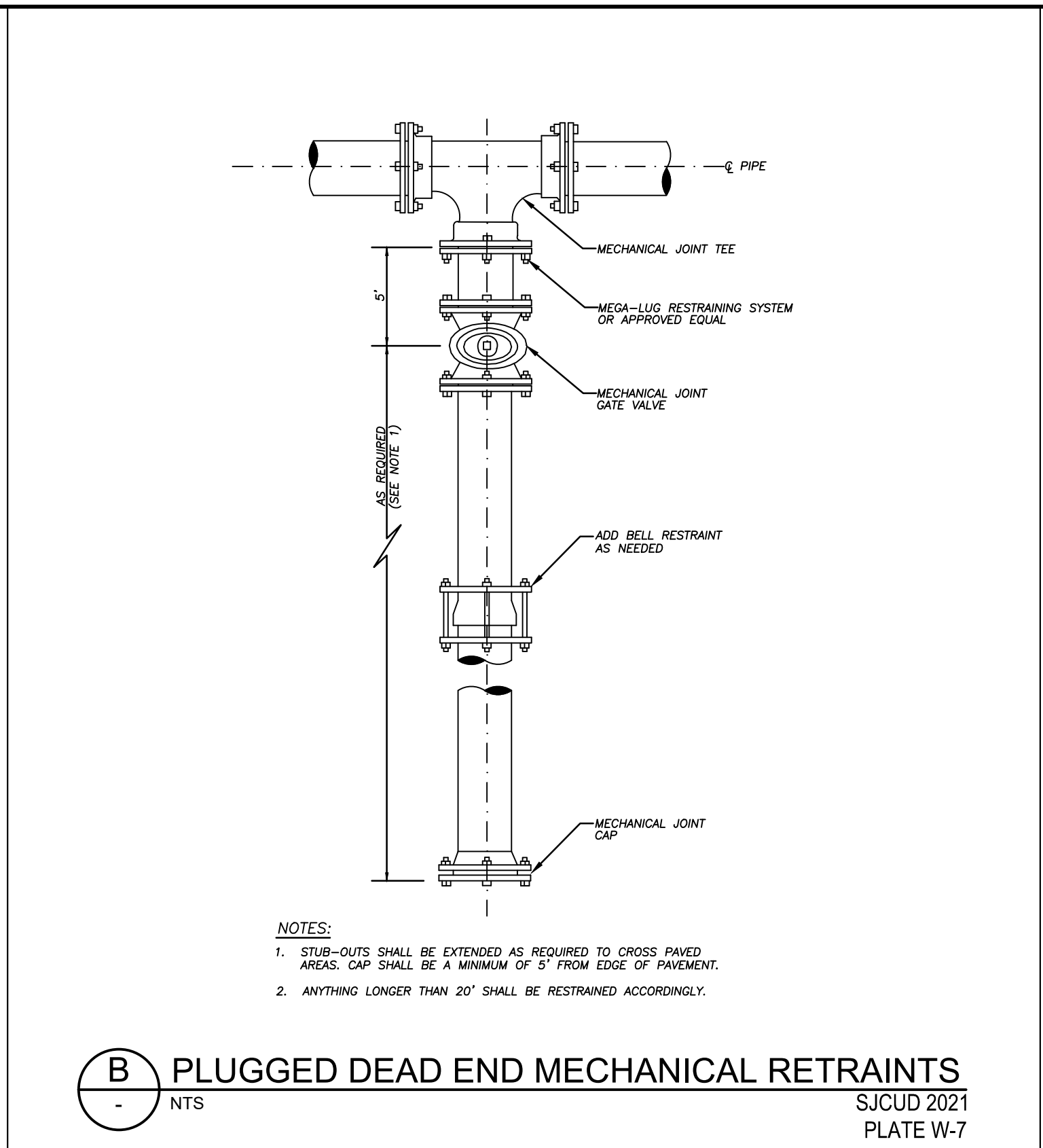
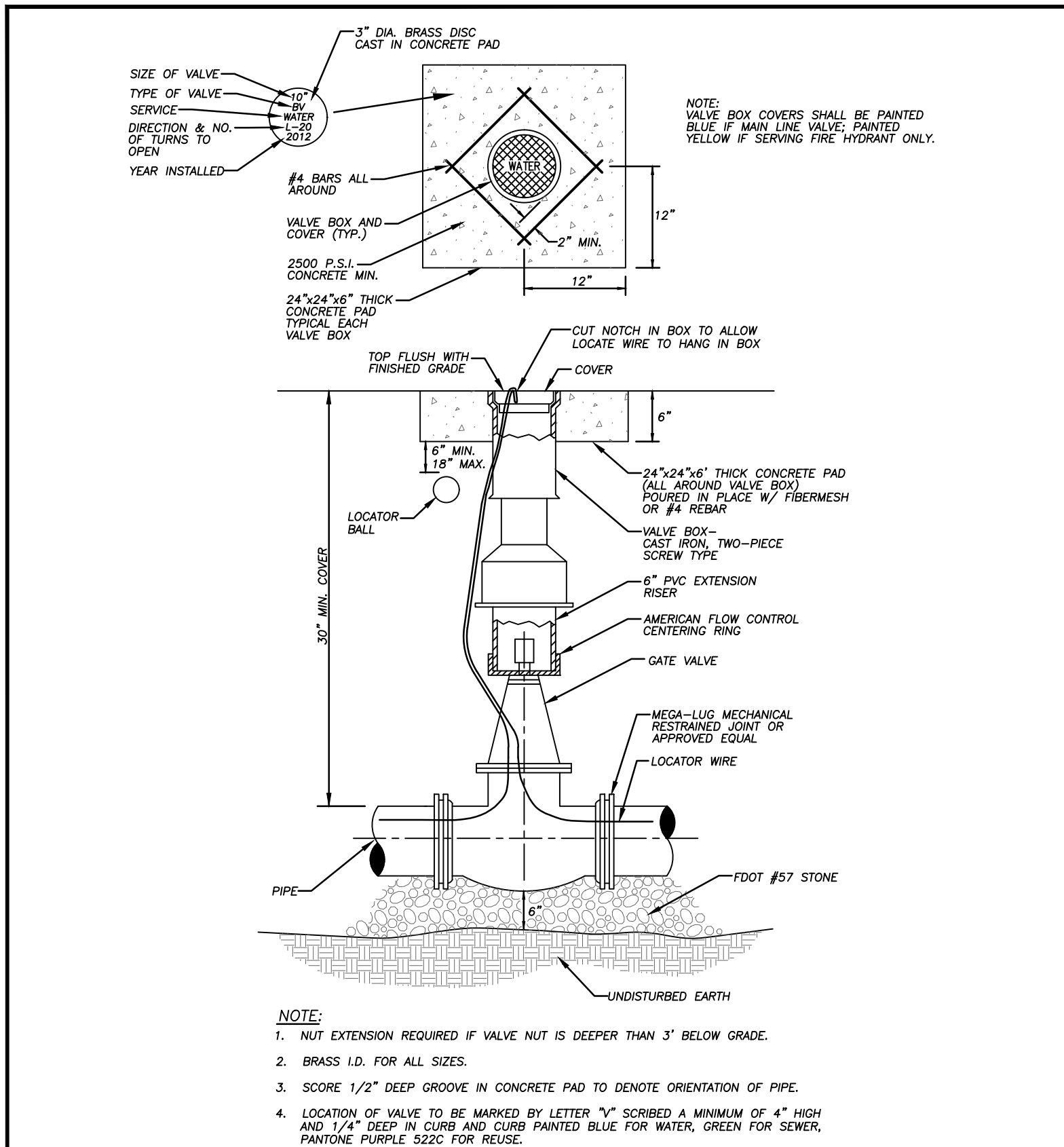
**E TAPPING SADDLE & TAPPING VALVE**  
- NTS

SJCUD 2021  
PLATE W-26

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NO.	BY	DATE	SYMBOL	REVISIONS													
1	MM	10/2022		GST CONTRACTOR BID PACKAGE													





REVISIONS	Date	Comments
2015	9/06	REVISION 2
2015	9/06	REVISION 1

REVISIONS	Date	Comments
2015	9/06	REVISION 2
2015	9/06	REVISION 1

REVISIONS	Date	Comments
2015	9/06	REVISION 2
2015	9/06	REVISION 1

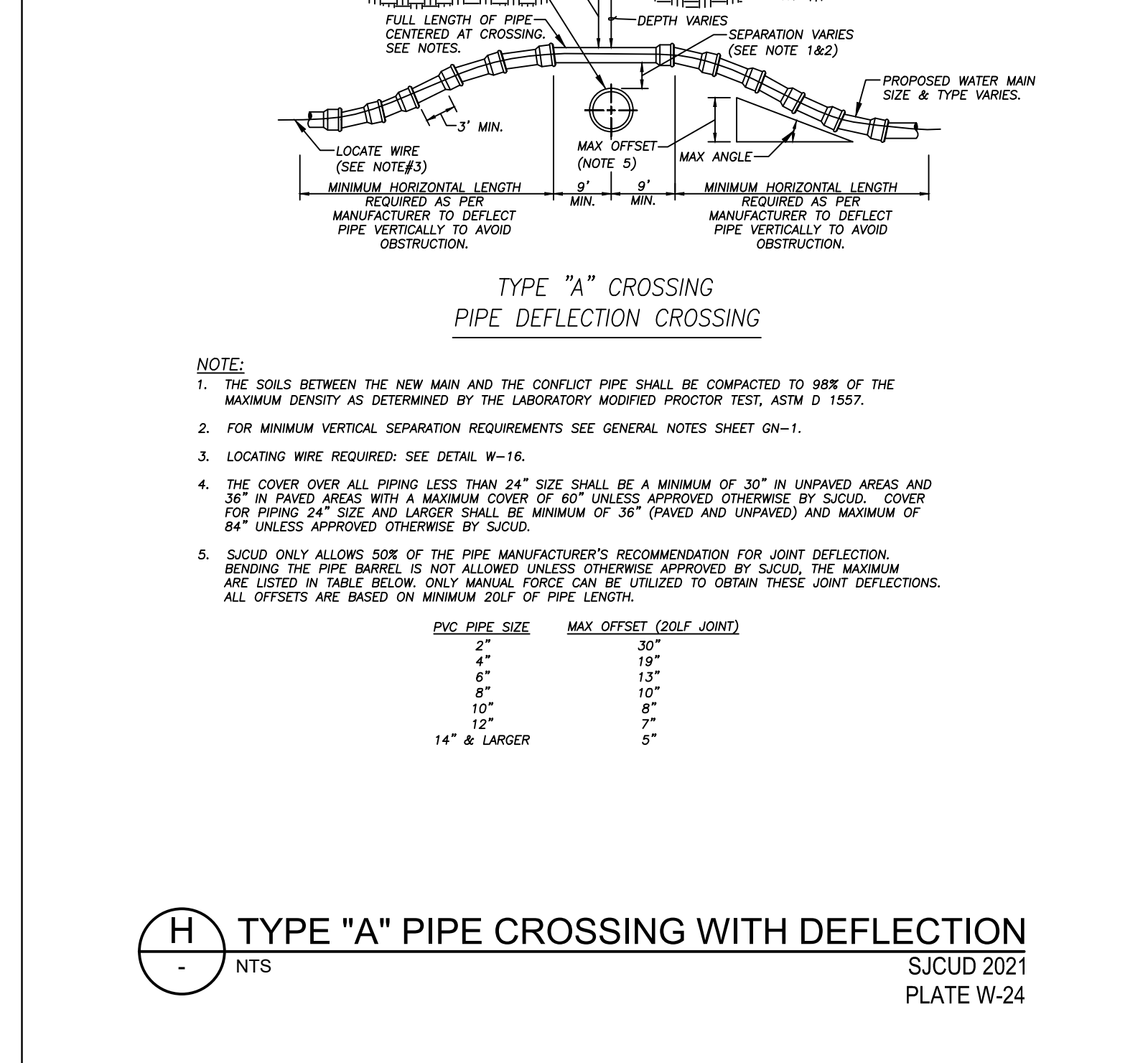
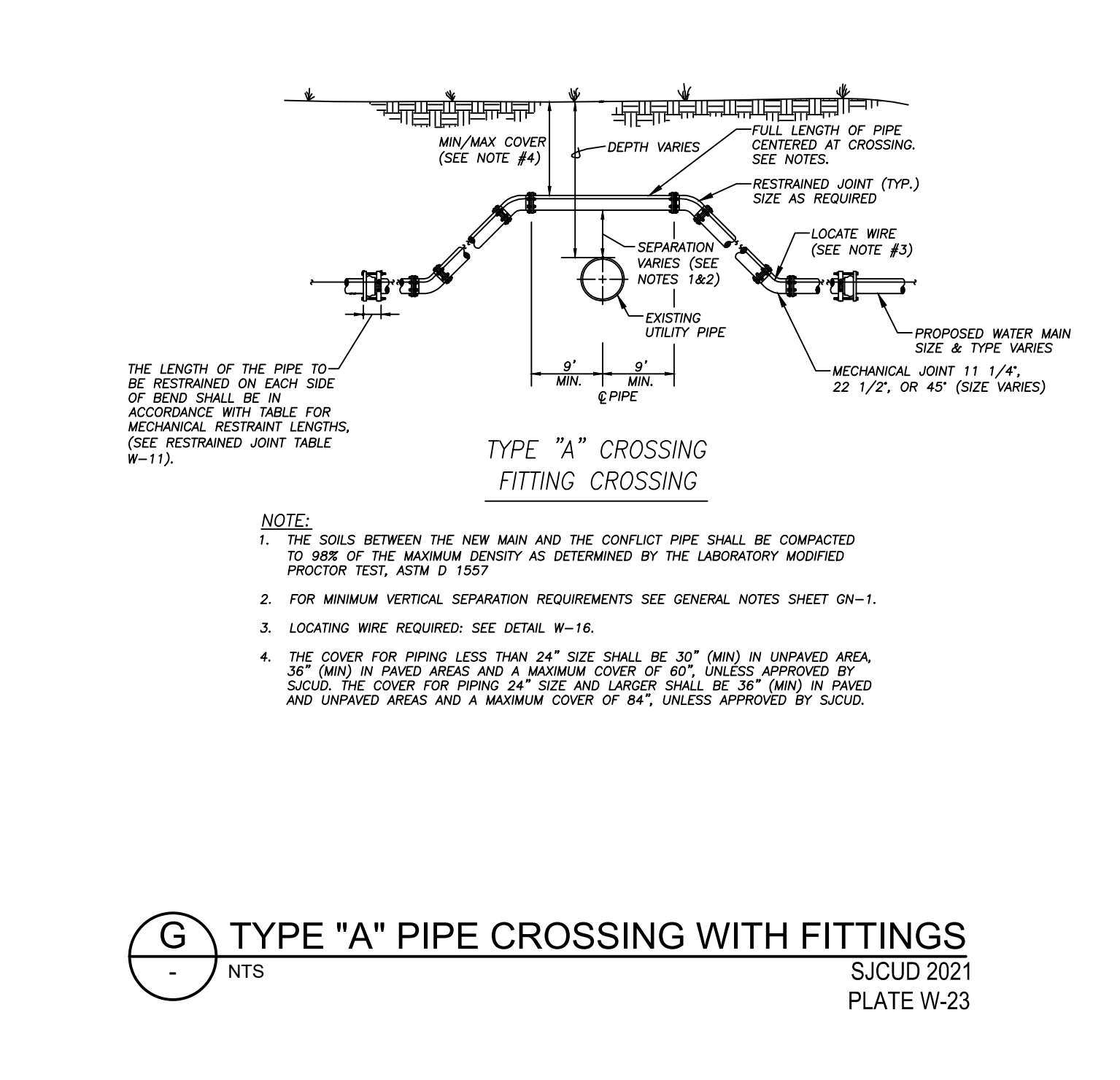
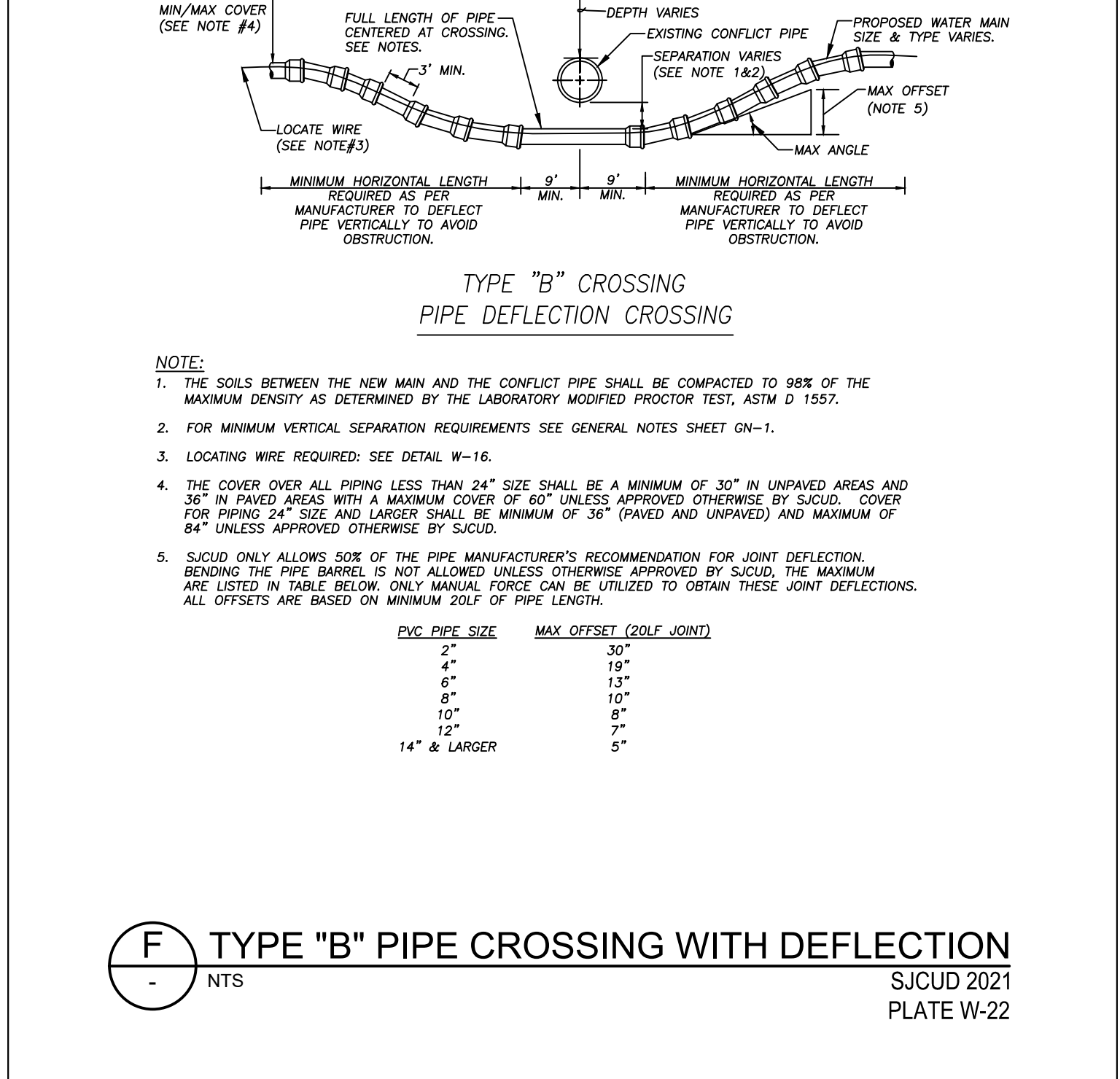
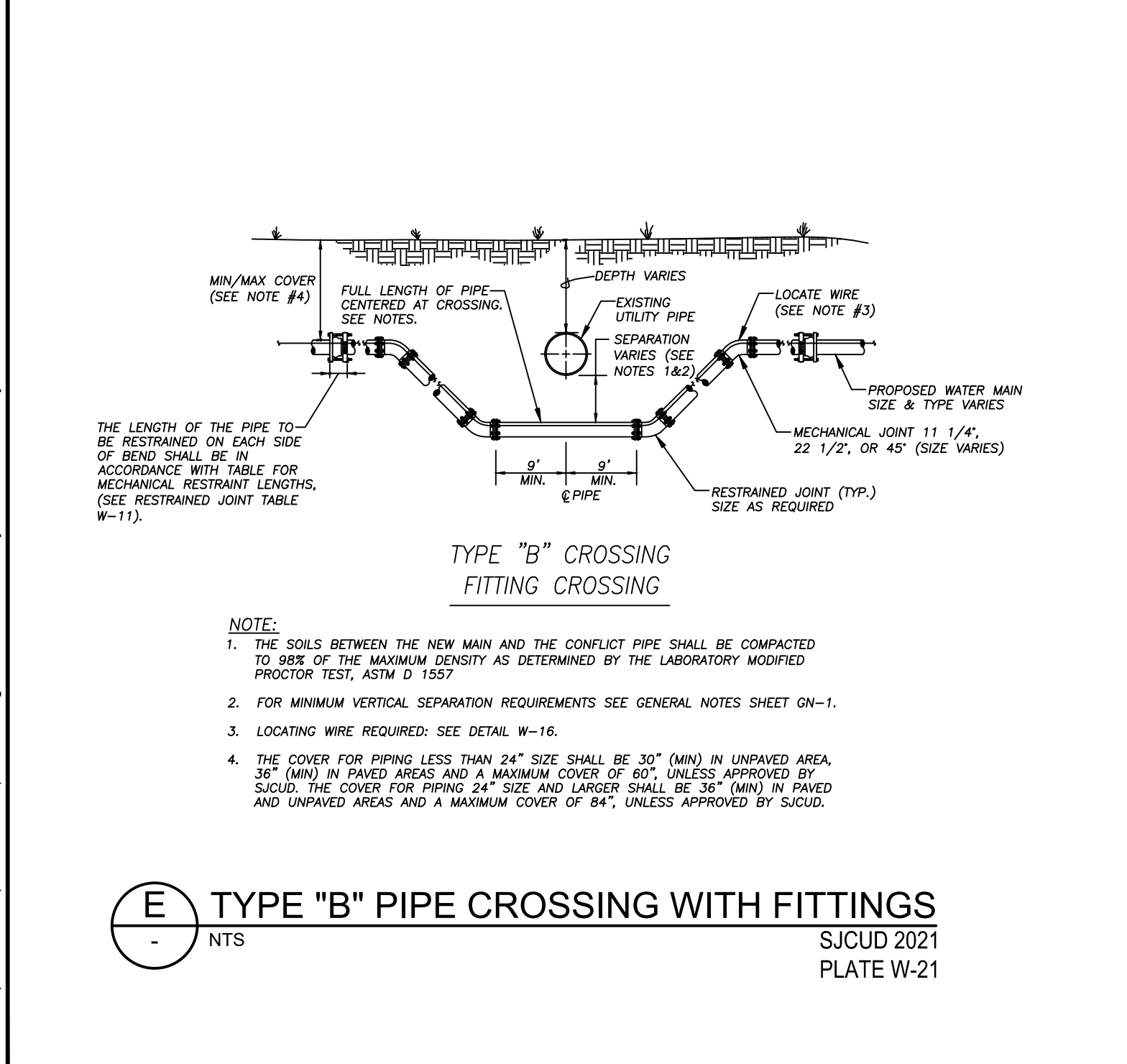
REVISIONS	Date	Comments
2015	9/06	REVISION 2
2015	9/06	REVISION 1

<p><b>A GATE VALVE &amp; BOX</b> SJCUD 2021 PLATE W-3/W-4</p>	<p><b>ST. JOHNS COUNTY UTILITY DEPARTMENT</b> 1205 STATE ROAD 16 ST. AUGUSTINE, FLORIDA 32084 Phone (904) 209-2700 • Fax (904) 209-2802</p>	<p><b>GATE VALVE &amp; BOX FOR UNPAVED LOCATIONS</b> 4" - 16" SCALE: N.T.S.</p>	<p>PLATE: W-3</p>
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<p><b>B PLUGGED DEAD END MECHANICAL RESTRAINTS</b> SJCUD 2021 PLATE W-7</p>	<p><b>ST. JOHNS COUNTY UTILITY DEPARTMENT</b> 1205 STATE ROAD 16 ST. AUGUSTINE, FLORIDA 32084 Phone (904) 209-2700 • Fax (904) 209-2802</p>	<p><b>PLUGGED DEAD END MECHANICAL RESTRAINTS</b> SCALE: N.T.S.</p>	<p>PLATE: W-7</p>
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<p><b>C CASING SPACER DETAIL</b> SJCUD 2021 PLATE W-12</p>	<p><b>ST. JOHNS COUNTY UTILITY DEPARTMENT</b> 1205 STATE ROAD 16 ST. AUGUSTINE, FLORIDA 32084 Phone (904) 209-2700 • Fax (904) 209-2802</p>	<p><b>CASING DETAIL</b> SCALE: N.T.S.</p>	<p>PLATE: W-12</p>
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<p><b>D LOCATE WIRE STATION DETAIL</b> SJCUD 2021 PLATE W-16</p>	<p><b>ST. JOHNS COUNTY UTILITY DEPARTMENT</b> 1205 STATE ROAD 16 ST. AUGUSTINE, FLORIDA 32084 Phone (904) 209-2700 • Fax (904) 209-2802</p>	<p><b>LOCATE WIRE STATION DETAIL</b> SCALE: N.T.S.</p>	<p>PLATE: W-16</p>
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REVISIONS	Date	Comments
2015	9/06	REVISION 1

REVISIONS	Date	Comments
2015	9/06	REVISION 1

REVISIONS	Date	Comments
2015	9/06	REVISION 1

REVISIONS	Date	Comments
2015	9/06	REVISION 1

<p><b>E TYPE "B" PIPE CROSSING WITH FITTINGS</b> SJCUD 2021 PLATE W-21</p>	<p><b>ST. JOHNS COUNTY UTILITY DEPARTMENT</b> 1205 STATE ROAD 16 ST. AUGUSTINE, FLORIDA 32084 Phone (904) 209-2700 • Fax (904) 209-2802</p>	<p><b>TYPE "B" PIPE CROSSING WITH FITTINGS</b> SCALE: N.T.S.</p>	<p>PLATE: W-21</p>
<p><b>F TYPE "B" PIPE CROSSING WITH DEFLECTION</b> SJCUD 2021 PLATE W-22</p>	<p><b>ST. JOHNS COUNTY UTILITY DEPARTMENT</b> 1205 STATE ROAD 16 ST. AUGUSTINE, FLORIDA 32084 Phone (904) 209-2700 • Fax (904) 209-2802</p>	<p><b>TYPE "B" PIPE CROSSING WITH DEFLECTION</b> SCALE: N.T.S.</p>	<p>PLATE: W-22</p>
<p><b>G TYPE "A" PIPE CROSSING WITH FITTINGS</b> SJCUD 2021 PLATE W-23</p>	<p><b>ST. JOHNS COUNTY UTILITY DEPARTMENT</b> 1205 STATE ROAD 16 ST. AUGUSTINE, FLORIDA 32084 Phone (904) 209-2700 • Fax (904) 209-2802</p>	<p><b>TYPE "A" PIPE CROSSING WITH FITTINGS</b> SCALE: N.T.S.</p>	<p>PLATE: W-23</p>
<p><b>H TYPE "A" PIPE CROSSING WITH DEFLECTION</b> SJCUD 2021 PLATE W-24</p>	<p><b>ST. JOHNS COUNTY UTILITY DEPARTMENT</b> 1205 STATE ROAD 16 ST. AUGUSTINE, FLORIDA 32084 Phone (904) 209-2700 • Fax (904) 209-2802</p>	<p><b>TYPE "A" PIPE CROSSING WITH DEFLECTION</b> SCALE: N.T.S.</p>	<p>PLATE: W-24</p>





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**STEEL JOISTS AND JOISTS GIRDERS**

1. THE ENGINEER OF RECORD DELEGATES DESIGN RESPONSIBILITY FOR THE PREPARATION, FABRICATION, AND ERECTION DRAWINGS TO A SPECIALTY ENGINEER. SUBMIT STEEL JOISTS SHOP DRAWING TO THE ENGINEER OF RECORD FOR REVIEW PRIOR TO FABRICATION. ALL SHOP DRAWINGS SHALL BE SIGNED, DATED, AND SEALED BY A SPECIALTY ENGINEER LICENSED IN THE STATE OF FLORIDA PRIOR TO SUBMITTING FOR REVIEW.
2. ALL JOISTS SHALL BE DESIGNED AND FABRICATED BY THE MANUFACTURER, AND ERECTED IN ACCORDANCE WITH STEEL JOIST INSTITUTE, LATEST REVISION.
3. STEEL JOIST MANUFACTURER SHALL SUBMIT ERECTION AND SHOP DRAWINGS SHOWING JOIST LOCATIONS, BRIDGING, CONNECTIONS AND DETAILS, JOIST TO JOIST CONNECTIONS, SPECIAL & EXTENDED ENDS, SLOPED SEATS & ACCESSORIES REQUIRED FOR THE INSTALLATION OF JOISTS.
4. JOISTS SHALL BE STORED ON WOOD SLEEPERS ON DRY, LEVEL GROUND. PERMANENTLY DEFORMED OR OTHERWISE DAMAGED JOISTS SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
5. THE CONTRACTOR SHALL SUPPLY THE STEEL JOIST FABRICATOR SPRINKLER DRAWINGS. THE STEEL JOIST FABRICATOR SHALL DESIGN THEIR PRODUCTS FOR THE LOADING IMPOSED BY SPRINKLER MAIN SUPPLY LINES AND BRANCHES. THE STEEL JOIST FABRICATOR SHALL BE SOLELY RESPONSIBLE FOR THE ADEQUACY OF THE JOIST DESIGN TO ACCOMMODATE SUCH IMPOSED LOADS. IF SPRINKLER DRAWINGS ARE NOT AVAILABLE, THE JOIST FABRICATOR SHALL USE A DESIGN LOAD OF 3 PSF APPLIED AS A UNIFORM OR CONCENTRATED LOADS WHICH CAN BE SUPPORTED BY THEIR SYSTEMS.
6. LH-SERIES JOIST STRUCTURAL STEEL SHALL BE ASTM A572, GRADE 50 (FY = 50,000 PSI) UNLESS NOTED OTHERWISE.
7. ALL JOIST SHALL BE COATED AS PER SPECIFICATION 09900.
8. THE STEEL JOIST MANUFACTURER SHALL INVESTIGATE THE JOISTS FOR A MINIMUM NET UPLIFT IN ACCORDANCE WITH THE STRUCTURAL NOTES AND FURNISH THE BRIDGING AND ATTACHMENTS NECESSARY TO ENSURE PROPER JOIST PERFORMANCE UNDER UPLIFT FORCES AND FORCES DUE TO ERECTION PER SJI SPECIFICATIONS AND OSHA REQUIREMENTS.
9. THE JOIST SPECIALTY ENGINEER SHALL COORDINATE REQUIRED CAMBER TO ACCOUNT FOR POSSIBLE INCREASED SECTION PROPERTIES DUE TO THE WIND UPLIFT DESIGN.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A STRAIGHT AND UNIFORM ROOF SYSTEM. PROVIDE SMOOTH TRANSITIONS BETWEEN ADJACENT JOISTS AND BETWEEN JOIST AND ADJACENT WALLS. WALLS THAT EXTEND TO THE ROOF DECK SHALL BE CONSTRUCTED AND COORDINATED TO MATCH FINAL IN-PLACE JOIST PROFILES OR SHIM AS REQUIRED.
11. STEEL JOIST BEARING AT EXTERIOR WALLS SHALL BE DESIGNED TO RESIST 2,500 POUNDS LATERAL FORCE PERPENDICULAR TO LONG SPAN JOISTS APPLIED AT THE TOP OF THE JOIST.
12. UNLESS OTHERWISE NOTED OR AS REQUIRED BY DESIGN OF JOIST MANUFACTURER, JOISTS SHALL BE CONNECTED TO STEEL BY 1/4" WELD, 4" LONG EACH SIDE.
13. HORIZONTAL BRIDGING SHALL BE AN ANGLE AT TOP AND BOTTOM. DESIGNED FOR L/R LESS THAN OR EQUAL TO 300. A SINGLE LINE OF BOTTOM CHORD BRIDGING MUST BE PROVIDED AT THE ENDS OF STEEL ROOF JOISTS NEAR THE FIRST BOTTOM CHORD PANEL POINT FOR WIND UPLIFT.
14. DIAGONAL BRIDGING SHALL BE AN ANGLE DESIGNED FOR L/R LESS THAN OR EQUAL TO 200.
15. UNLESS NOTED, 2ND AND 3RD JOIST SPACES FROM WALLS AND 1ST AND 2ND JOIST SPACES FROM DISCONTINUOUS TRANSITIONS SHALL HAVE CROSS BRIDGING (TO BE ALIGNED WITH HORIZONTAL BRIDGING).
16. JOIST BRIDGING SHALL NOT BE USED TO SUPPORT EQUIPMENT, PIPING, CONDUITS, DUCTWORK, ETC.
17. WHERE FIELD WELDING IS REQUIRED AT TOP OR BOTTOM CHORDS OF JOISTS, TEMPORARILY SHORE AT EACH SIDE OF WELDING LOCATION.
18. MECHANICAL/ELECTRICAL SUPPORTS:
  - A. COORDINATE ALL SUPPORTS WITH MECHANICAL DRAWINGS AND COMPLY WITH MECHANICAL SPECIFICATIONS.
  - B. LOCATE ALL ATTACHMENTS AS CLOSE TO PANEL POINTS AS POSSIBLE.
  - C. DISTRIBUTE LOADS UNIFORMLY ALONG JOISTS.
  - D. ALL SUPPORTS SHALL BE ATTACHED SO AS TO APPLY CONCENTRIC LOADS TO THE JOISTS AND JOIST MEMBERS. NO ECCENTRIC LOADS SHALL BE APPLIED WHICH MAY CAUSE THE JOISTS OR INDIVIDUAL MEMBERS TO ROTATE AND BUCKLE.
  - E. DO NOT ALTER ANY PART OF ANY JOIST WITHOUT WRITTEN APPROVAL FROM THE SPECIALTY ENGINEER. CUTTING, DRILLING, OR NOTCHING ANY MEMBER OF THE JOIST IS PROHIBITED WITHOUT WRITTEN PRIOR APPROVAL. IN NO WAY SHALL THE INTEGRITY OF THE JOISTS BE ADVERSELY ALTERED BY ATTACHING PIPE SUPPORTS OR ANY OTHER ATTACHMENTS.

**STRUCTURAL STEEL**

1. ALL STEEL WORK (INCLUDING FABRICATION AND ERECTION) SHALL CONFORM TO THE AISC "MANUAL OF STEEL CONSTRUCTION, ALLOWABLE STRESS DESIGN" 15TH EDITION AND PROJECT SPECIFICATIONS, USE THE FOLLOWING:
  - A. STRUCTURAL STEEL WIDE FLANGE AND WT SECTIONS: ASTM A992 Fy=50 KSI
  - B. CHANNELS, ANGLES, PLATES, AND MISCELLANEOUS STEEL: ASTM A36, Fy=36 KSI
  - C. STRUCTURAL STEEL TUBING: ASTM A500 GRADE B, Fy=46 KSI (RECTANGULAR) & Fy=42 KSI (ROUND)
  - D. STEEL PIPE: ASTM A53, TYPE E OR S GRADE B, Fy=35 KSI
2. THE CONNECTIONS FOR ANY PORTION OF THE STRUCTURE NOT INDICATED ON THE DRAWINGS SHALL BE DESIGNED AND DETAILED BY THE FABRICATOR'S SPECIALTY ENGINEER. THESE CONNECTIONS SHALL BE DESIGNED FOR THE FORCES INDICATED ON THE STRUCTURAL DRAWINGS. WHERE FORCES ARE NOT SHOWN ON THE DRAWINGS, EACH END CONNECTION SHALL BE DESIGNED FOR ONE-HALF THE TOTAL LOAD SHOWN IN THE APPROPRIATE AISC "ALLOWABLE LOADS ON BEAMS" TABLES.
3. USE STRUCTURAL STEEL THAT IS FULLY WELDABLE WITHIN GRADES AND FROM ANY GRADE TO ANY OTHER GRADE. WELD ALL SHOP CONNECTIONS, UNLESS OTHERWISE NOTED.
4. ALL SHOP AND FIELD WELDING SHALL CONFORM TO THE STRUCTURAL WELDING CODE AWS D1.1, LATEST EDITION, PUBLISHED BY THE AMERICAN WELDING SOCIETY (AWS). USE ELECTRODES CONFORMING TO AWS D1.1, E70 SERIES, UNLESS OTHERWISE NOTED. SHOW ALL SHOP WELDS ON THE FABRICATION DRAWINGS AND ALL FIELD WELDS ON THE ERECTION DRAWINGS.
5. ALL SHOP AND FIELD WELDERS, WELDING OPERATORS, AND TACKERS SHALL BE CERTIFIED ACCORDING TO AWS PROCEDURE FOR THE WELDING PROCESS AND WELDING POSITION USED. ALL RECORDS OF SUCH CERTIFICATION SHALL BE FILED AT THE JOBSITE AND MADE AVAILABLE TO THE ENGINEER UPON REQUEST.
6. ALL JOINT WELDING PROCEDURES TO BE USED SHALL BE PREPARED BY THE FABRICATOR OR CONTRACTOR AS WRITTEN PROCEDURE SPECIFICATIONS. ALL RECORDS SHALL BE FILED AT THE JOB SITE & MADE AVAILABLE TO THE ENGINEER UPON REQUEST. ALL JOINT WELDING PROCEDURES SHALL BE QUALIFIED PRIOR TO USE ACCORDING TO AWS PROCEDURES.
7. CUT, DRILL, OR PUNCH HOLES PERPENDICULAR TO METAL SURFACES. DO NOT FLAME CUT HOLES OR ENLARGE HOLES BY BURNING.
8. SPLICING OF STRUCTURAL STEEL MEMBERS IN THE FIELD OR IN THE SHOP IS PROHIBITED EXCEPT WHERE INCLUDED ON THE DRAWINGS.
9. DO NOT PAINT STEEL SURFACES IN CONTACT WITH CONCRETE. DO NOT APPLY FINISH COAT AND LIMIT PRIME COAT TO 2 MILS AT FAYING SURFACES OF SLIP CRITICAL BOLTED CONNECTIONS, SURFACES TO BE WELDED AND TOP SURFACES OF BEAMS AND TRUSSES TO RECEIVE STEEL STUDS AND/OR SUPPORTING METAL FLOOR AND ROOF DECKING. USE PRIMER WHICH HAS A MINIMUM CLASS A SLIP COEFFICIENT (0.33).
10. REFER TO ARCHITECTURAL PLANS FOR FIREPROOFING OF STRUCTURAL STEEL MEMBERS. REFER TO SPECIFICATIONS FOR PAINTING OF STRUCTURAL STEEL.
11. SUBMIT STRUCTURAL STEEL SHOP DRAWINGS TO ENGINEER FOR REVIEW BEFORE FABRICATION. ALL STRUCTURAL STEEL SHOP DRAWINGS, REQUIRING INPUT FROM A SPECIALTY ENGINEER, SHALL BE SIGNED AND SEALED PRIOR TO SUBMITTAL. DO NOT REPRODUCE THE STRUCTURAL DRAWINGS FOR USE AS SHOP DRAWINGS.
12. PROVIDE TEMPORARY BRACING AS NECESSARY TO INSURE A STABLE STRUCTURE DURING CONSTRUCTION.
13. NO CUTTING OF SECTIONS, FLANGES, WEBS, OR ANGLES SHALL BE ALLOWED WITHOUT WRITTEN APPROVAL FROM THE ENGINEER OF RECORD.
14. FABRICATE AND ERECT STRUCTURAL STEEL IN ACCORDANCE WITH AISC SPECIFICATIONS AND "CODE OF STANDARD PRACTICE".
15. IMMEDIATELY AFTER ERECTION ALL FRAMING MEMBERS AND WELDS SHALL BE TOUCHED UP WITH A PAINT COMPATIBLE WITH THE SHOP PAINT OR COATING.
16. ALL EXPOSED STEEL SHALL EITHER BE PAINTED PER SPEC 09900 OR HOT DIPPED GALVANIZED.

**MISCELLANEOUS STEEL**

1. FOR MISCELLANEOUS STEEL NOT SHOWN ON STRUCTURAL DRAWINGS, REFER TO ARCHITECTURAL AND MECHANICAL DRAWINGS.
  2. EDGE ANGLES, CLIP ANGLES, PLATES, BARS, AND OTHER MISCELLANEOUS ROLLED SHAPES SHALL BE ASTM A-36 STRUCTURAL STEEL, UNLESS OTHERWISE NOTED.
  3. THE PROVISIONS OF THE ABOVE STRUCTURAL STEEL SECTION SHALL ALSO APPLY TO MISCELLANEOUS STEEL.
- ALUMINUM**
1. ALL ALUMINUM ITEMS SHALL BE ALLOY 6061-T6 WITH TEMPER T6 CONFORMING TO ASTM B209 AND B308. REFER TO ARCHITECTURAL FOR FINISH.
  2. WELDING OF ALUMINUM SHALL USE GAS TUNGSTEN ARC OR GAS METAL ARC WELDING WITH NO POSTWELD HEAT TREATMENT. THE FILLER WIRE SHALL BE 5556.
  3. ALUMINUM IN CONTACT WITH CONCRETE, GROUT, OR DISSIMILAR METALS SHALL BE COATED WITH A CHROMATE CONVERSION COATING.
  4. STEEL FASTENERS OR HARDWARE IN CONTACT WITH ALUMINUM SHALL BE AISI 316 STAINLESS STEEL.

**PIPING, PIPELINE APPURTENANCES, VALVE, SUPPORTS, HANGERS, STRUTS, BLOCKING AND ANCHORAGE NOTES**

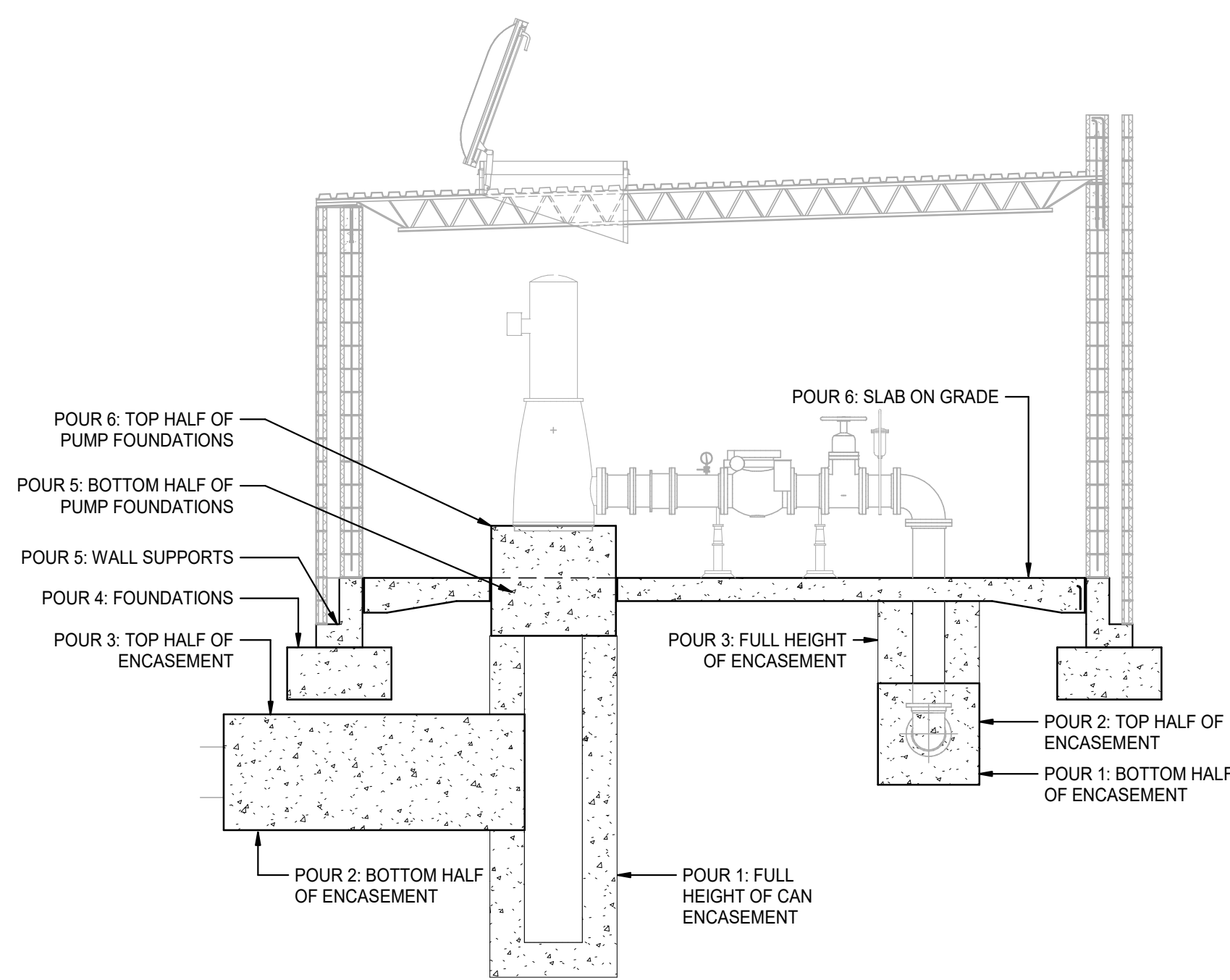
1. CONTRACTOR SHALL REFER TO THE APPLICABLE DIVISIONS OF THE SPECIFICATIONS FOR SUPPORTS, BLOCKING, ANCHORAGE, AND RESTRAINING OF ALL PIPE, VALVES AND PIPING APPURTENANCES.
2. CONTRACTOR SHALL REVIEW WITH THE ENGINEER ALL LOCATION AND ARRANGEMENT OF PIPING OPENINGS, PIPE SLEEVES, TRENCHES, AS REQUIRED TO COMPLETE HIS WORK AND SHALL NOT PROCEED WITH INSTALLATION OF SAME UNTIL SUCH HAS BEEN REVIEWED AND WILL NOT IMPAIR THE STRUCTURAL INTEGRITY OF THE CONCRETE MEMBERS.
3. CONTRACTOR SHALL PROVIDE AND COORDINATE THE INSTALLATION OF ALL ITEMS TO BE EMBEDDED IN THE CONCRETE SYSTEM AND SHALL COOPERATE SO AS NOT TO DELAY THE CONSTRUCTION WORK. SUCH ITEMS SHALL INCLUDE PIPES, SLEEVES, BOLTS, STRUTS, HANGERS AND FITTINGS, ETC., THAT ARE TO BE EMBEDDED IN THE CONCRETE SYSTEM.

**REFERENCE DATUM AND FLOOD DATA**

1. ELEVATIONS INDICATED ON BOOSTER STATION BUILDING PLANS AND DETAILS ARE NAVD ELEVATIONS. COORDINATE ADDITIONAL ELEVATIONS WITH CIVIL DRAWINGS.
2. PROJECT IS LOCATED IN FLOOD ZONE X.

**STANDARD STRUCTURAL ABBREVIATIONS**

AB	ANCHOR BOLT	PC	PRECAST
ADD	ADDITIVE	PREFAB	PREFABRICATED
ADD'L	ADDITIONAL	PROJ	PROJECTION
ALT	ALTERNATE/ALTERNATIVE	REF	REFERENCE
ALUM	ALUMINUM	REINF	REINFORCING
ACI	AMERICAN CONCRETE INSTITUTE	REQ'D	REQUIRED
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION	RW	RETAINING WALL
AISI	AMERICAN IRON AND STEEL INSTITUTE	RD	ROOF DRAIN
ASTM	AMERICAN SOCIETY OF TESTING MATERIALS	REV	REVISION
AWS	AMERICAN WELDING SOCIETY	SCHED	SCHEDULE
ARCH	ARCHITECTURAL	SP, SP'S	SPACE/SPACES
BP	BASE PLATE	SPECS	SPECIFICATIONS
BM	BEAM	SLV	SHORT LEG VERTICAL
BRG	BEARING	SIM	SIMILAR
BLK	BLOCK	STD	STANDARD
B/	BOTTOM OF BUILDING	STIFF	STIFFENER
BLDG	BUILDING	STRUCT	STRUCTURAL
BTWN	BETWEEN	SYM	SYMMETRICAL
BOT	BOTTOM	THD	THREAD/THREADED
CIP	CAST IN PLACE	THK	THICK
C TO C	CENTER TO CENTER	T/	TOP OF
CLR	CLEAR/CLEARANCE	TD	TURNDOWN SLAB
COL	COLUMN	T&B	TOP AND BOTTOM
CONC	CONCRETE	TS	THICKENED SLAB
CB	CONCRETE BEAM	TYP	TYPICAL
CMU	CONCRETE MASONRY UNIT	UON	UNLESS OTHERWISE NOTED
CONT	CONTINUOUS	VERT	VERTICAL
CONN	CONNECTION	VIF	VERIFY IN FIELD
CJ	CONSTRUCTION JOINT	WWF	WELDED WIRE FABRIC
DET	DETAIL	W	WIDE FLANGE
DIM	DIMENSION	w/	WITH
DWG	DRAWING	w/O	WITHOUT
EA	EACH	@	WORK POINT
EE	EACH END	C	AT
EF	EACH FACE	K	CHANNEL
ES	EACH SIDE	Sx	KIP (1,000 LBS)
EW	EACH WAY	Ix	SECTION MODULUS
ELEC	ELECTRICAL	±	MOMENT OF INERTIA
ENGR	ENGINEER	±	PLUS OR MINUS
EQ SP	EQUAL SPACED	Q , CL	CENTERLINE
EL	ELEVATION	DIA	DIAMETER
EJ	EXPANSION JOINT	⊕	ELEVATION
EXIST	EXISTING	⊞	MASONRY CONTROL JOINT
EXP	EXPANSION	⊞	(REFER TO PLAN FOR LOCATIONS)
EXT	EXTERIOR	RL , PL	PLATE
FD	FLOOR DRAIN		
FDN	FOUNDATION		
FF	FINISH FLOOR		
FIN FL	FINISH FLOOR		
FS	FAR SIDE		
FTG	FOOTING		
GA	GAGE/GAUGE		
GALV	GALVANIZE		
GL	GRID LINE		
HORIZ	HORIZONTAL		
HP	HIGH POINT		
HT	HEIGHT		
ID	INSIDE DIAMETER		
IF	INSIDE FACE		
JT	JOINT		
JST	JOIST		
KWY	KEYWAY		
LDG	LANDING		
LT	LIGHT		
LT WT	LIGHT WEIGHT		
LLH	LONG LEG HORIZONTAL		
LLV	LONG LEG VERTICAL		
LP	LOW POINT		
MAX	MAXIMUM		
MID	MIDDLE		
MANUF	MANUFACTURER		
MIN	MINIMUM		
MISC	MISCELLANEOUS		
M.O.	MASONRY OPENING		
MATL	MATERIAL		
MECH	MECHANICAL		
MPH	MILES PER HOUR		
MTL	METAL		
NS	NEAR SIDE		
NIC	NOT IN CONTACT		
NTS	NOT TO SCALE		
NO. , #	NUMBER		
OC	ON CENTER		
OD	OUTSIDE DIAMETER		
OF	OUTSIDE FACE		
O/O	OUT TO OUT		
OPNG	OPENING		
PLY	PLYWOOD		

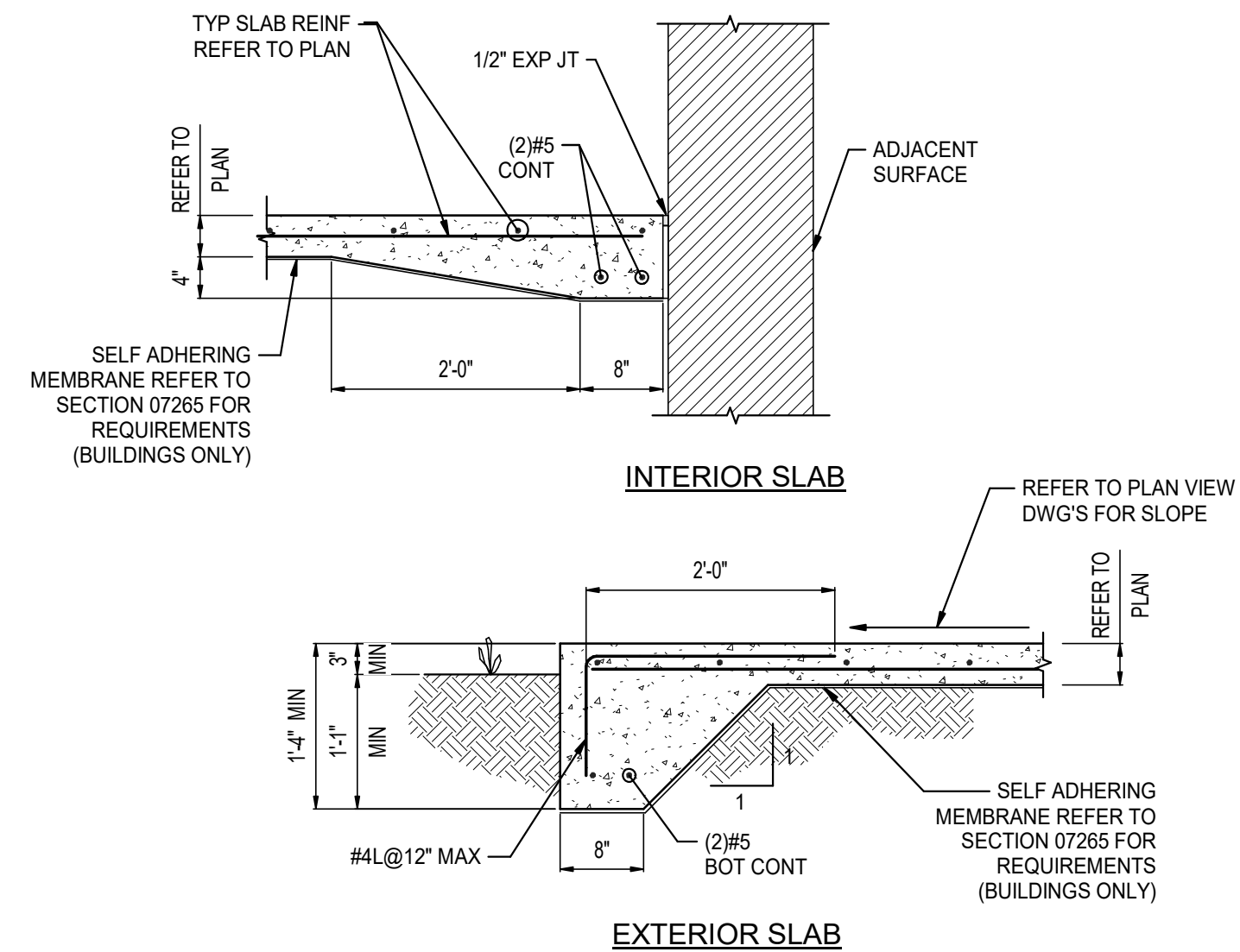


**SUGGESTED CONCRETE POUR SEQUENCE**  
1/4" = 1'-0"

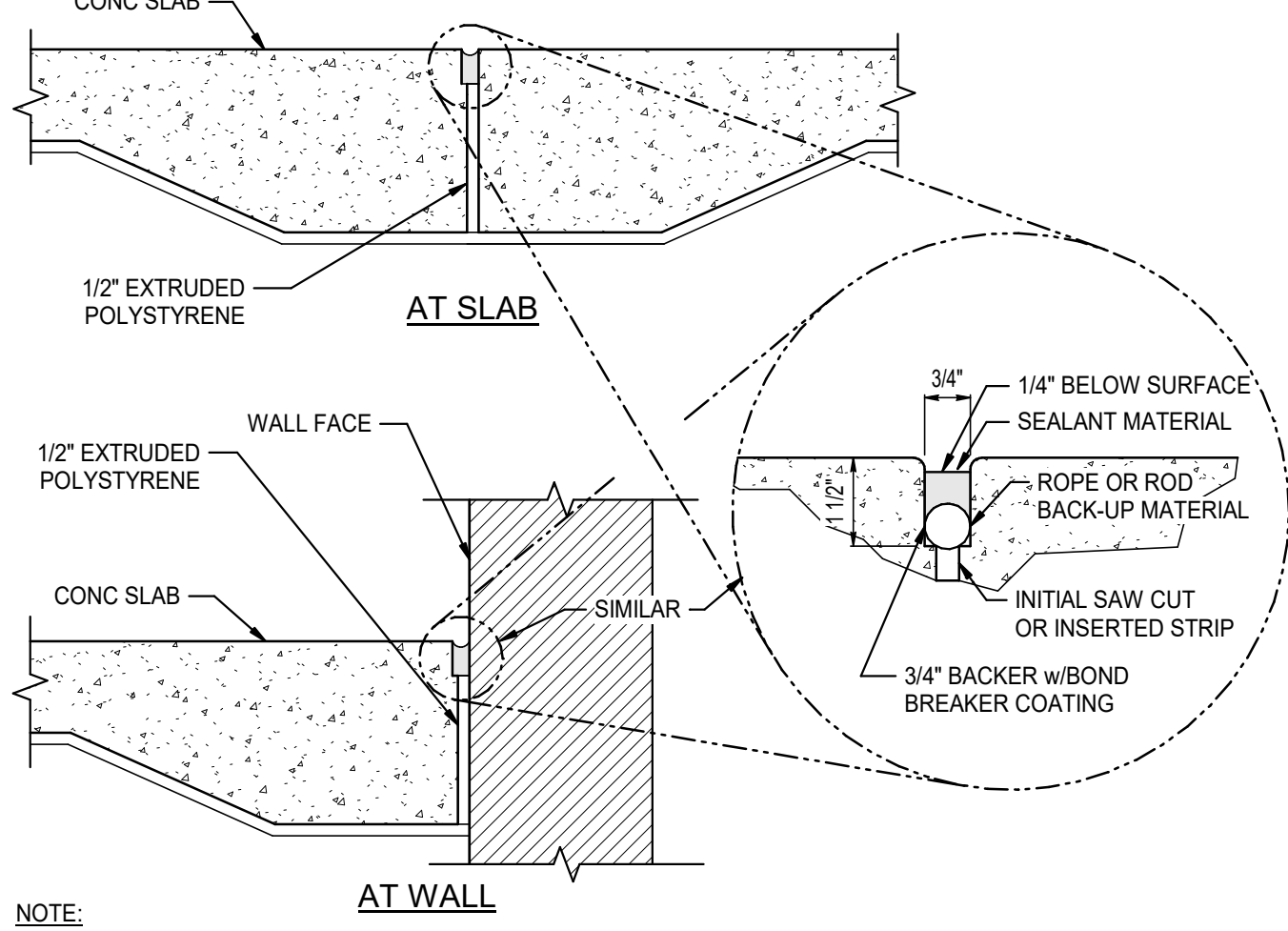
NO.	BY	DATE	SYMBOL	REVISIONS	<p><b>MOTT MACDONALD</b> Mott MacDonald Florida, LLC</p>	<p>Architects Engineers Surveyors AA - C0000035 EB - 0000155 LB - 0006783 10245 Centurion Pkwy. N., Suite 320 Jacksonville, Florida 32256 Telephone: (904) 203-1090</p>	<p>DESIGNER: C. LYNER DRAWN BY: B. LEE DATE: OCT 2022 CHECKED BY: B. PERRY DATE: OCT 2022</p>	<p>DESIGN ENGINEER CHAD E. LYNER, P.E. FLORIDA REGISTRATION NO. 66277</p>	<p>St. Johns County Utility Department 1205 STATE ROAD 16 ST. AUGUSTINE, FL 32084 PHONE: (904) 209-2826 FAX: (904) 209-2827</p>	<p>CR-208 GROUND STORAGE TANK AND BOOSTER PUMP STATION</p>	<p>STRUCTURAL GENERAL NOTES</p>	SHEET NO. 30
6.				DWG NO. S-2								
5.				GST BID PACKAGE								
4.												
3.												
2.	MM	10/2022		GST CONTRACTOR BID PACKAGE								

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**A** TURNDOWN AT SLAB EDGE  
 3/4" = 1'-0"



**B** TYPICAL SLAB 1/2" EXPANSION JOINT (EJ)  
 1 1/2" = 1'-0"

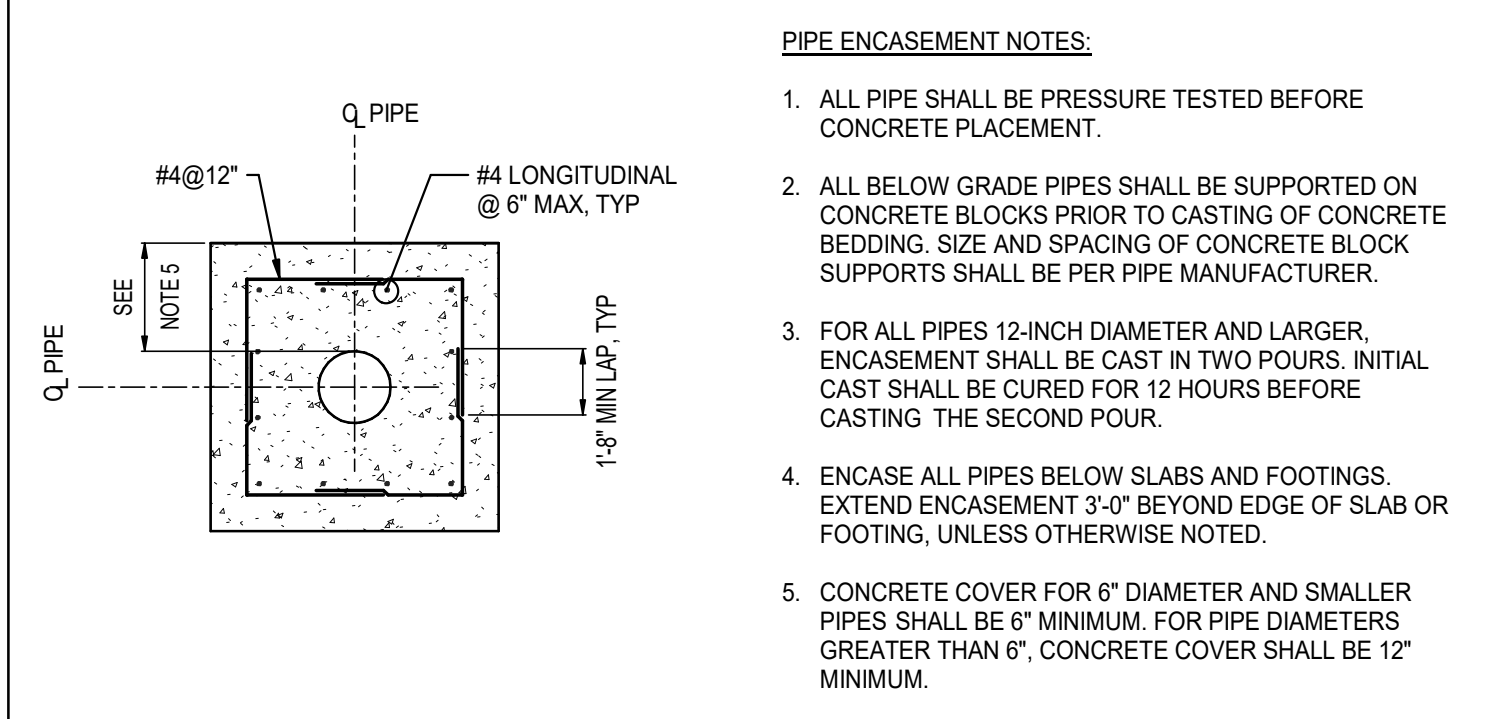
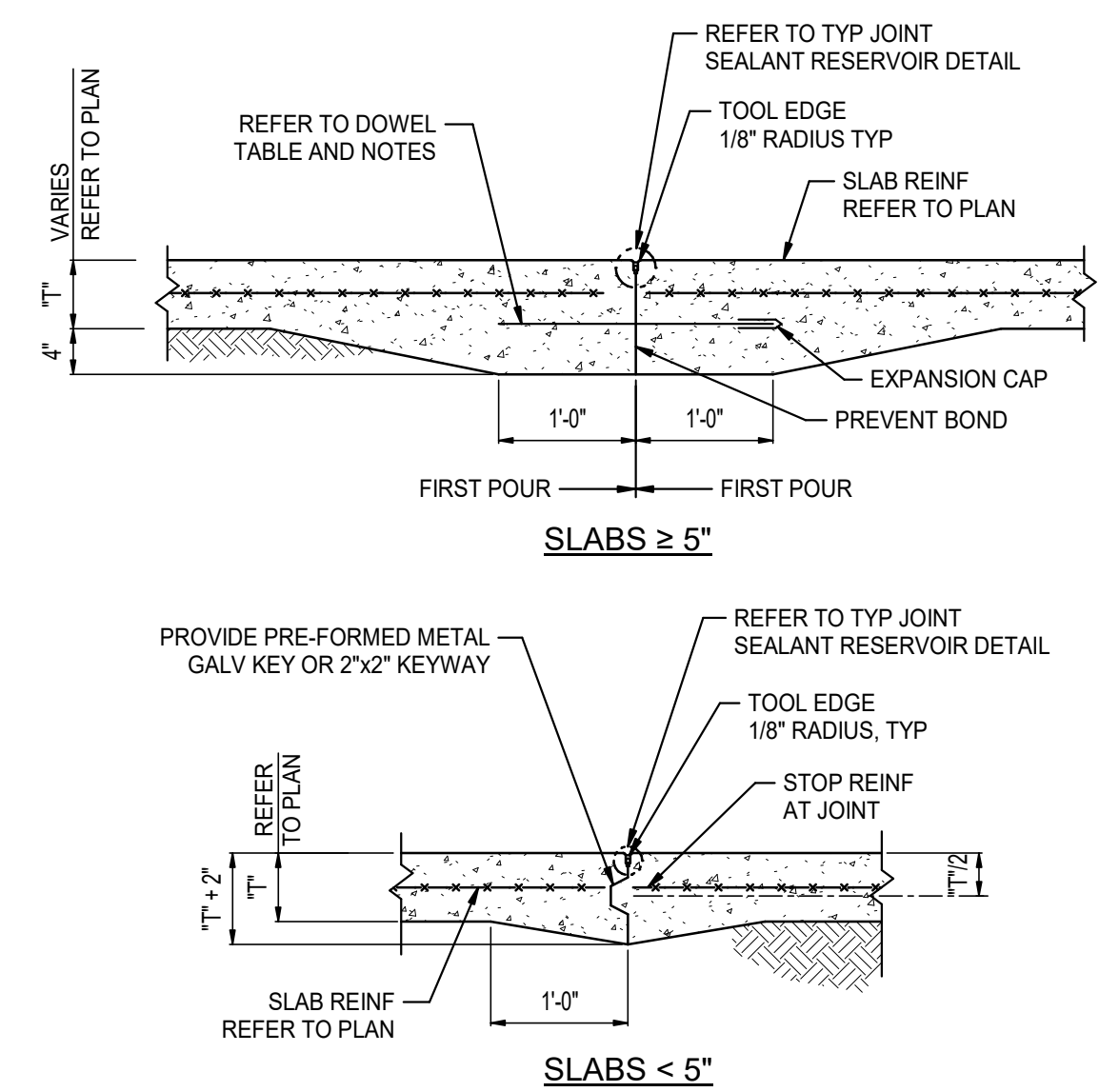
NOTE:  
 SEALANT MATERIAL SHALL BE A FIELD MOLDED SEALANT OF ONE OF THE FOLLOWING TYPES:  
 1. HOT APPLIED THERMOPLASTIC ASPHALT - RUBBER COMPOUNDS MEETING ASTM D1190.  
 2. HOT POURED ELASTOMERIC TYPE SEALANTS - MEETING ASTM D3406.  
 3. COLD APPLIED, MASTIC SINGLE OR MULTIPLE - COMPONENT SEALANTS MEETING ASTM D1850.

**DOWEL TABLE**

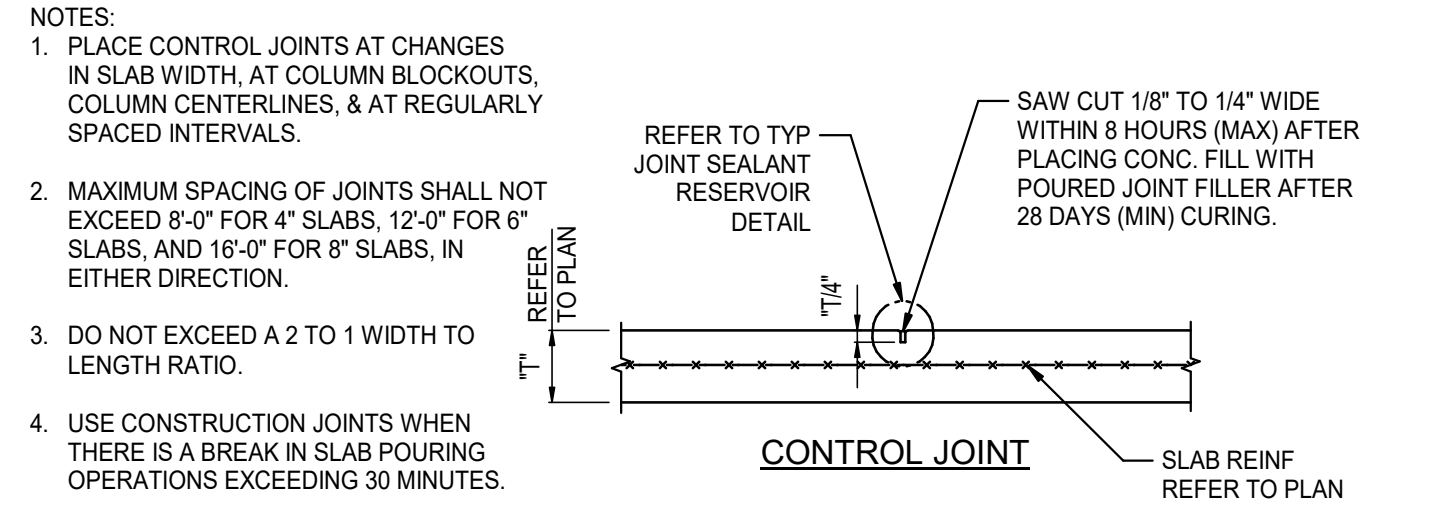
"T" SLAB DEPTH (INCHES)	DIAMETER (INCHES)	TOTAL LENGTH (INCHES)	CENTER TO CENTER SPACING (IN)
5	5/8	12	12
6	3/4	14	12
7	7/8	14	12
8	1	14	12
9	1 1/8	16	12
10	1 1/4	18	12
11	1 3/8	18	12
12	1 1/2	20	12

- DOWEL NOTES:**
- DOWELS SHALL BE PLAIN ROUND BARS EQUIVALENT TO ASTM A615 WITH A CORROSION RESISTANT COATING.
  - ONE-HALF (1/2) OF EACH BAR SHALL BE COVERED WITH ONE COAT TAR. PLACE EXPANSION CAP ON COATED SIDE.
  - DOWELS SHALL BE PLACED PARALLEL TO THE CENTERLINE AND SURFACE OF THE SLAB. TOLERANCE OF THE PLACEMENT SHALL BE ±1/4".

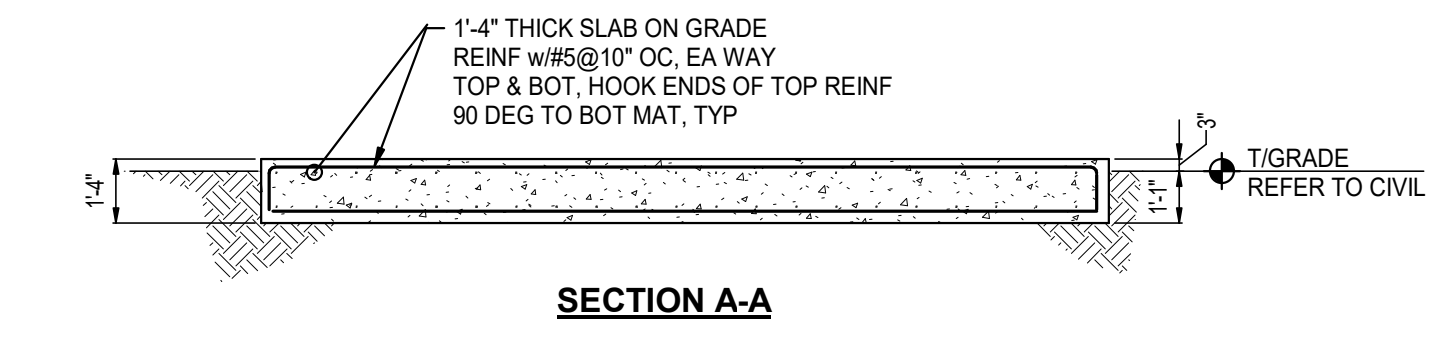
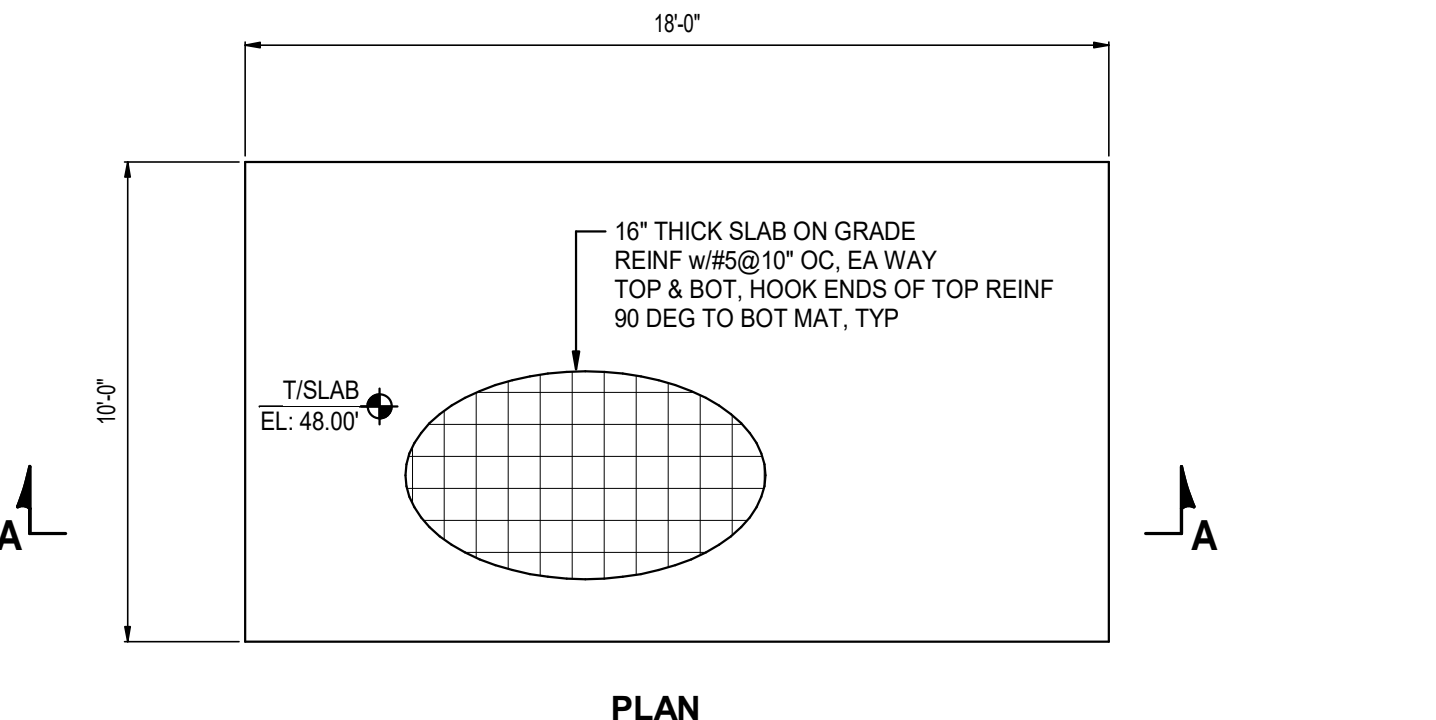
**C** TYPICAL SLAB ON GRADE CONSTRUCTION JOINT  
 3/4" = 1'-0"



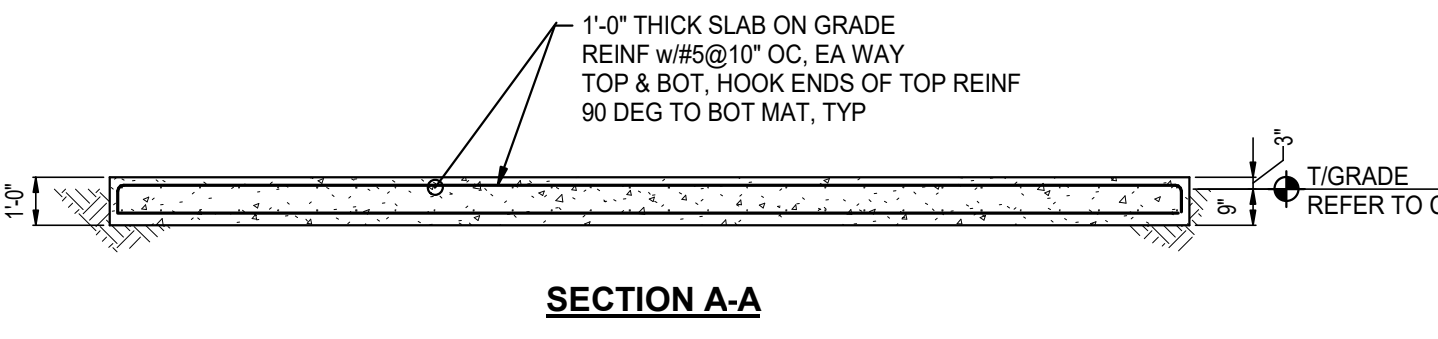
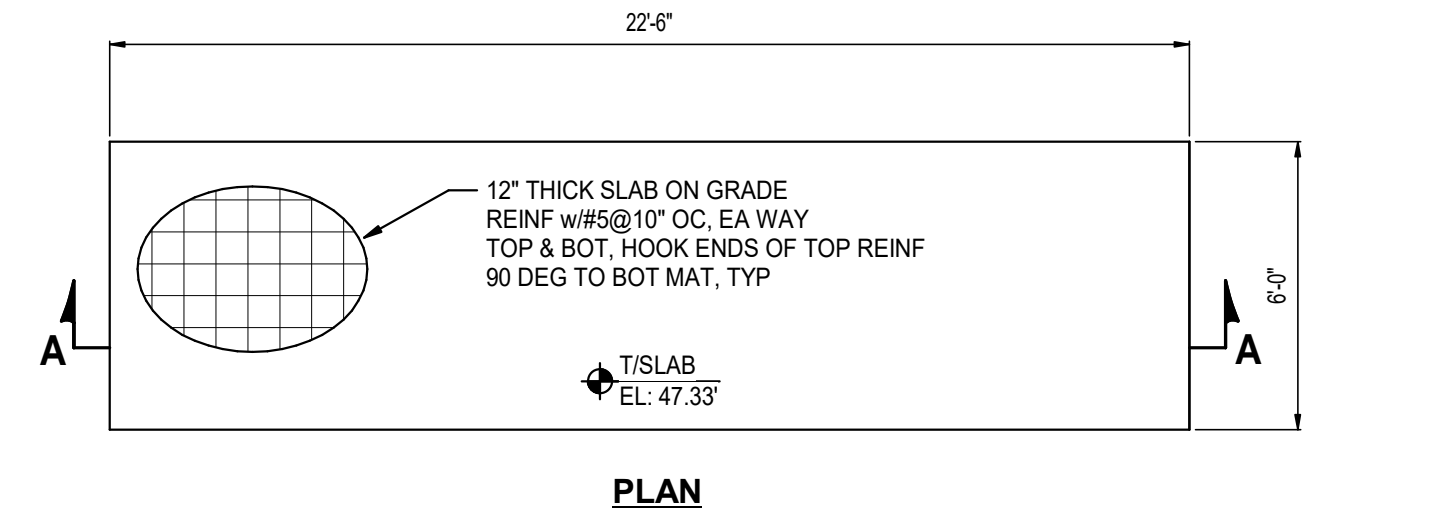
**H** CONCRETE PIPE ENCASEMENT  
 3/4" = 1'-0"



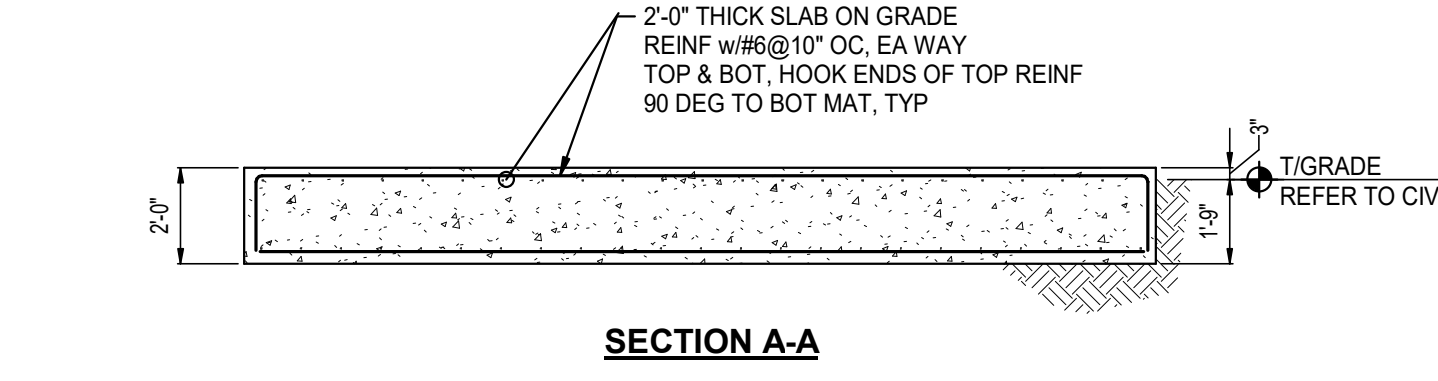
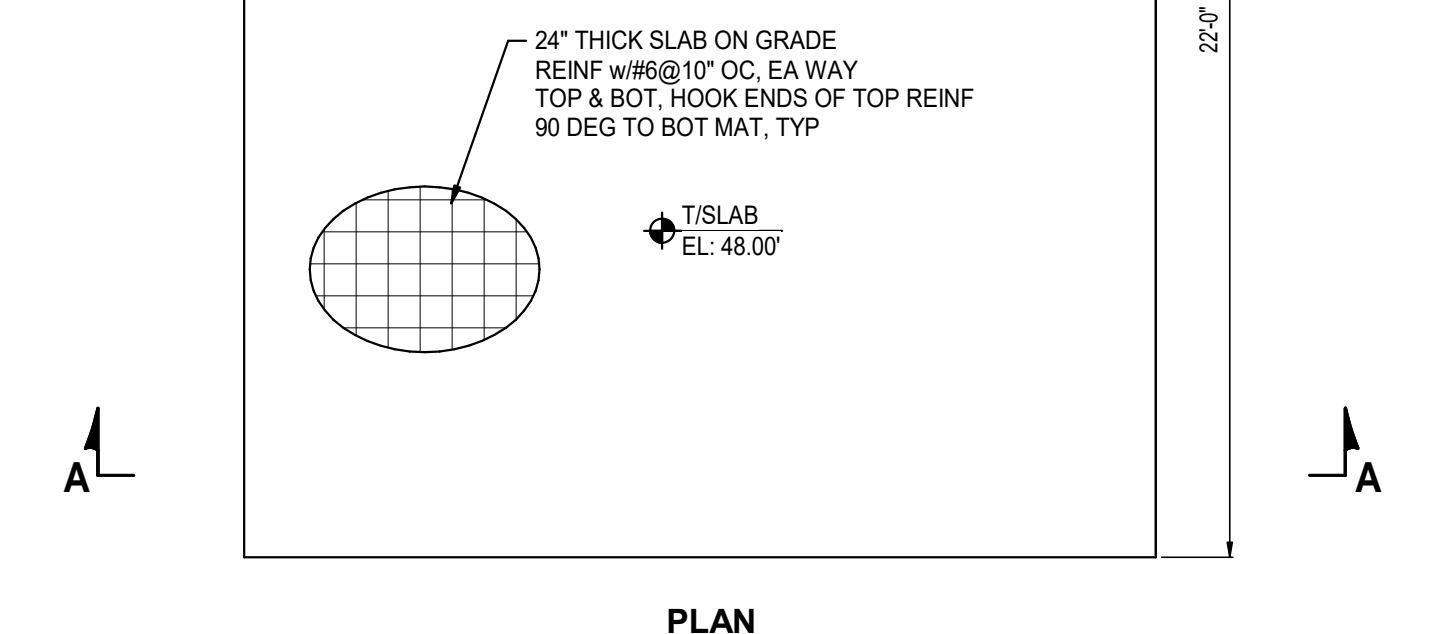
**D** TYPICAL SLAB ON GRADE CONTROL JOINT (CJ)  
 3/4" = 1'-0"



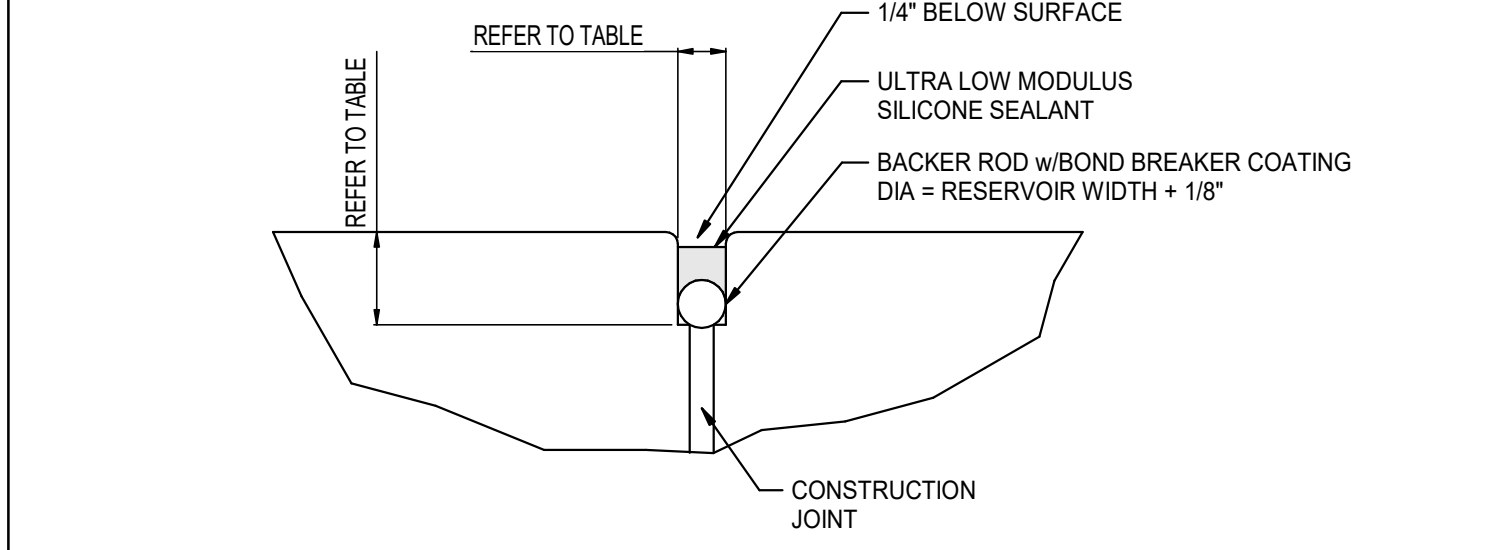
**E** DISCHARGE FLOW METER AND BYPASS PAD  
 1/4" = 1'-0"



**F** FILL VALVE PAD  
 1/4" = 1'-0"



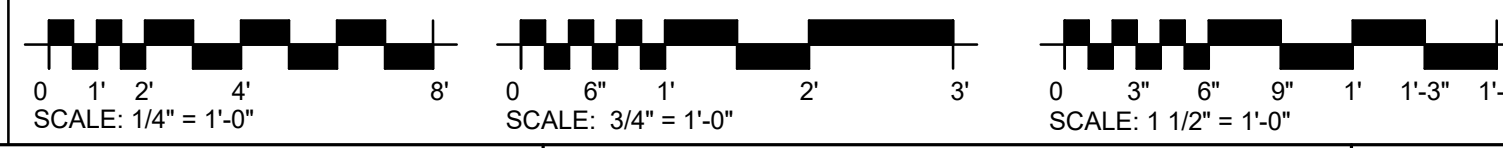
**G** GENERATOR PAD PLAN  
 1/4" = 1'-0"



JOINT SPACING	SEALANT RESERVOIR SHAPE	
	WIDTH	DEPTH
15'-0" OR LESS	5/8"	3/4"
20'-0"	5/8"	3/4"
30'-0"	5/8"	3/4"
40'-0"	5/8"	1"

- NOTE:**
- SEALANT MATERIAL SHALL BE A FIELD MOLDED SEALANT OF ONE OF THE FOLLOWING TYPES:
  - HOT APPLIED THERMOPLASTIC ASPHALT - RUBBER COMPOUNDS MEETING ASTM D1190.
  - HOT POURED ELASTOMERIC TYPE SEALANTS - MEETING ASTM D3406.
  - COLD APPLIED, MASTIC SINGLE OR MULTIPLE - COMPONENT SEALANTS MEETING ASTM D1850.

**I** TYPICAL JOINT SEALANT RESERVOIR  
 3/4" = 1'-0"



NO.	BY	DATE	SYMBOL	REVISIONS
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1.	MM	10/2022		GST CONTRACTOR BID PACKAGE

**M**  
**MOTT MACDONALD**  
 Mott MacDonald Florida, LLC

Architects Engineers Surveyors  
 AA - C0000035 EB - 0000155 LB - 0006783  
 10245 Centurion Pkwy. N., Suite 320  
 Jacksonville, Florida 32256  
 Telephone: (904) 203-1090

DESIGNER: C. LYNER  
 DRAWN BY: B. LEE  
 DATE: OCT 2022  
 CHECKED BY: B. PERRY  
 DATE: OCT 2022

DESIGN ENGINEER  
**CHAD E. LYNER, P.E.**  
 FLORIDA REGISTRATION NO.  
 66277

**St. Johns County**  
 Utility Department  
 1205 STATE ROAD 16  
 ST. AUGUSTINE, FL 32084  
 PHONE: (904) 209-2626 FAX: (904) 209-2627

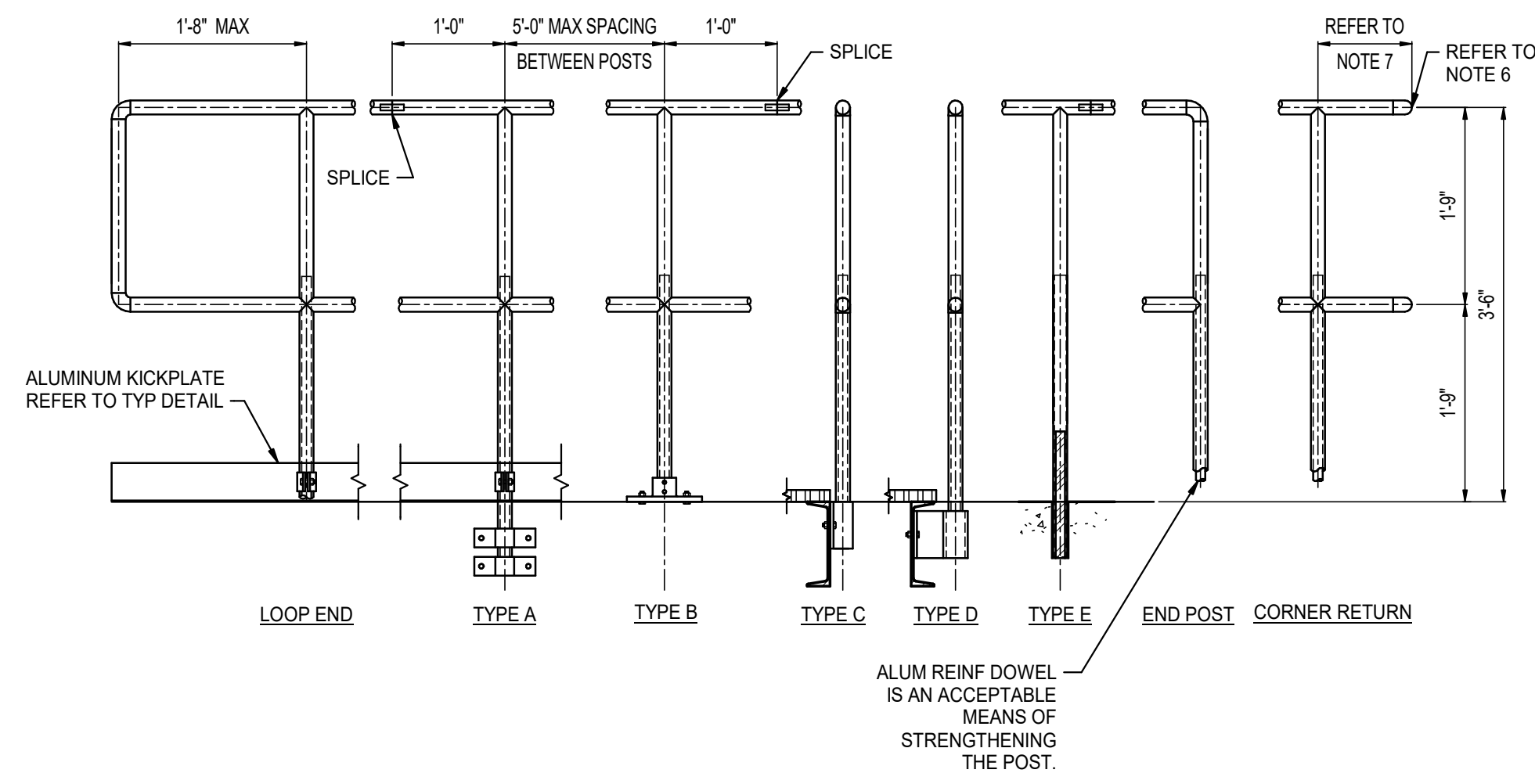
**CR-208 GROUND STORAGE TANK AND BOOSTER PUMP STATION**

**SLAB AND FOUNDATION DETAILS**

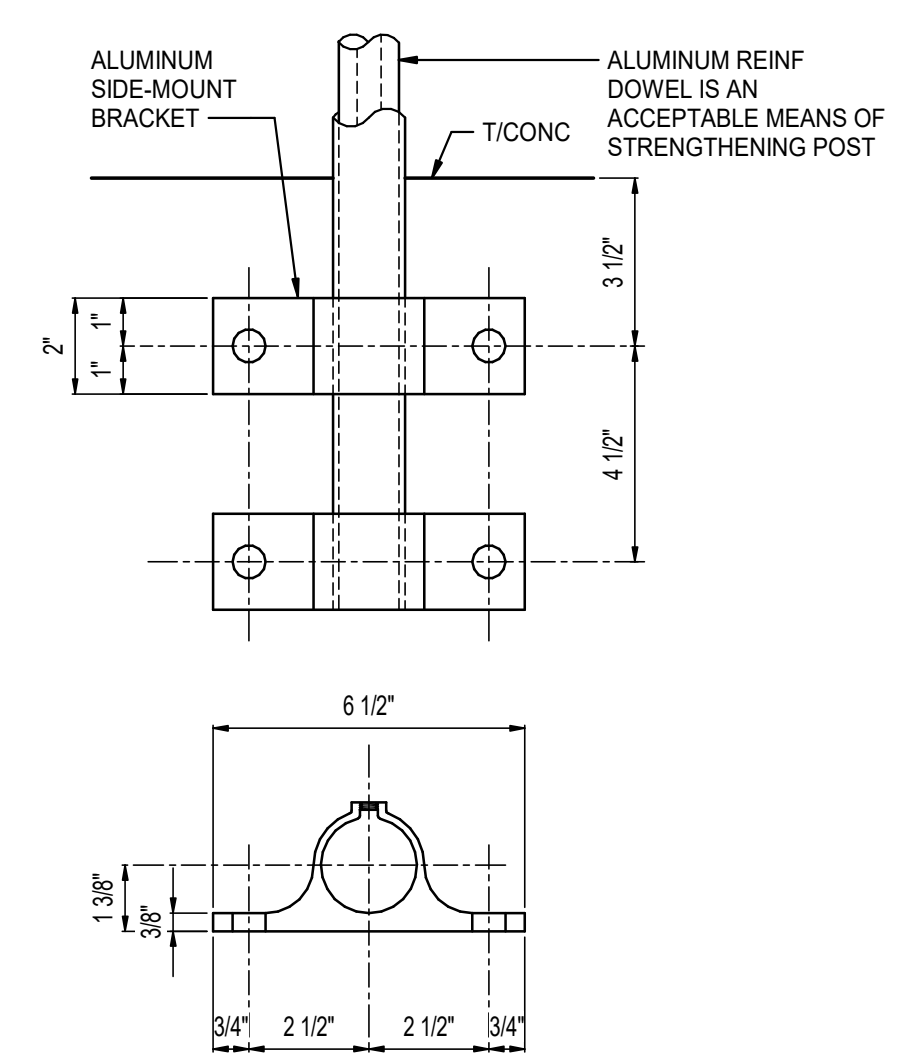
SHEET NO. 33  
 DWG NO. S-5  
 GST BID PACKAGE

**GUARDRAIL NOTES**

- GUARDRAIL SHALL BE THE PRODUCT OF A COMPANY NORMALLY ENGAGED IN THE MANUFACTURE OF PIPE RAILING. RAILING SHALL BE SHOP ASSEMBLED IN LENGTHS NOT TO EXCEED 24'-0" FOR FIELD ERECTION.
- GUARDRAILS AND STAIR RAILS SHALL BE DESIGNED TO WITHSTAND A 200# CONCENTRATED LOAD APPLIED IN ANY DIRECTION AT ANY POINT ON THE TOP RAIL. GUARDRAILS AND STAIR RAILS SHALL ALSO BE DESIGNED TO WITHSTAND A LOAD OF 50#/FT APPLIED HORIZONTALLY TO THE TOP RAIL. THE 200# LOAD WILL NOT BE APPLIED SIMULTANEOUSLY WITH THE 50#/FT LOAD. IN ADDITION, THE GUARDRAIL SHALL BE DESIGNED TO WITHSTAND A LOAD OF 100#/FT APPLIED VERTICALLY DOWNWARD TO THE TOP RAIL AND SIMULTANEOUSLY WITH THE 50#/FT HORIZONTAL LOAD. THE 100#/FT VERTICAL LOAD DOES NOT APPLY TO STAIR RAILS.
- THE MANUFACTURER SHALL SUBMIT CALCULATIONS TO THE ENGINEER FOR REVIEW. TESTINGS OF BASE CASTINGS OR BASE EXTRUSIONS BY AN INDEPENDENT LAB OR MANUFACTURER'S LAB (IF MANUFACTURER'S LAB MEETS THE REQUIREMENTS OF THE ALUMINUM ASSOCIATION) WILL BE AN ACCEPTABLE SUBSTITUTE FOR CALCULATIONS. CALCULATIONS WILL BE REQUIRED FOR REVIEW OF ALL OTHER DESIGN ASPECTS.
- POST SPACING SHALL BE A MAXIMUM OF 5'-0". POSTS AND RAILINGS SHALL BE A MINIMUM OF 1 1/2" SCHEDULE 40 ALUMINUM PIPE ALLOY 6063-T6 ASTM-B-429 OR ASTM-B-221. THE GUARDRAIL MANUFACTURER SHALL SHOW THAT THEIR POSTS ARE OF ADEQUATE STRENGTH TO MEET THE LOADING REQUIREMENTS. IF THE MANUFACTURER'S POSTS ARE NOT OF ADEQUATE STRENGTH, THE MANUFACTURER MAY REDUCE THE POST SPACING OR ADD REINFORCING DOWELS OR MAY DO BOTH IN ORDER TO MEET LOADING REQUIREMENTS.
- THE GUARDRAIL SHALL BE MADE OF PIPES JOINED TOGETHER WITH COMPONENT FITTINGS. SAMPLES OF ALL COMPONENTS, BASES, TOE PLATE AND PIPE MUST BE SUBMITTED FOR REVIEW. COMPONENTS THAT ARE POP-RIVETED OR GLUED AT THE JOINTS WILL NOT BE ACCEPTABLE. ALL COMPONENTS MUST BE MECHANICALLY FASTENED WITH STAINLESS STEEL HARDWARE.
- POSTS SHALL NOT INTERRUPT THE CONTINUATION OF THE TOP RAIL AT ANY POINT ALONG THE RAILING, INCLUDING CORNERS AND END TERMINATIONS (OSHA 1910.23). THE TOP SURFACE OF THE TIP RAILING SHALL BE SMOOTH AND SHALL NOT BE INTERRUPTED IN PROJECTING FITTINGS.
- THE MIDRAIL AT THE CORNER RETURN SHALL BE ABLE TO WITHSTAND A 200# LOAD WITHOUT LOOSENING. THE MANUFACTURER IS TO DETERMINE THIS DIMENSION FOR THEIR SYSTEM. PROVIDE PHYSICAL TESTS FROM A LABORATORY TO CONFIRM COMPLIANCE.
- STAINLESS STEEL EXPANSION BOLTS SHALL BE SPACED 10 DIA APART AND 5 DIA EDGE DISTANCE FOR A REDUCTION IN PULLOUT STRENGTH. A SAFETY FACTOR OF 4 SHALL BE USED ON EXPANSION BOLT PULLOUT VALUES PUBLISHED BY THE MANUFACTURER. EXPANSION BOLTS SHALL BE STAINLESS STEEL TYPE 303 WEDGE BOLTS AND SHALL BE FURNISHED BY THE GUARDRAIL MANUFACTURER.
- KICK PLATE SHALL CONFORM TO OSHA STANDARDS. KICK PLATE SHALL BE A MINIMUM OF 4" HIGH AND SHALL BE AN EXTRUSION THAT ATTACHED TO THE POSTS WITH CLAMPS WHICH WILL ALLOW FOR EXPANSION AND CONTRACTION BETWEEN POSTS. KICK PLATES SHALL BE SET 1/4" ABOVE THE WALKING SURFACE. KICK PLATES SHALL BE PROVIDED ON GUARDRAILS AS REQUIRED BY OSHA AND/OR AS SHOWN ON DRAWINGS. KICK PLATES SHALL BE SHIPPED LOOSE IN STOCK LENGTHS WITH PRE-MANUFACTURED CORNERS FOR FIELD INSTALLATION.
- OPENINGS IN THE RAILING SHALL BE GUARDED BY A SELF-CLOSING GATE. (OSHA 1910.23). SAFETY CHAINS SHALL NOT BE USED UNLESS SPECIFICALLY SHOWN ON THE DRAWINGS.
- FINISH SHALL BE ALUMINUM ASSOCIATION M10-C22-A41 (215-41). THE PIPE SHALL BE PLASTIC WRAPPED. THE PLASTIC WRAP IS TO BE REMOVED AFTER ERECTION.
- ALUMINUM SURFACES IN CONTACT WITH CONCRETE, GROUT, OR DISSIMILAR METALS SHALL BE COATED WITH A CHROMATE CONVERSION COATING.
- GUARDRAILS SHALL BE IN ACCORDANCE WITH OSHA REGULATION 29CFR 1910 AND 7TH EDITION FLORIDA BUILDING CODE (2020).



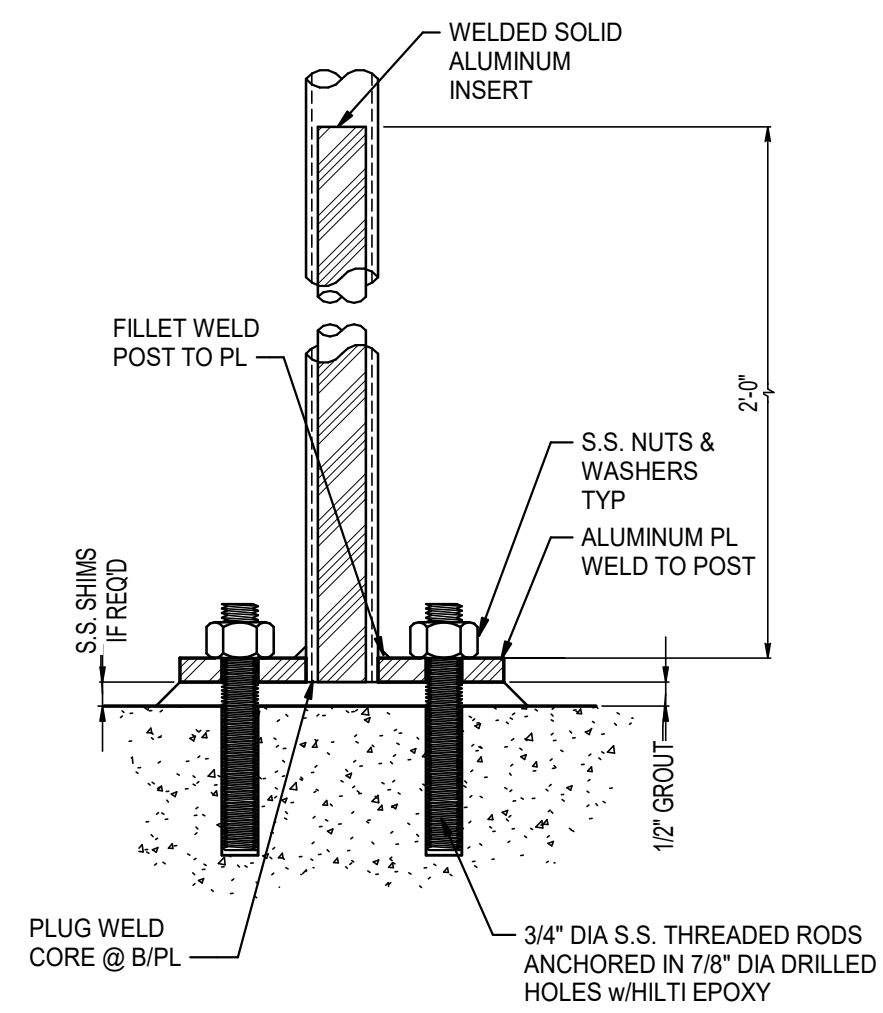
**TYPICAL GUARDRAIL DETAIL**  
3/4" = 1'-0"



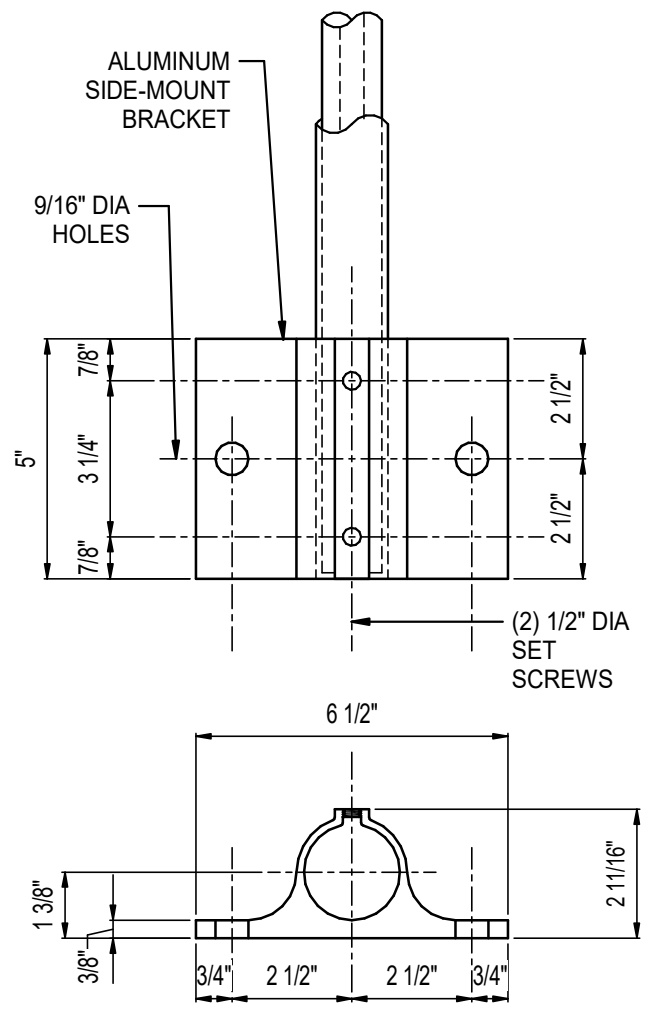
**A TYPE A**  
3" = 1'-0"

**ALUMINUM GUARDRAIL NOTES**

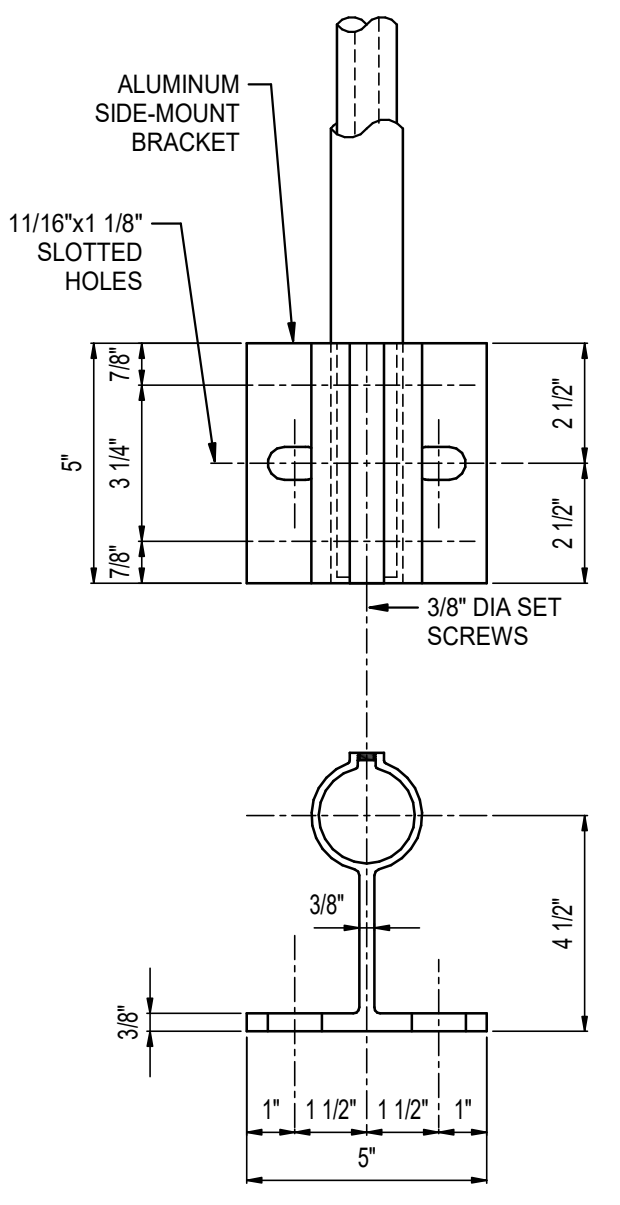
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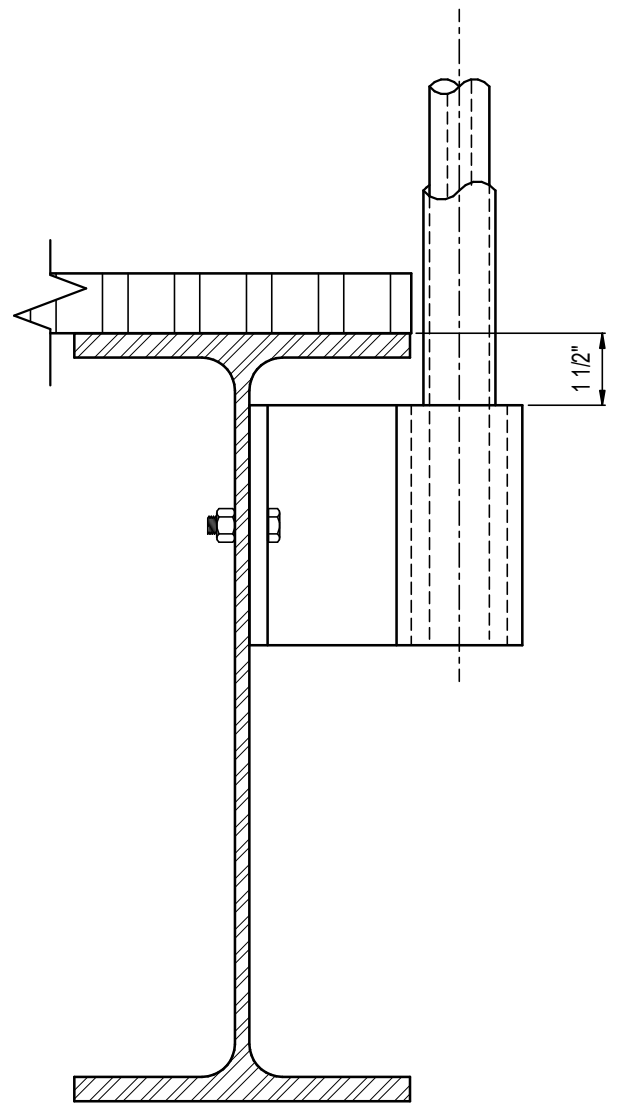
**B TYPE B**  
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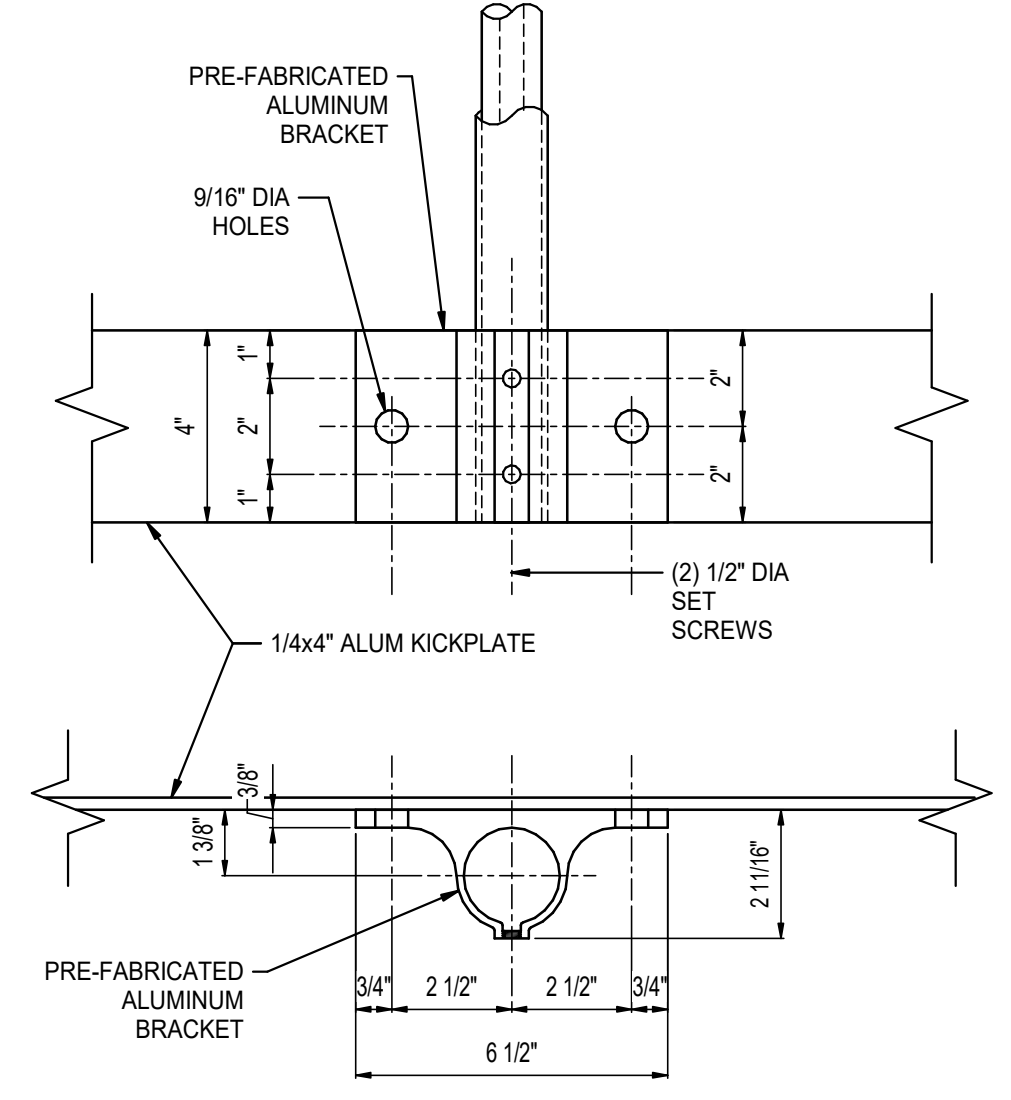
**C TYPE C**  
3" = 1'-0"



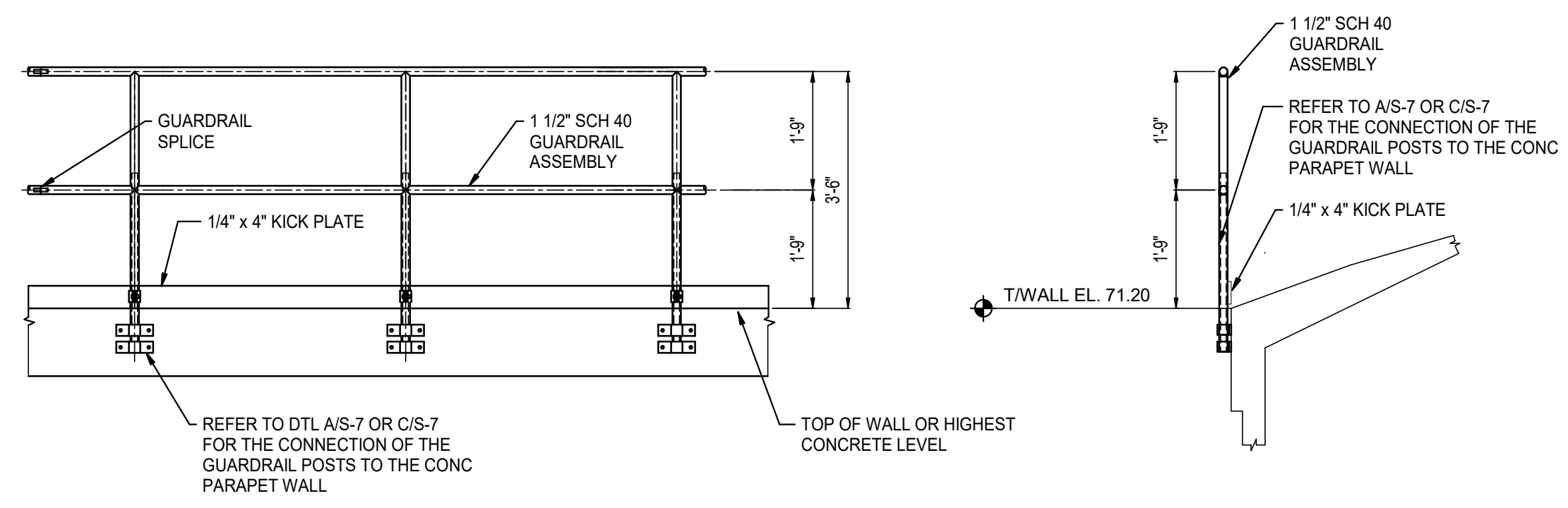
**D TYPE D**  
3" = 1'-0"



**E TYPE E**  
3" = 1'-0"



**F KICKPLATE DETAIL**  
3" = 1'-0"



**G PERIMETER GST GUARDRAIL DETAIL**  
1/2" = 1'-0"

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NO.	BY	DATE	SYMBOL	REVISIONS
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**MOTT MACDONALD**  
Mott MacDonald Florida, LLC

Architects Engineers Surveyors  
AA - C0000035 EB - 0000155 LB - 0006783  
10245 Centurion Pkwy. N., Suite 320  
Jacksonville, Florida 32256  
Telephone: (904) 203-1090

DESIGNER: C. LYNER  
DRAWN BY: B. LEE  
DATE: OCT 2022  
CHECKED BY: B. PERRY  
DATE: OCT 2022

DESIGN ENGINEER  
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FLORIDA REGISTRATION NO.  
66277

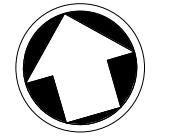


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ST. AUGUSTINE, FL 32084  
PHONE: (904) 209-2626 FAX: (904) 209-2627

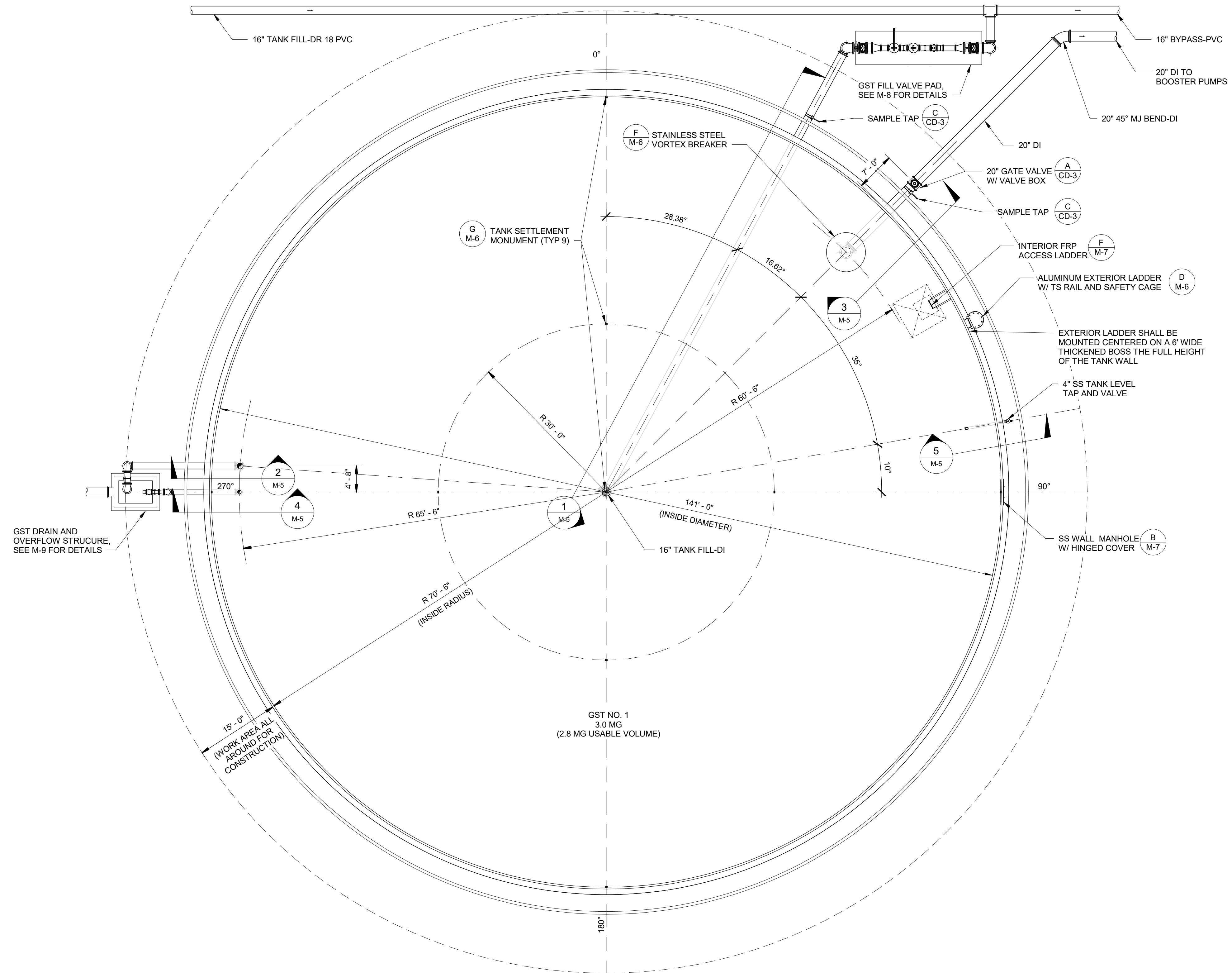
CR-208 GROUND STORAGE TANK AND BOOSTER PUMP STATION

GUARDRAIL DETAILS

SHEET NO.	35
DWG NO.	S-7
GST BID PACKAGE	



0 8 16 24  
SCALE: 3/32" = 1'-0"



**GST SLAB PLAN**  
SCALE: 3/32" = 1'-0"

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**M**  
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AA - C0000035 EB - 0000155 LB - 0006783  
10245 Centurion Pkwy, N., Suite 320  
Jacksonville, Florida 32256  
Telephone: (904) 203-1090

DESIGNER: L. TRACEY  
DRAWN BY: B. LEE  
DATE: OCT 2022  
CHECKED BY: L. SAMEL  
DATE: OCT 2022

DESIGN ENGINEER  
**LESLIE S. SAMEL, P.E.**  
FLORIDA REGISTRATION NO.  
68763



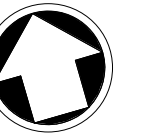
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Utility Department  
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PHONE: (904) 209-2626 FAX: (904) 209-2627

**CR-208 GROUND STORAGE TANK  
AND BOOSTER PUMP STATION**

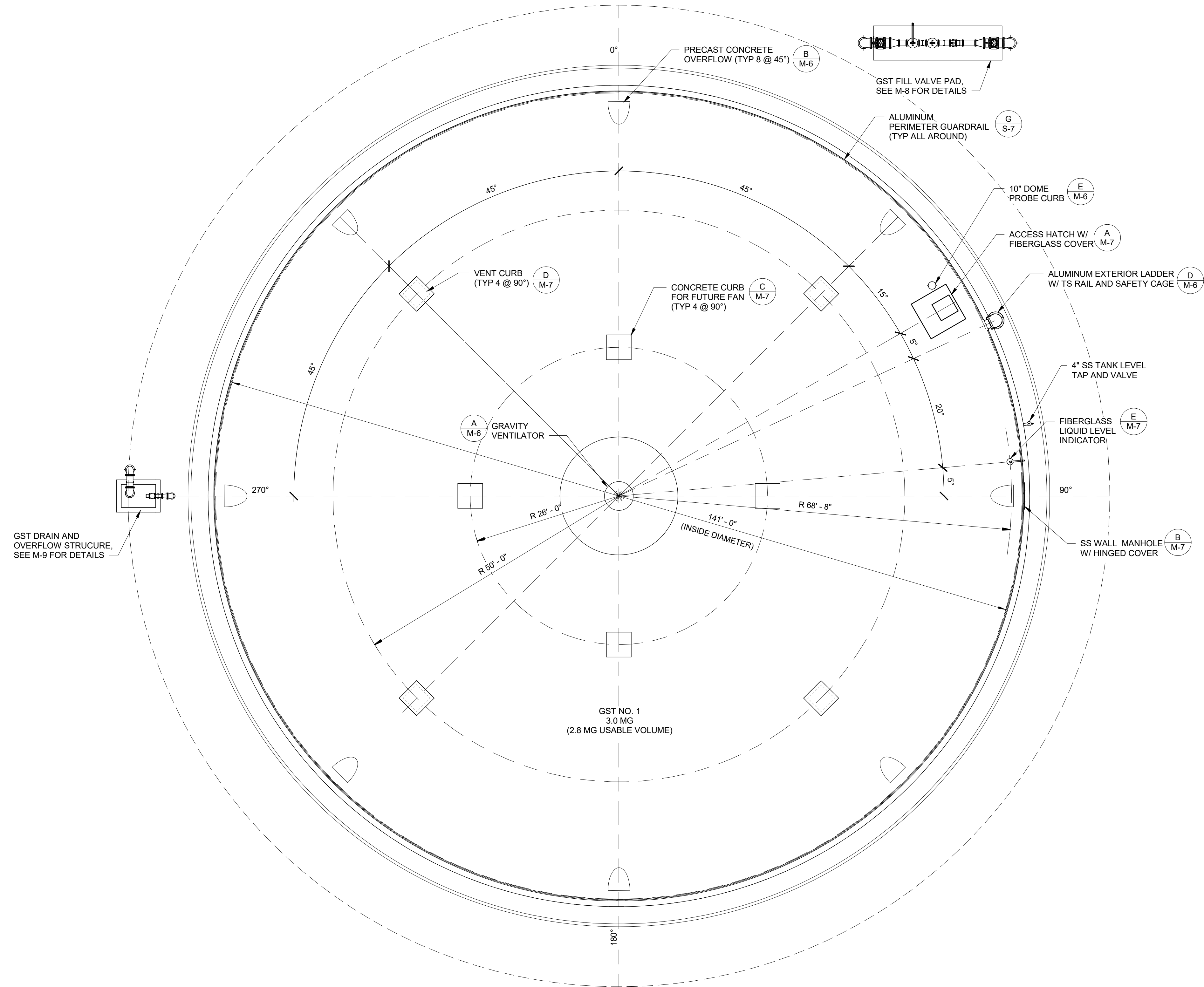
**GROUND STORAGE TANK  
SLAB PLAN**

SHEET NO.  
38  
DWG NO.  
M-3  
GST BID  
PACKAGE





0 8 16 24  
SCALE: 3/32" = 1'-0"



**GST ROOF PLAN**  
SCALE: 3/32" = 1'-0"

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Jacksonville, Florida 32256  
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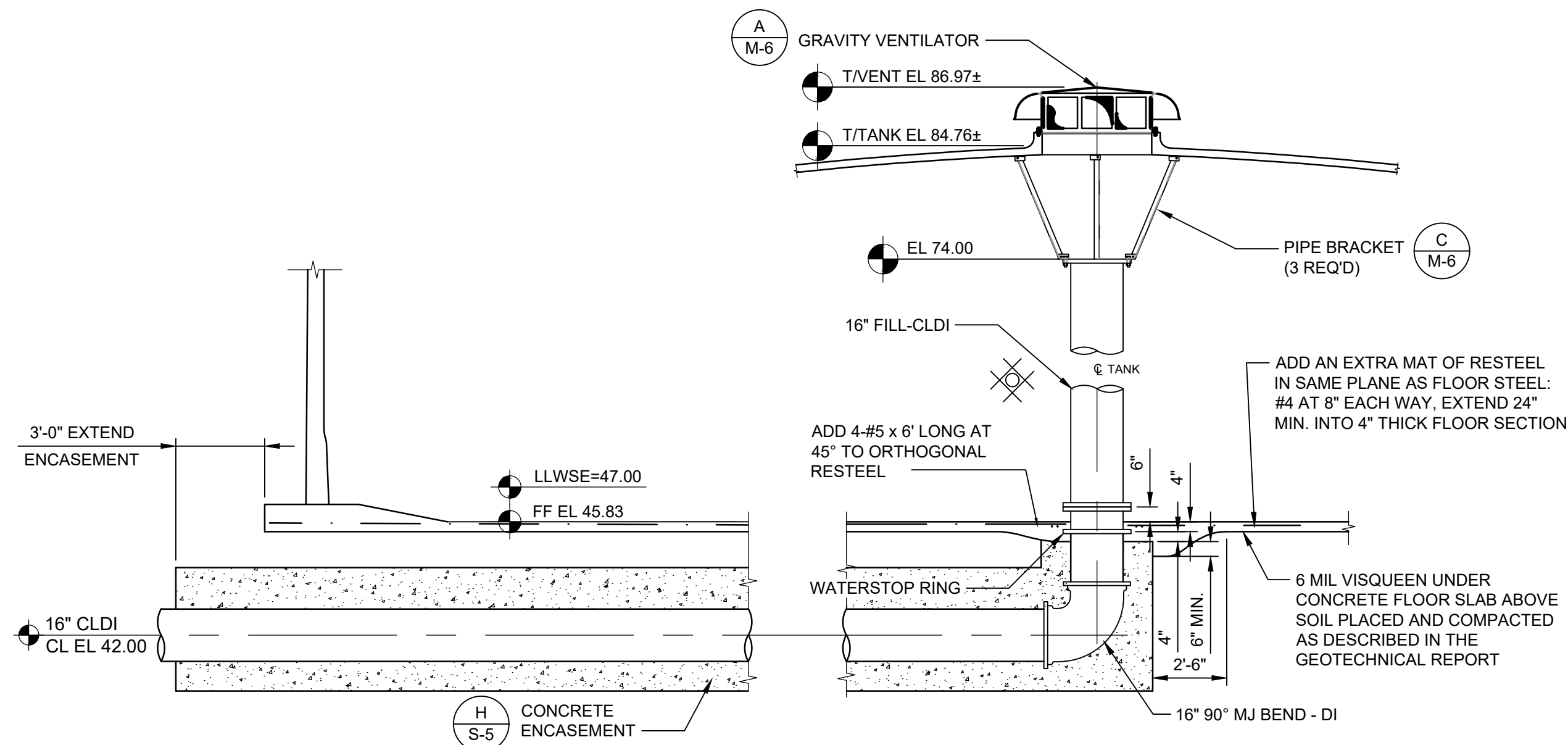


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1205 STATE ROAD 16  
ST. AUGUSTINE, FL 32084  
PHONE: (904) 209-2626 FAX: (904) 209-2627

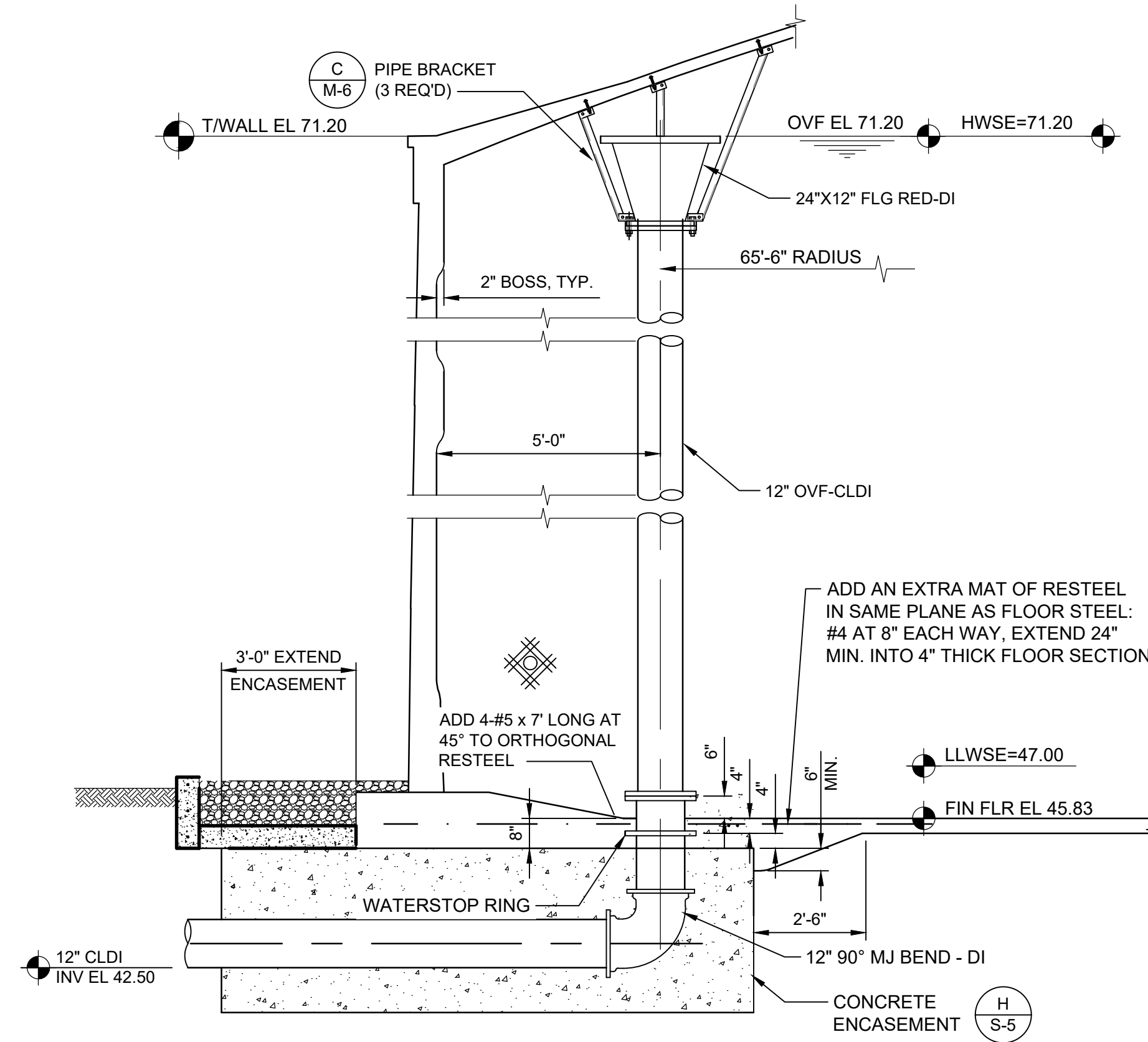
**CR-208 GROUND STORAGE TANK  
AND BOOSTER PUMP STATION**

**GROUND STORAGE TANK  
ROOF PLAN**

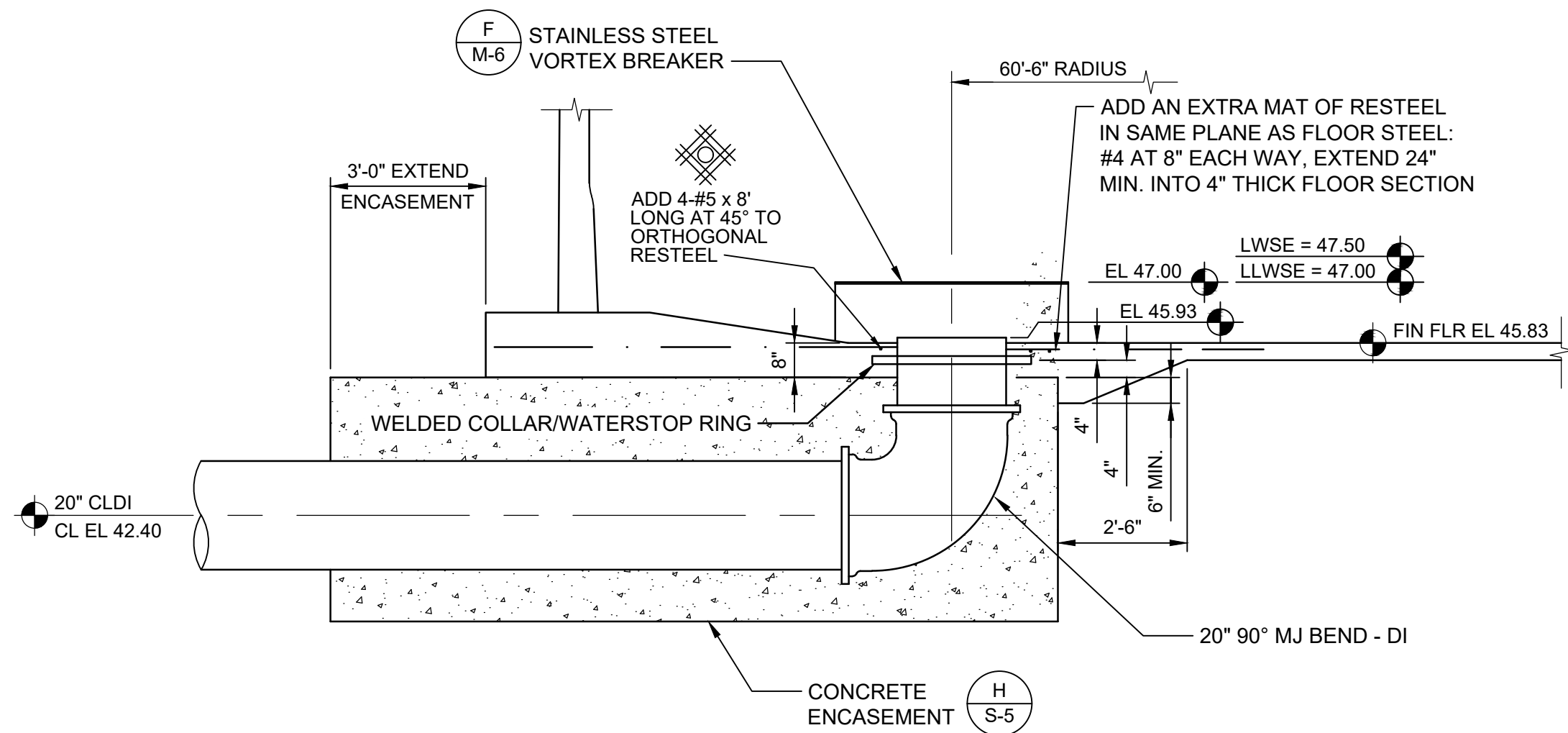
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39  
DWG NO.  
M-4  
GST BID  
PACKAGE



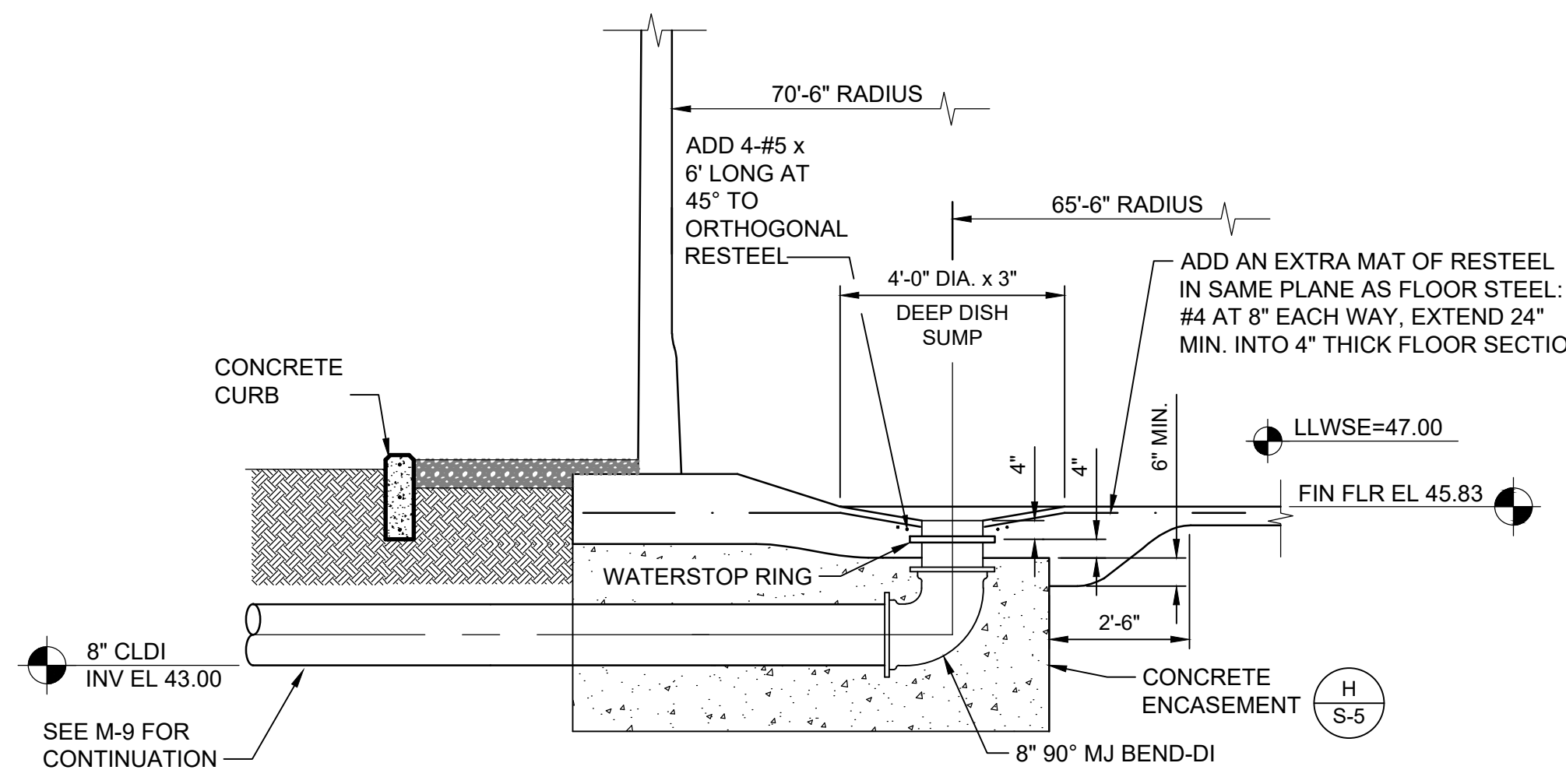
1 SECTION  
- NTS



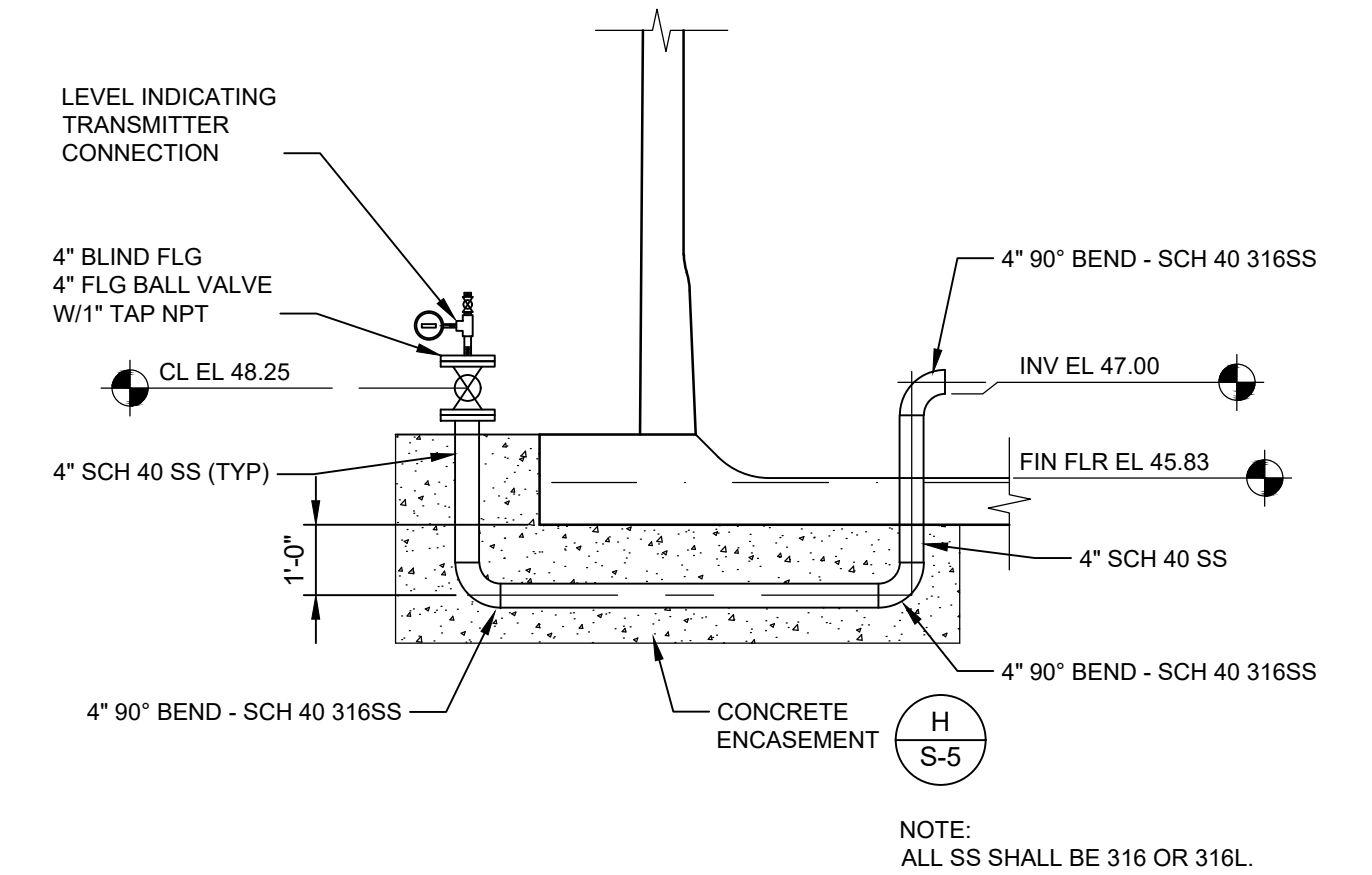
2 12\"/>



3 20\"/>



4 8\"/>



5 GROUND STORAGE TANK LEVEL TAP AND VALVE  
- NTS

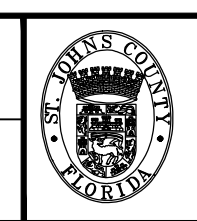
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**M**  
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Jacksonville, Florida 32256  
Telephone: (904) 203-1090

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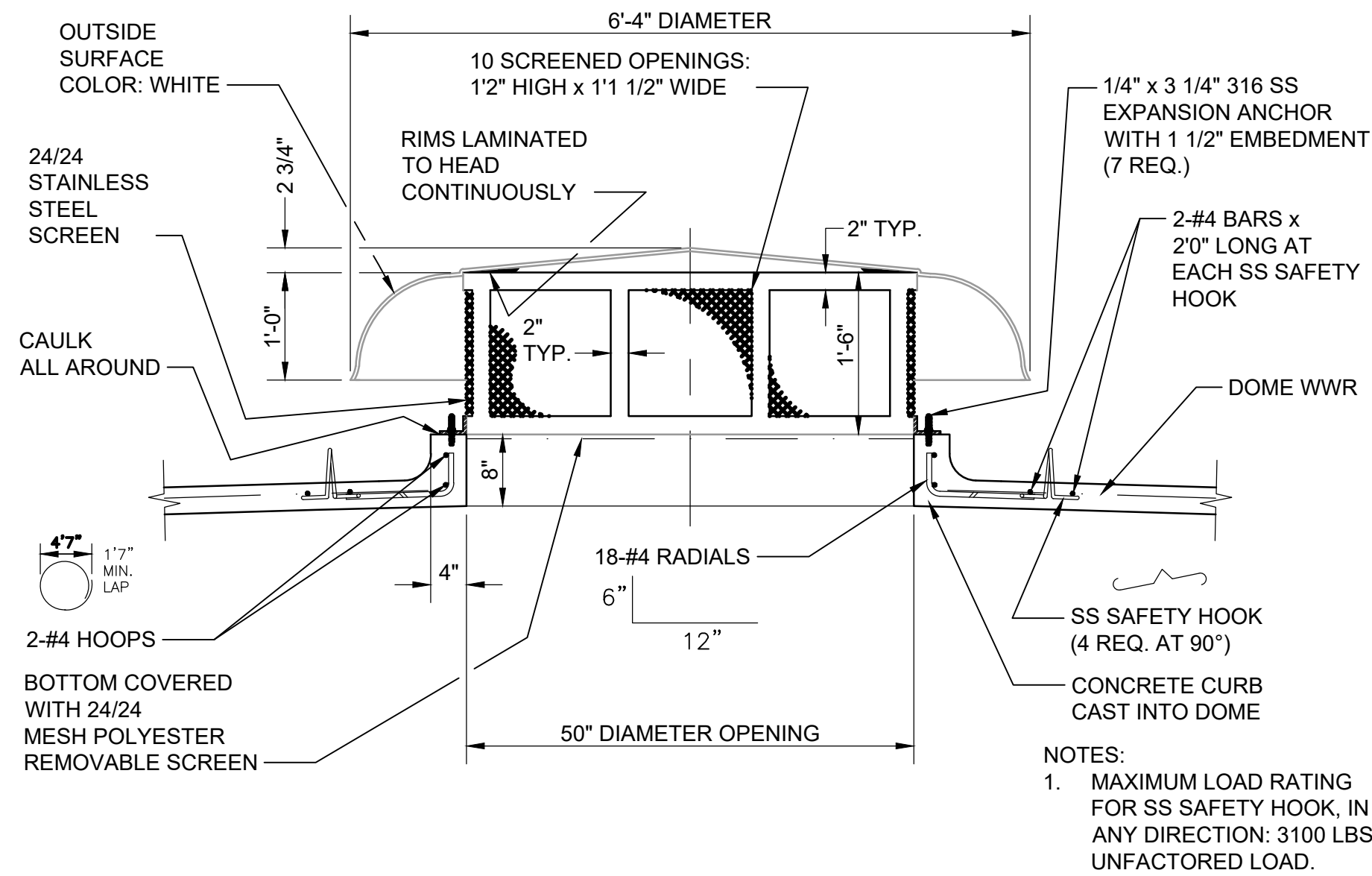


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1205 STATE ROAD 16  
ST. AUGUSTINE, FL 32084  
PHONE: (904) 209-2626 FAX: (904) 209-2627

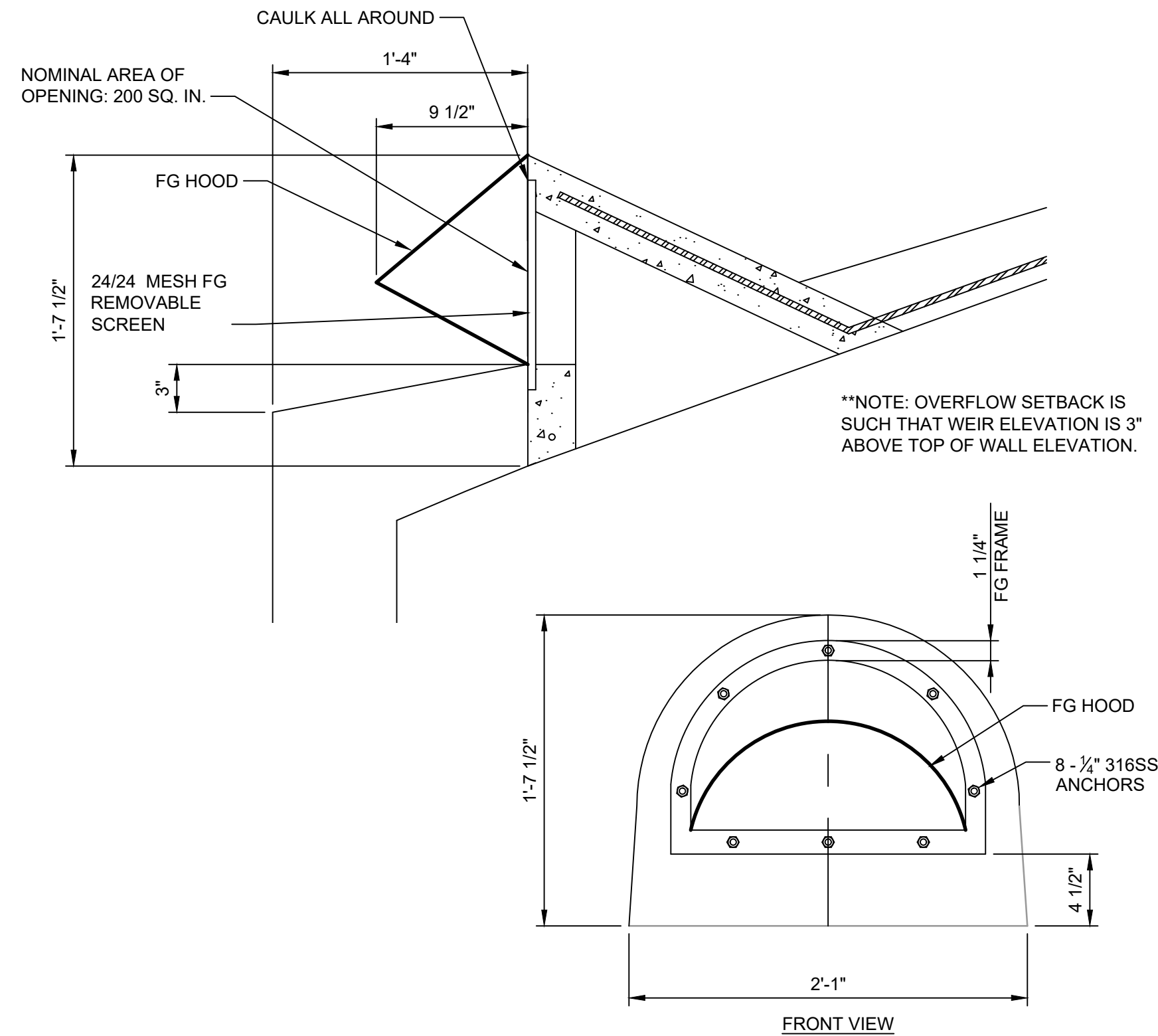
CR-208 GROUND STORAGE TANK  
AND BOOSTER PUMP STATION

GROUND STORAGE TANK  
SECTIONS

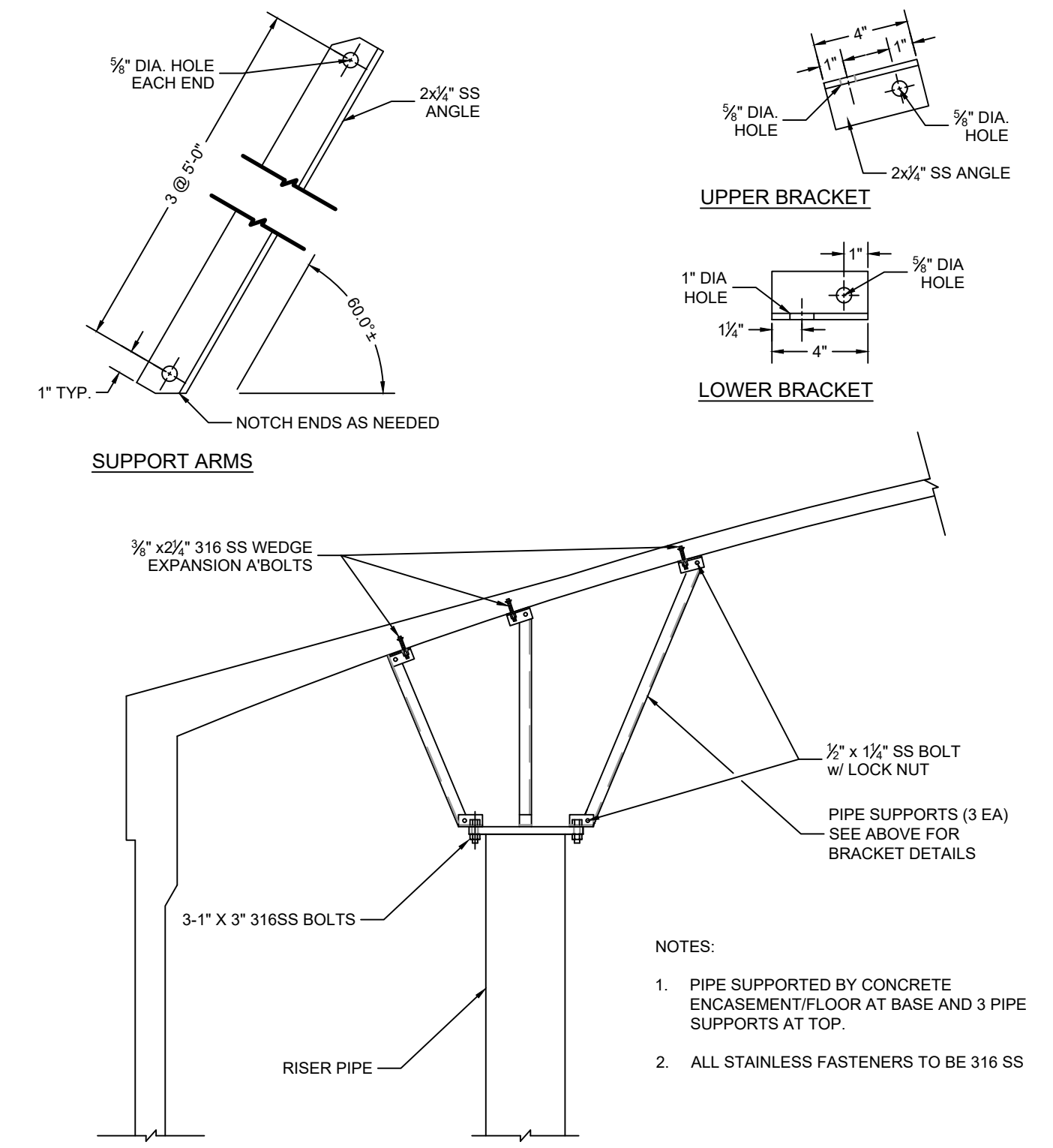
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40  
DWG NO.  
M-5  
GST BID  
PACKAGE



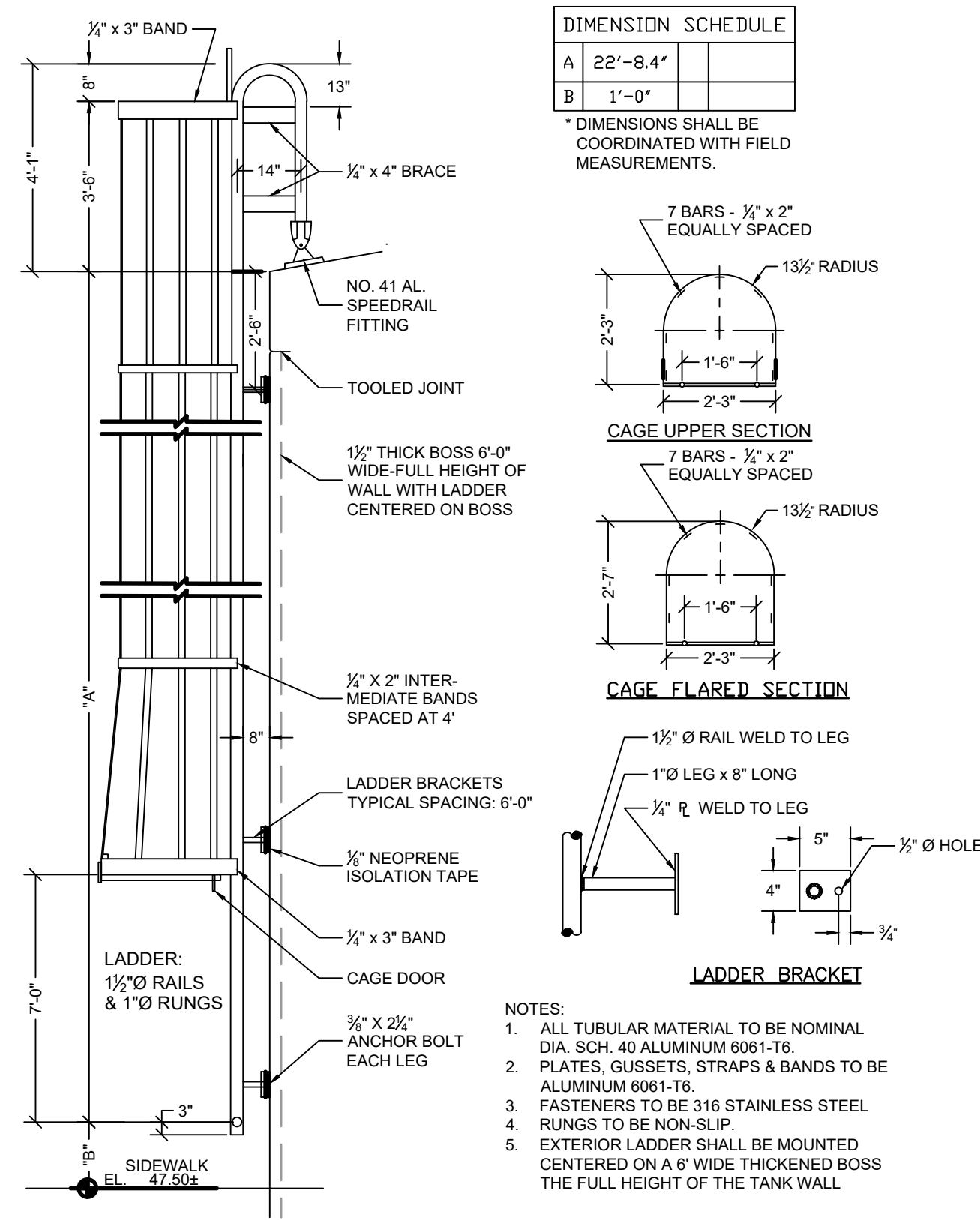
**A GRAVITY VENTILATOR**  
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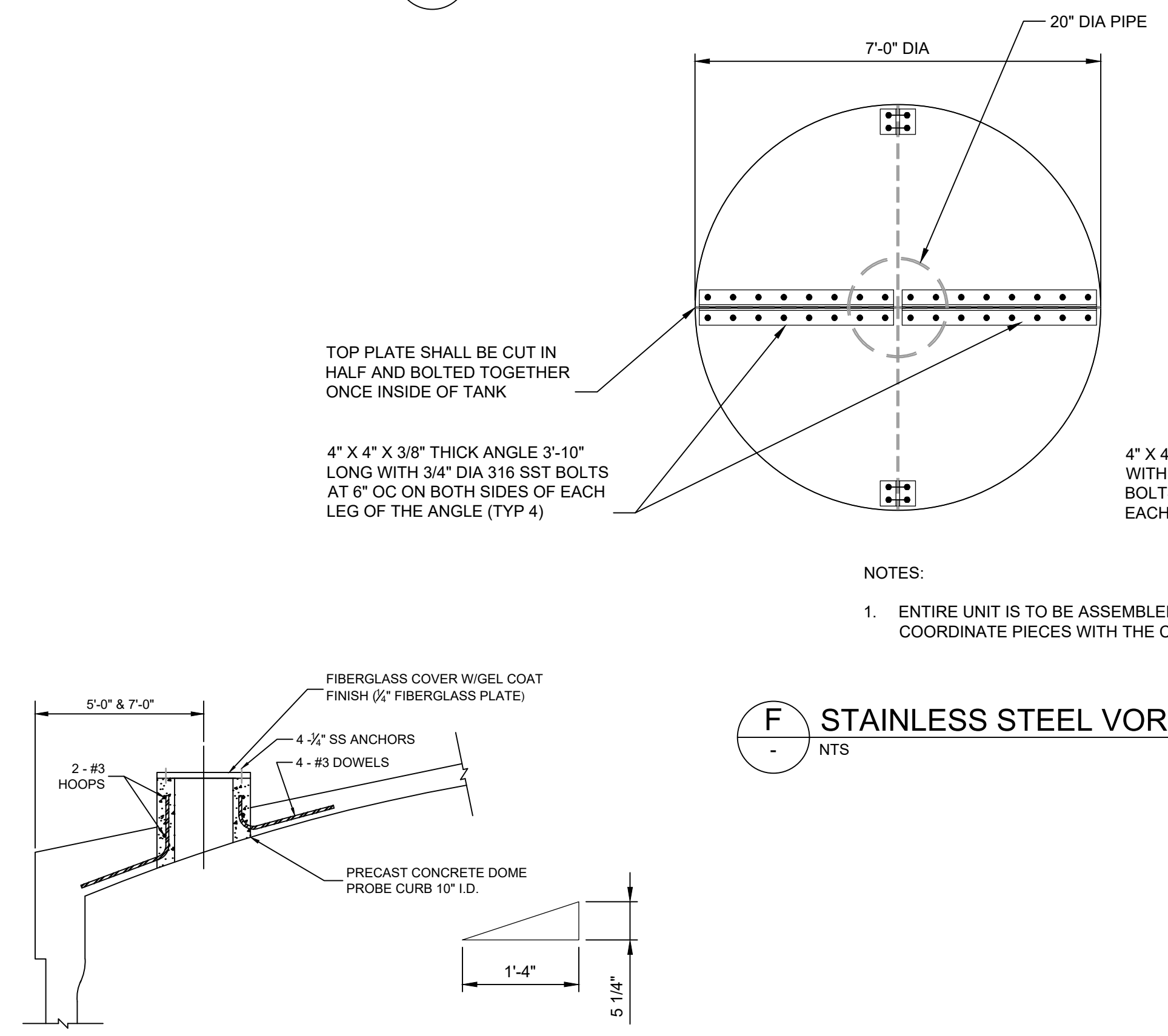
**B PRECAST CONCRETE OVERFLOW**  
NTS



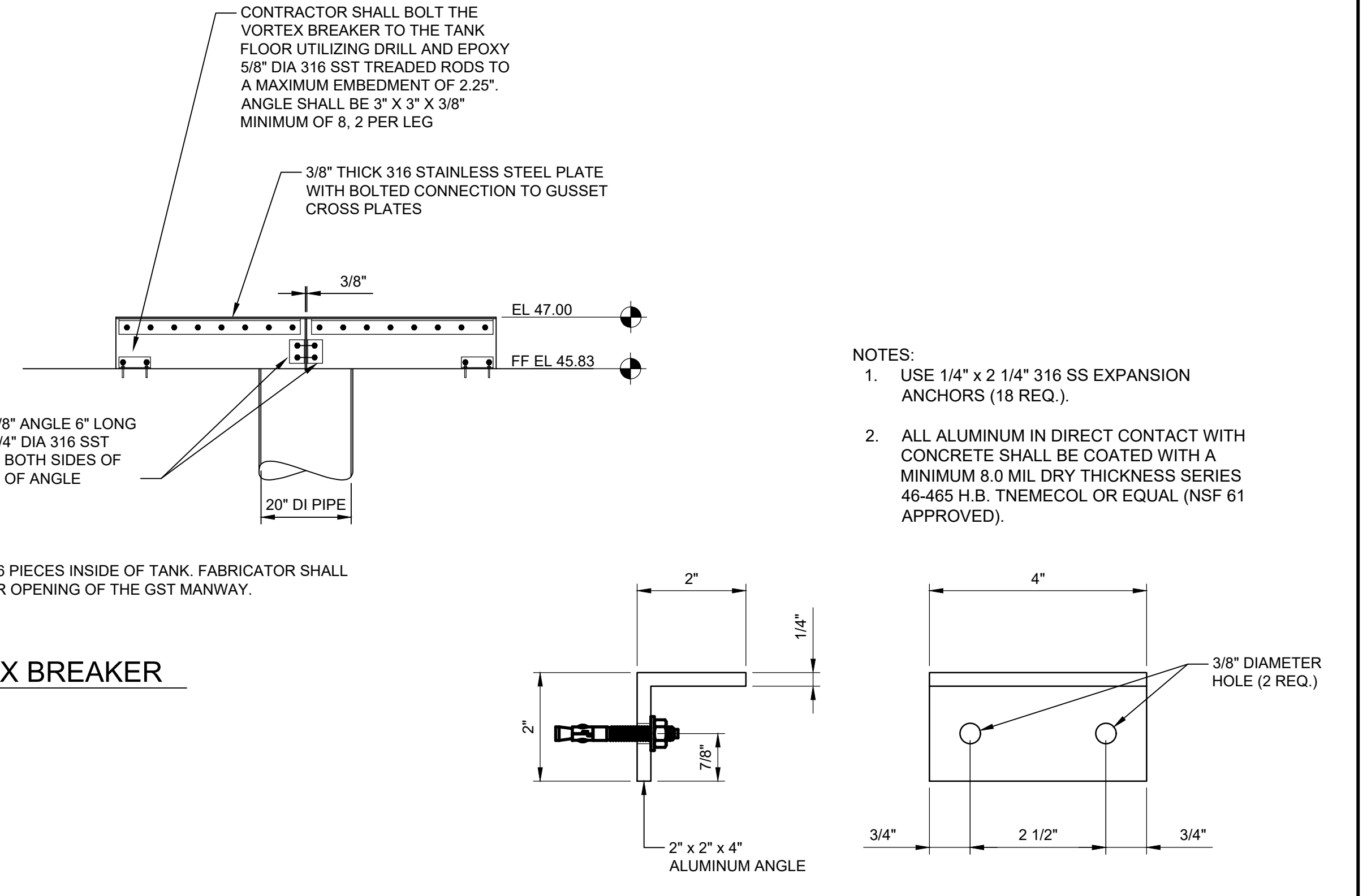
**C PIPE BRACKET**  
NTS



**D EXTERIOR ALUMINUM LADDER W/ TS SAFETY RAIL, SAFETY CAGE AND LOCKABLE SECURITY GATE**  
NTS



**E 10\"/>**



**F STAINLESS STEEL VORTEX BREAKER**  
NTS

**G TANK SETTLEMENT MONUMENT**  
NTS

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**M**  
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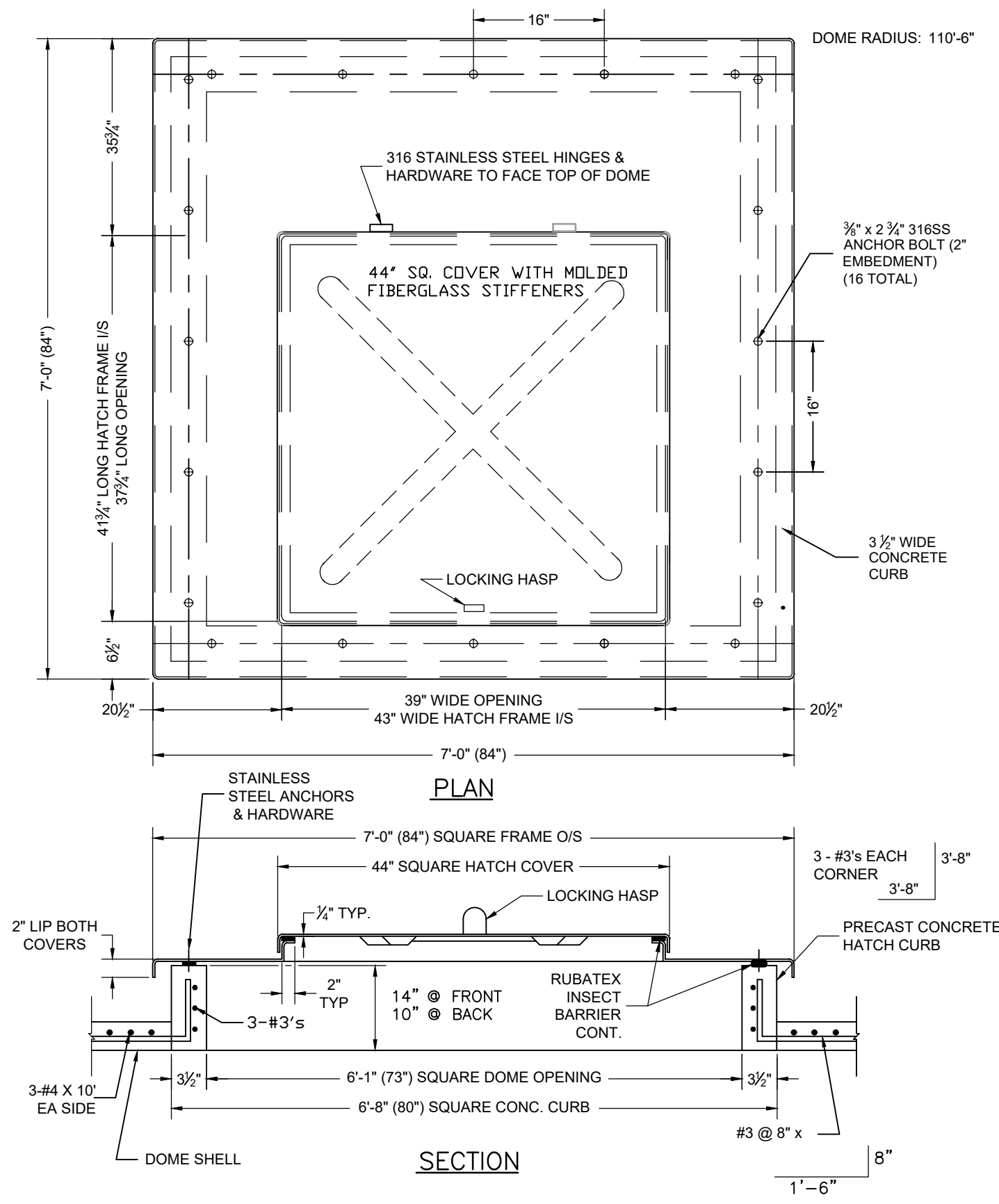


St. Johns County  
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1205 STATE ROAD 16  
ST. AUGUSTINE, FL 32084  
PHONE: (904) 209-2626 FAX: (904) 209-2627

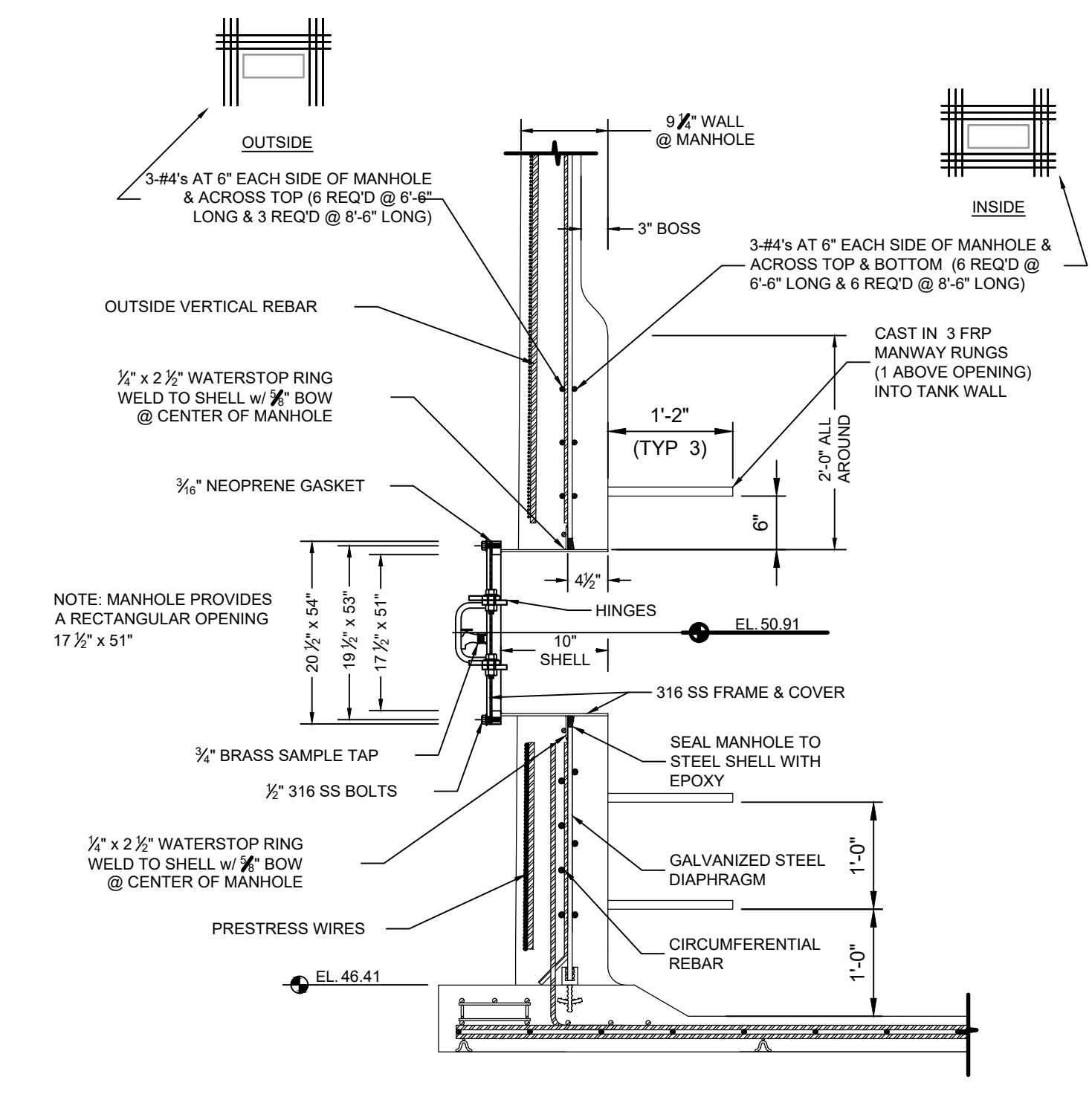
CR-208 GROUND STORAGE TANK  
AND BOOSTER PUMP STATION

GROUND STORAGE TANK  
DETAILS

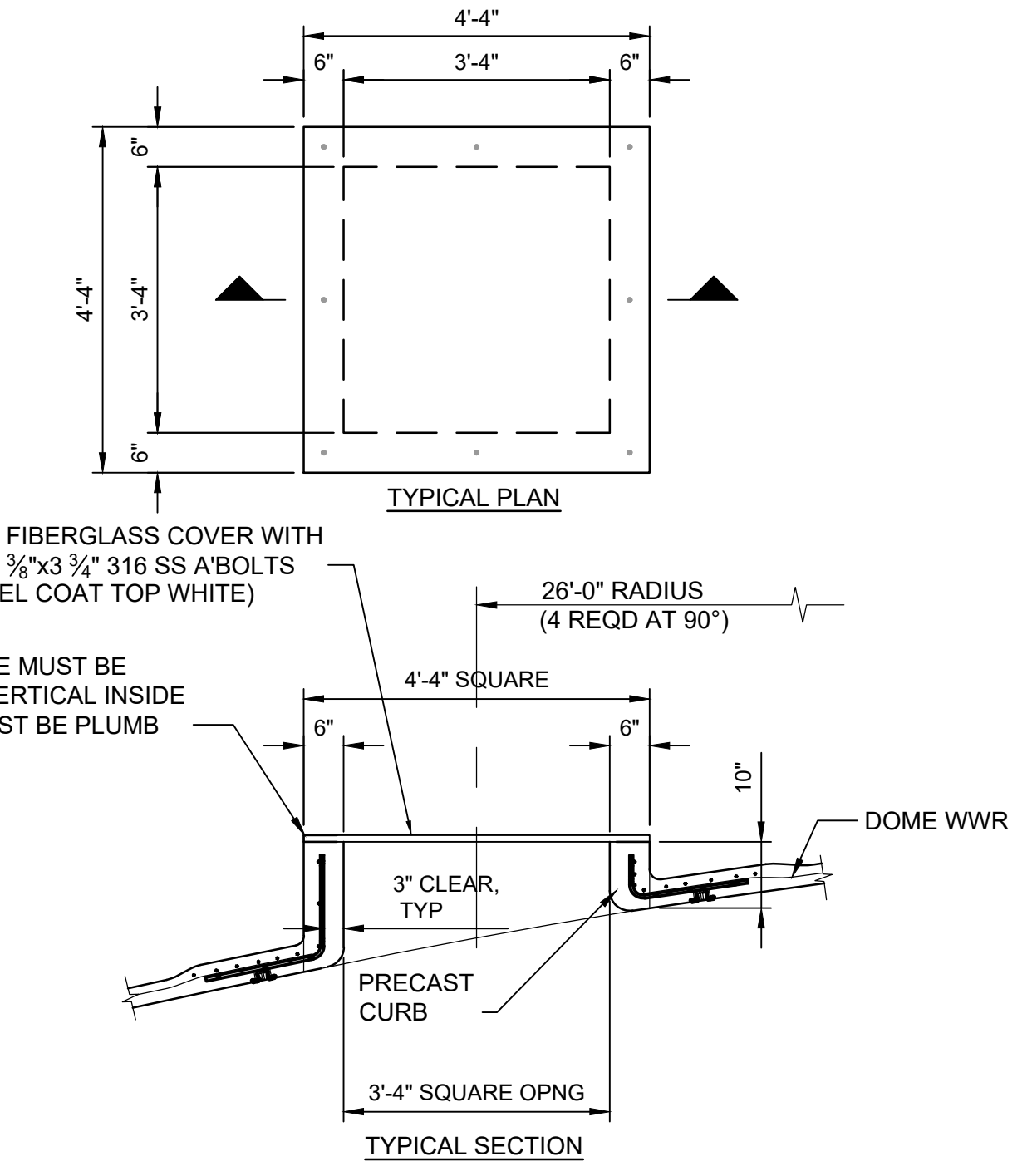
SHEET NO.  
40  
DWG NO.  
M-6  
GST BID  
PACKAGE



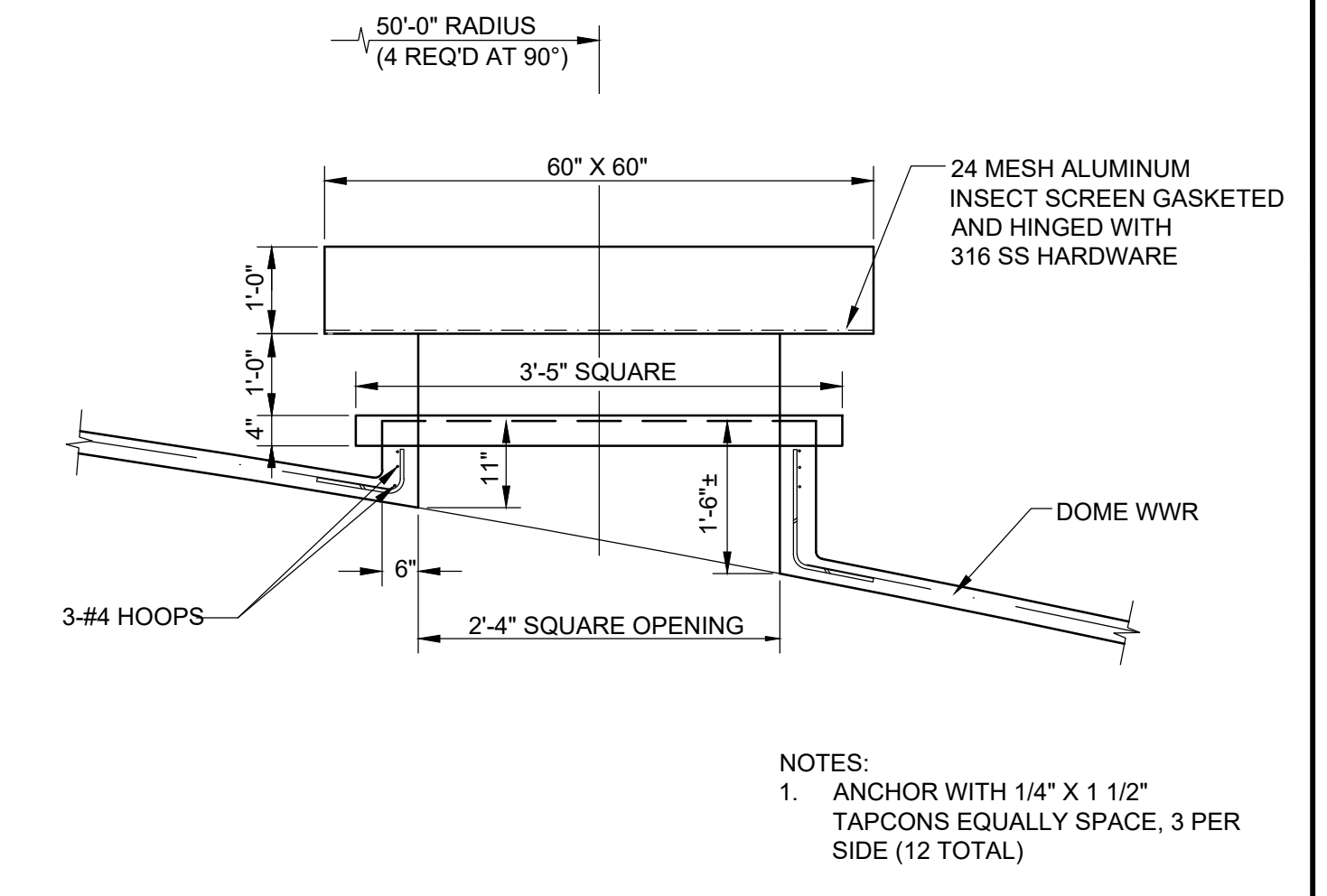
**B 316 SS WALL MANHOLE W/ HINGED COVER DETAIL**  
NTS



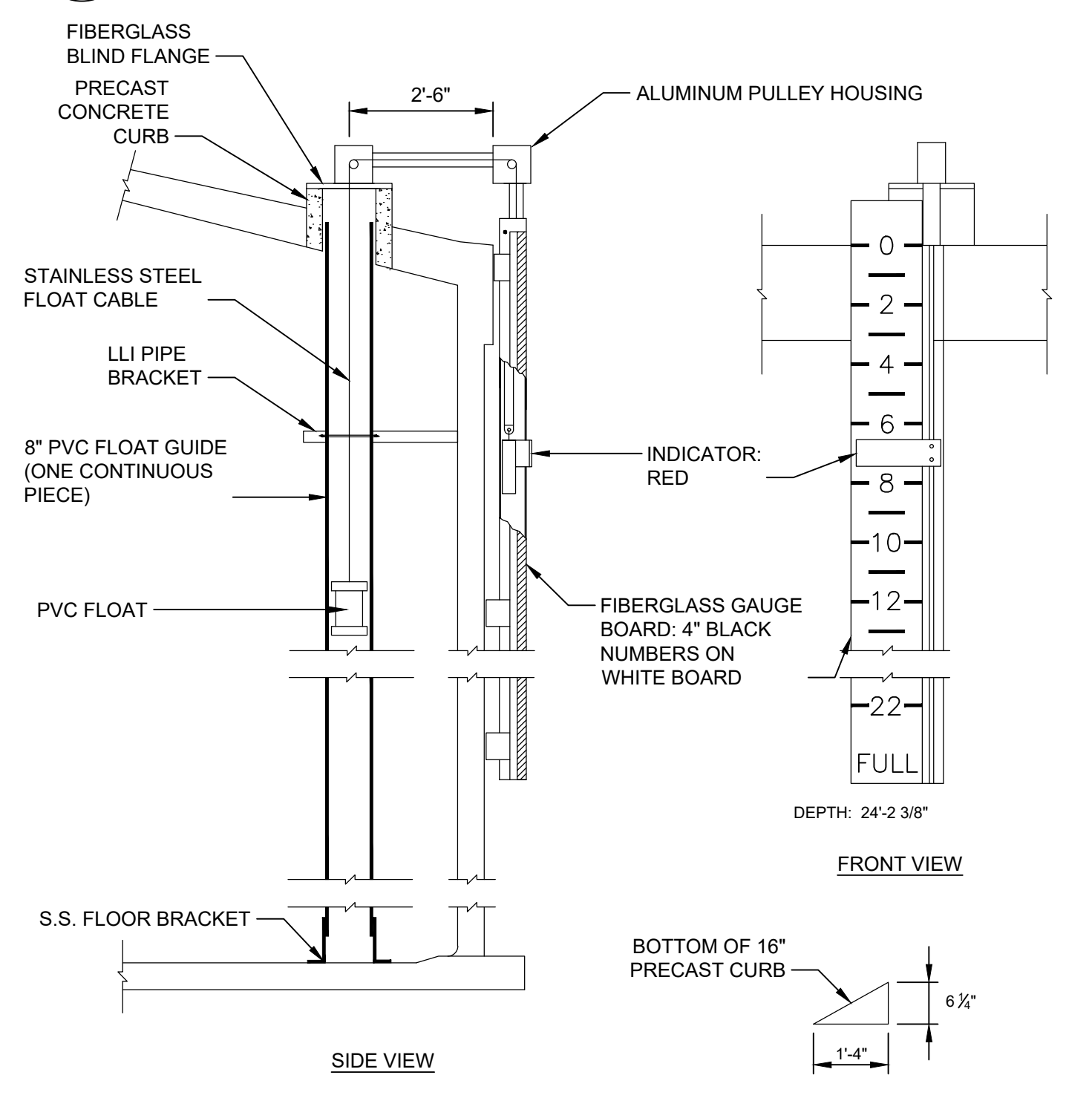
**C CONCRETE CURB FOR FUTURE FAN**  
NTS



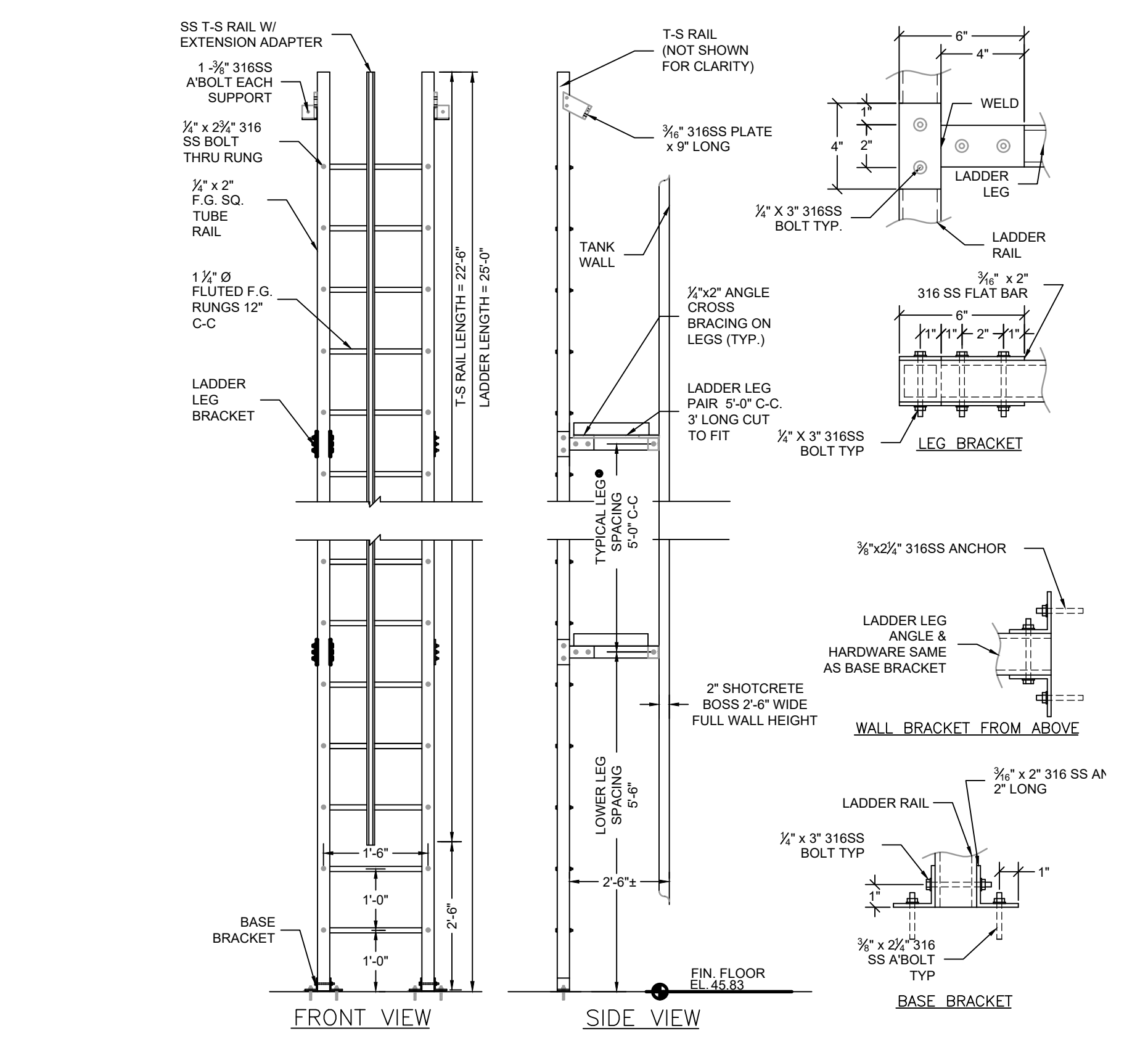
**D CONCRETE INTAKE VENT CURB**  
NTS



**A ACCESS HATCH WITH FIBERGLASS COVER DETAIL**  
NTS



**F INTERIOR FRP LADDER W/ STAINLESS STEEL TS SAFETY RAIL**  
NTS



**E FIBERGLASS LIQUID LEVEL INDICATOR**  
NTS

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ST. AUGUSTINE, FL 32084  
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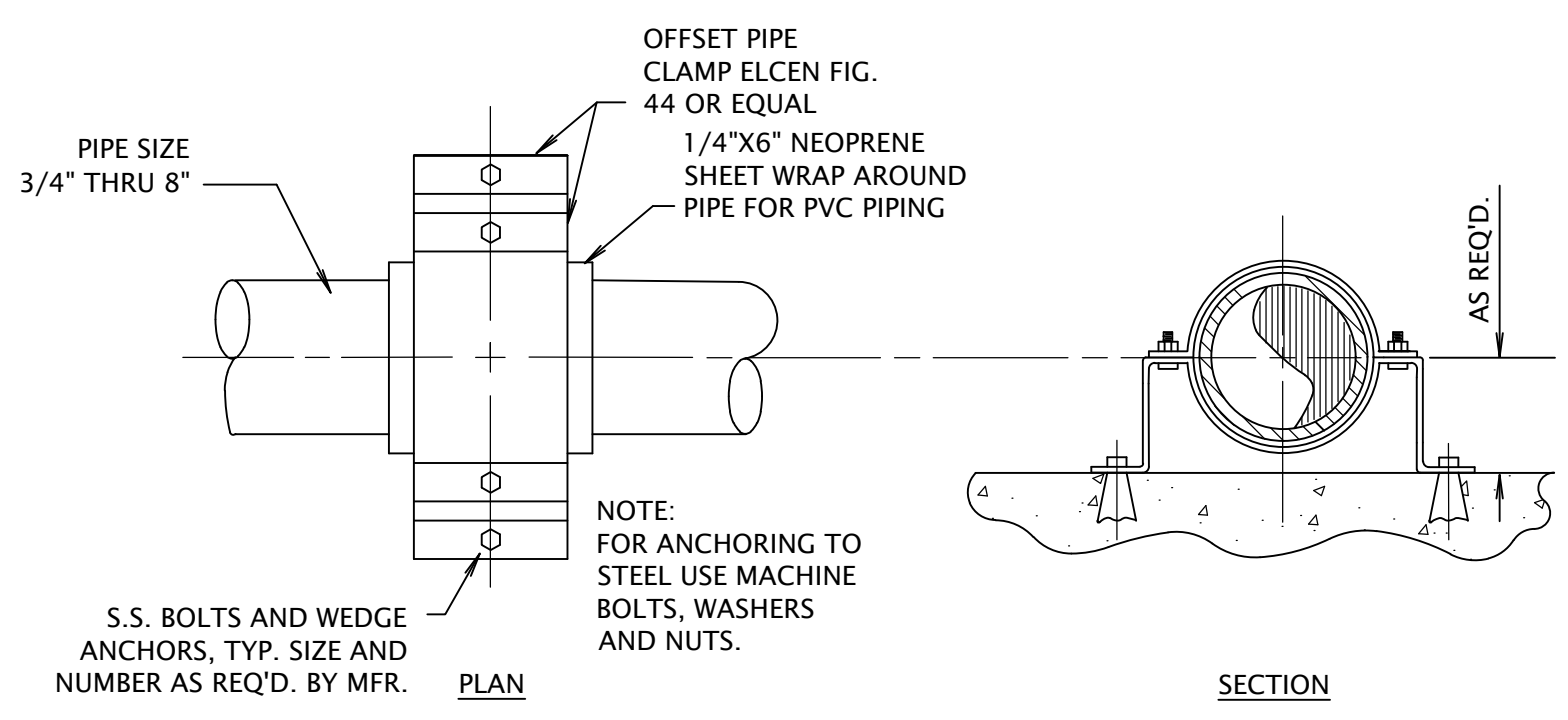
CR-208 GROUND STORAGE TANK  
AND BOOSTER PUMP STATION

GROUND STORAGE TANK  
DETAILS

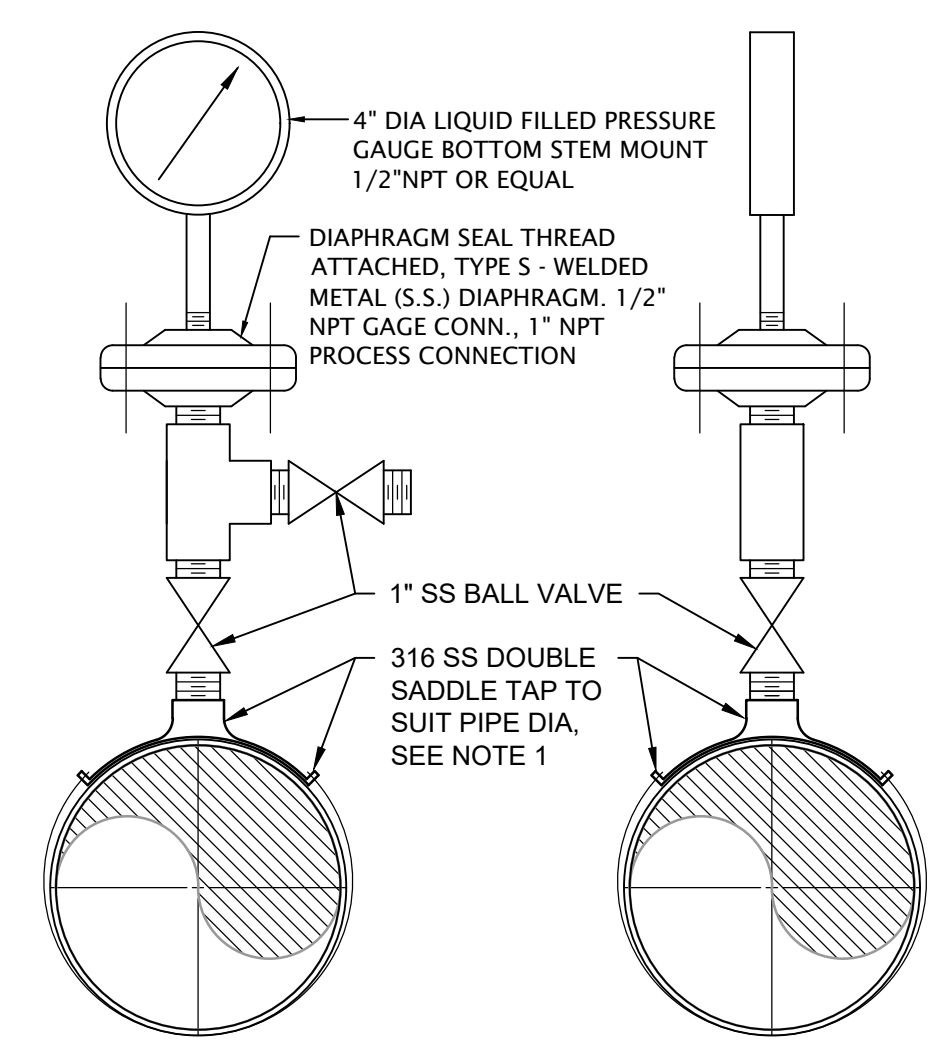
SHEET NO.  
42  
DWG NO.  
M-7  
GST BID  
PACKAGE



PIPE SIZE	A	B	C	D	E		F	G	H
					MIN.	MAX.			
2 1/2"	2 1/2"	3 1/2"	9"	1 1/2"	8"	13"	1/2"	3/16"	3/8"
3"	2 1/2"	3 3/4"	9"	1 1/2"	8 1/4"	13 1/4"	1/2"	3/16"	3/8"
3 1/2"	2 1/2"	4"	9"	1 1/2"	8 1/2"	13 1/2"	1/2"	3/16"	3/8"
4"	3"	4 1/4"	9"	2 1/2"	9 1/4"	14"	1/2"	3/16"	3/8"
5"	3"	4 7/8"	9"	2 1/2"	10"	14 3/4"	5/8"	3/16"	3/8"
6"	3"	5 1/2"	9"	2 1/2"	10 1/2"	15 1/4"	5/8"	1/4"	3/8"
8"	3"	6 7/8"	9"	2 1/2"	11 3/4"	16 1/2"	5/8"	1/4"	3/8"
10"	3"	8 1/2"	9"	2 1/2"	13 1/2"	18 1/4"	3/4"	1/4"	1/2"
12"	3"	9 15/16"	9"	2 1/2"	15"	19 3/4"	3/4"	1/4"	1/2"
14"	4"	10 15/16"	11"	3"	16 1/4"	20 3/4"	3/4"	1/4"	1/2"
16"	4"	12 3/8"	11"	3"	17 3/4"	22 1/4"	7/8"	3/8"	1/2"
18"	6"	13 7/8"	13 1/2"	3 1/2"	19 1/2"	24"	1"	3/8"	1/2"
20"	6"	15 3/8"	13 1/2"	3 1/2"	21"	25 1/2"	1"	3/8"	1/2"
24"	6"	17 15/16"	13 1/2"	4"	23 3/4"	28 1/4"	1"	3/8"	1/2"
30"	6"	21 5/16"	13 1/2"	4"	27"	31 1/2"	1"	1/2"	5/8"
32"	6"	22 1/2"	13 1/2"	4"	28 1/4"	32 3/4"	1"	1/2"	5/8"
36"	6"	24 1/2"	13 1/2"	4"	30 1/4"	34 3/4"	1"	1/2"	5/8"

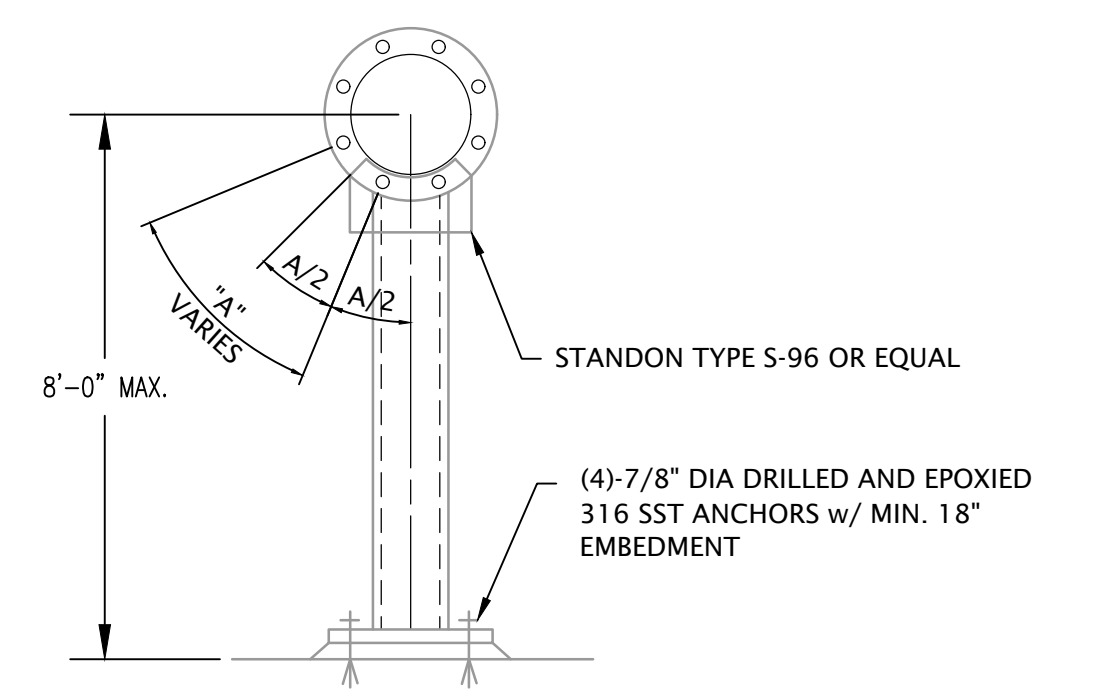


**B** 304 SS PIPE CLAMP  
- NTS

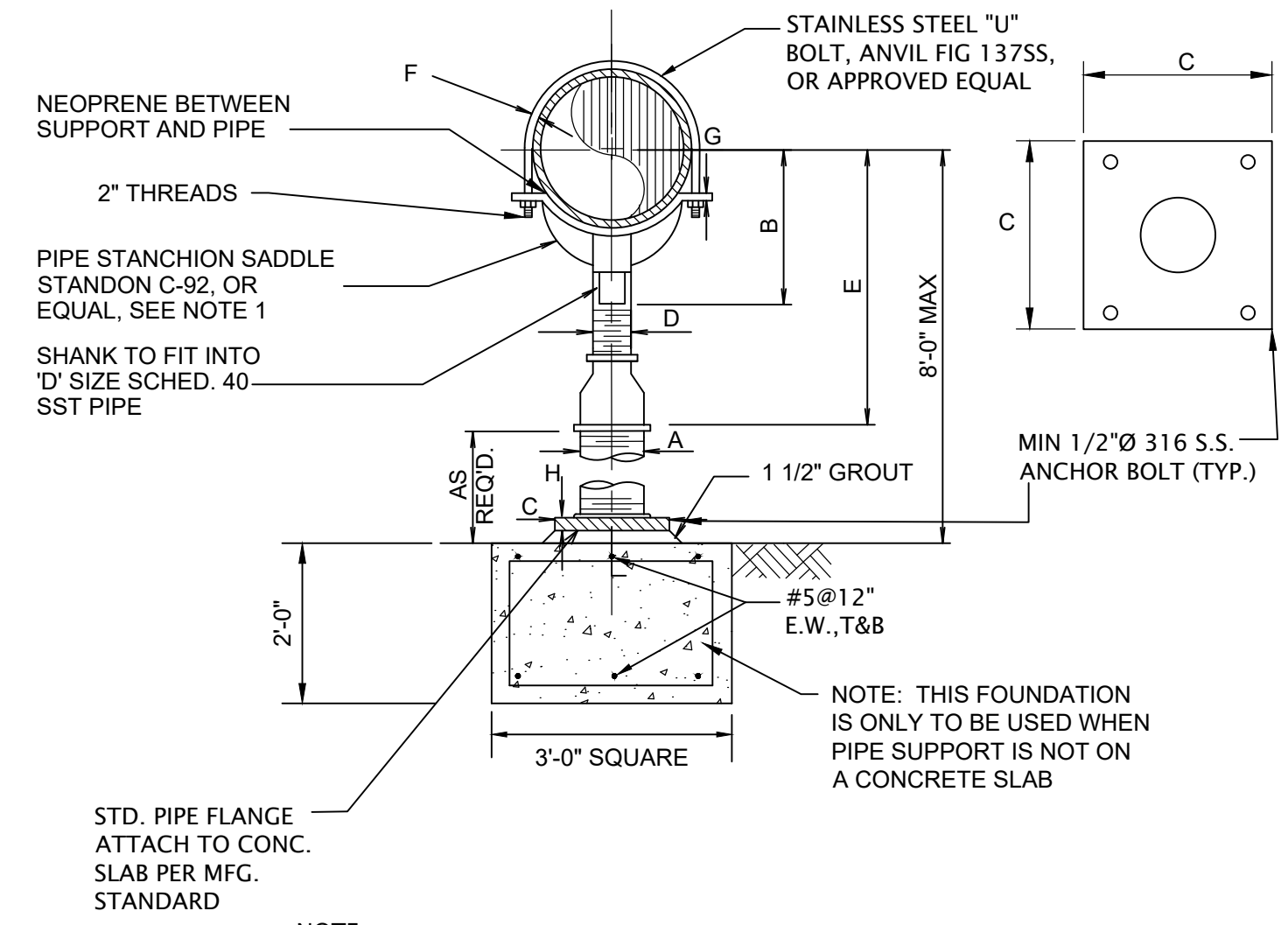


NOTE:  
1. SADDLE TAPS SHALL BE USED ON DUCTILE IRON AND PVC PIPING. ALL PRESSURE GAUGE CONNECTIONS ON STAINLESS STEEL PIPING SHALL BE WELDED TAPS UNLESS OTHERWISE AGREED UPON WITH ENGINEER.

**C** PRESSURE GAUGE  
- NTS

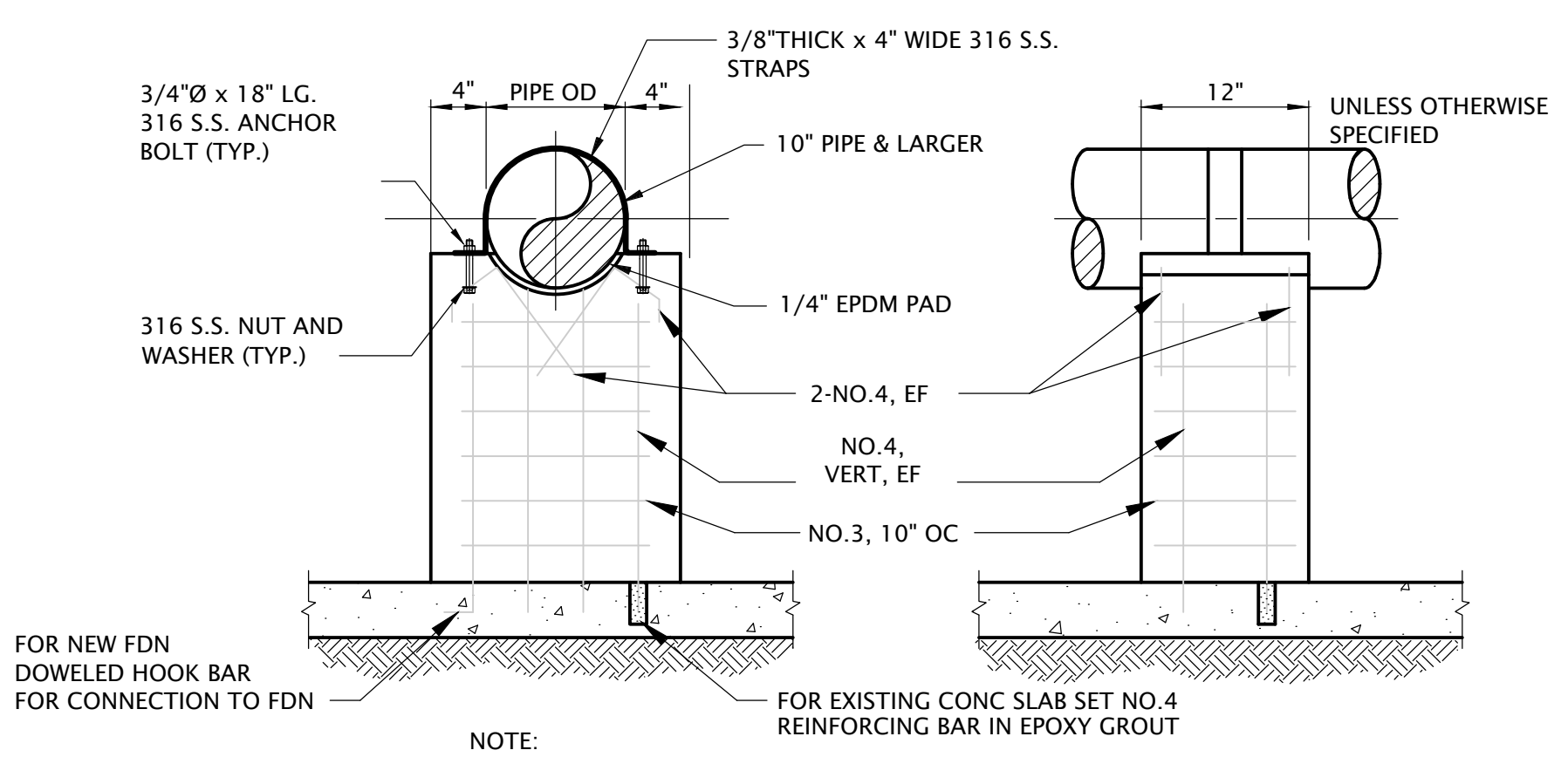


**D** 304 SS PIPE FLANGE CRADLE SUPPORT  
- NTS



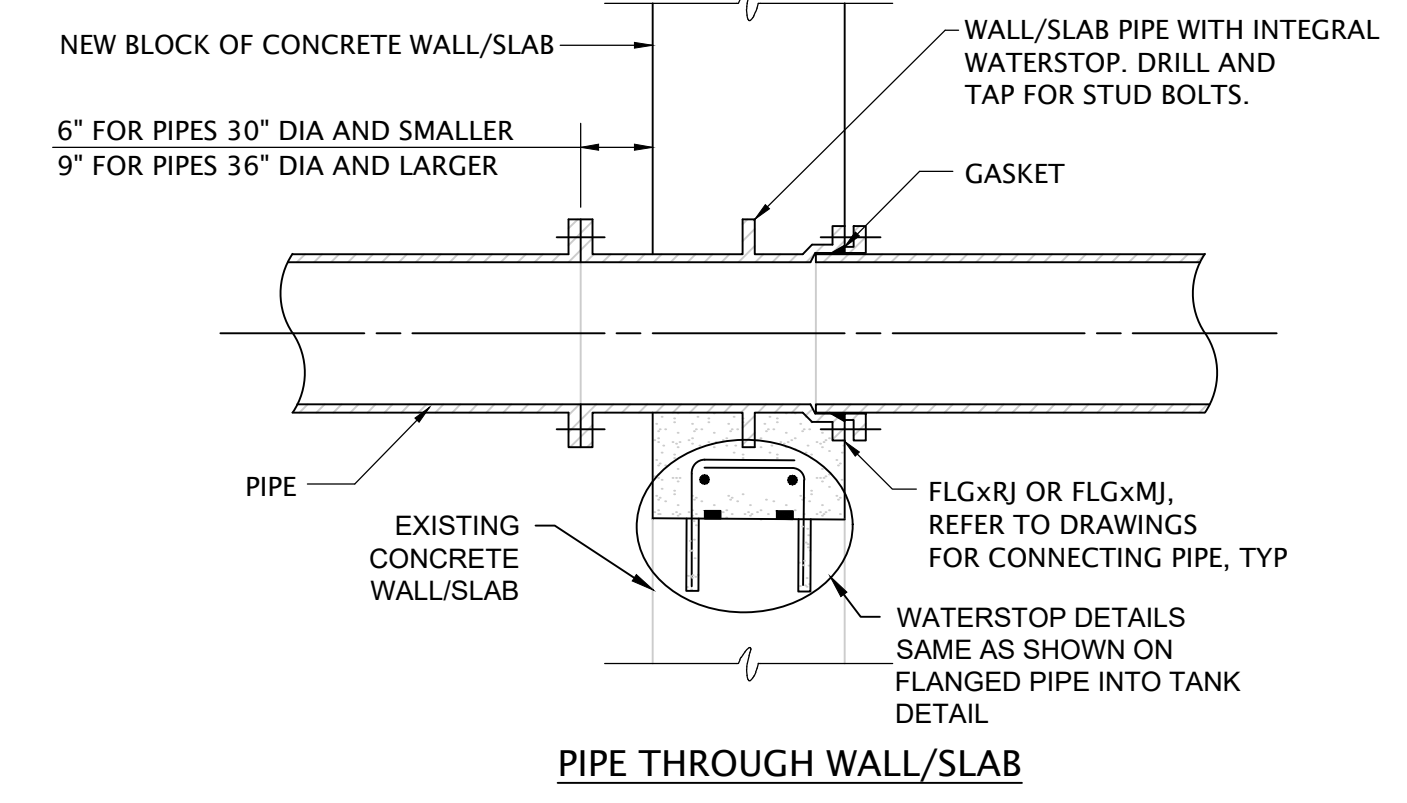
NOTE:  
1. SADDLE SHALL BE USED FOR SUPPORT LOCATED UNDER PIPING. SUPPORTS UNDER VALVES SHALL UTILIZE A FLAT PLATE PEDESTAL SUPPORT WITHOUT U-BOLT. VALVE SUPPORT SHALL BE EQUAL TO VALVE SUPPORT \"E\" AS MANUFACTURED BY E-Z LINE AND SHALL BE SIZED FOR THE VALVE.

**A** 304 SS PIPE SUPPORT  
- NTS



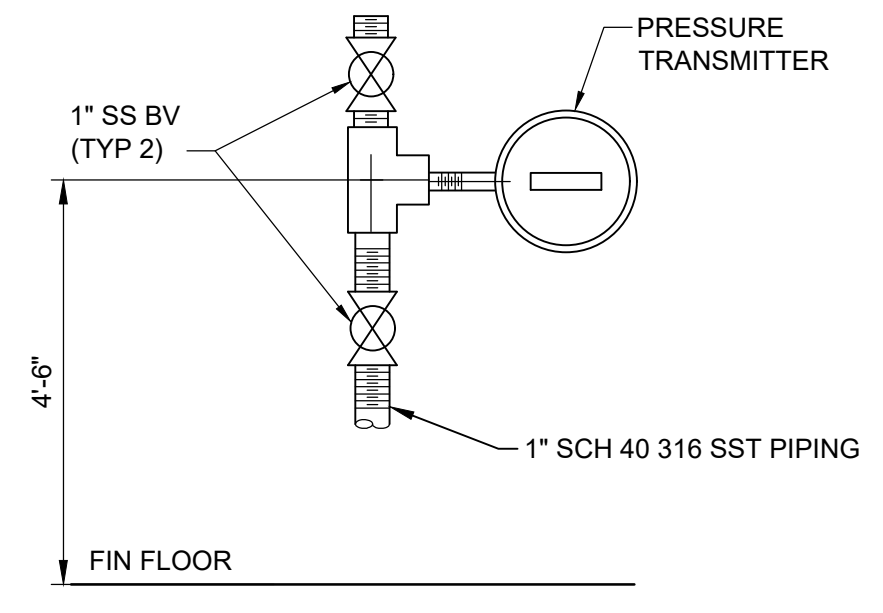
NOTE:  
1. WHERE PIPE SUPPORT IS UNDER A PIPE APPURTENANCE THAT CANNOT ACCOMMODATE A STRAP, CONTRACTOR SHALL PROVIDE THE SUPPORT WITH NO STRAP.

**F** TYPICAL CONCRETE PIPE SUPPORT  
- NTS



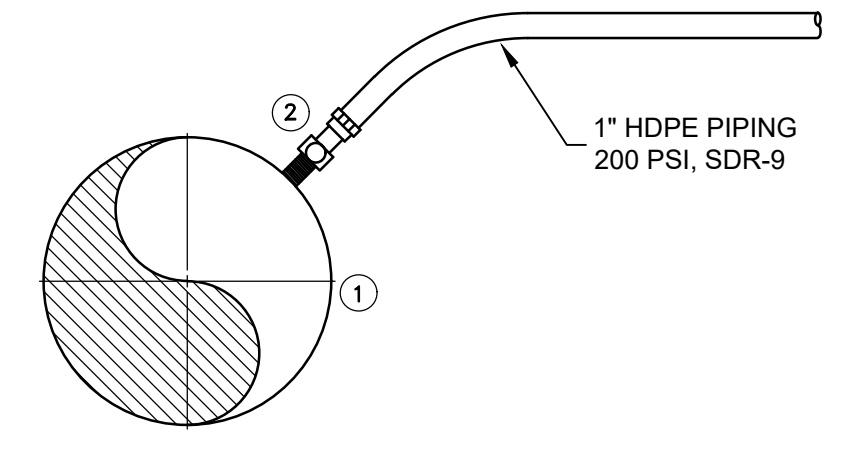
NOTES:  
1. ALL WALL PIPES SHALL BE CAST UNLESS OTHERWISE NOTED.  
2. PROVIDE PIPE JOINT WITHIN TWO (2) FEET OF EXTERIOR FACE OF WALL AT CONNECTION TO ALL NEW AND EXISTING STRUCTURES OR MANHOLES.  
3. ALL NEW OPENINGS IN EXISTING CONCRETE WALLS SHALL BE ACCOMPLISHED WITH A CLEAN SAW-CUT OR SINGLE CORE DRILLED AS REQUIRED. SURFACES SHALL BE ROUGHENED BY APPROVED METHODS (NOT APPLICABLE).  
4. FIRESTOP SLEEVED PENETRATIONS THROUGH FIRE-RATED WALLS OR FLOORS (NOT APPLICABLE).

**E** WALL/SLAB PENETRATION  
- NTS



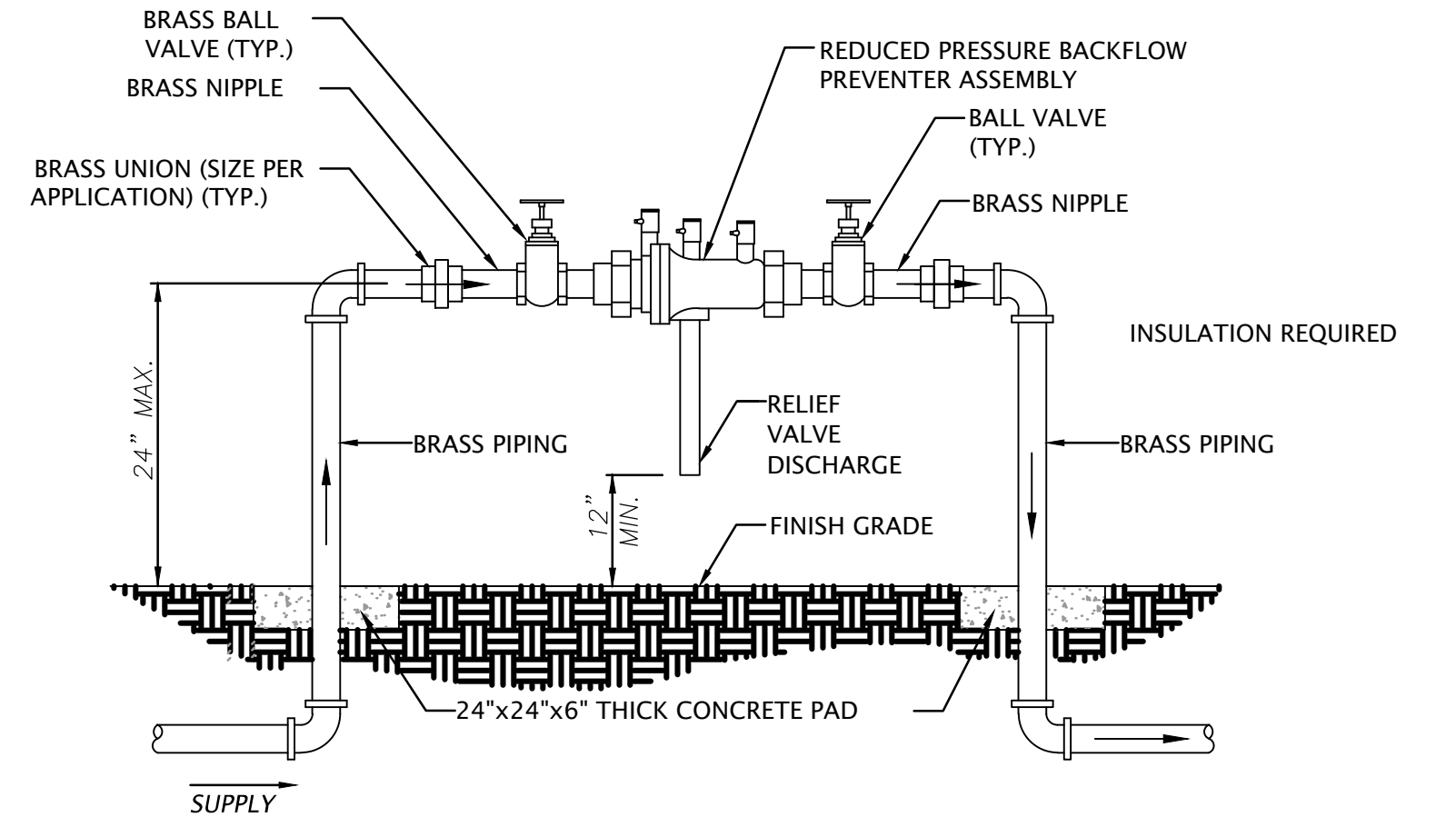
NOTES:  
1. ALL PIPING, FITTINGS AND VALVES SHALL BE 316 STAINLESS STEEL.  
2. SUPPORT PIPING AGAINST WALL WITH PIPE CLAMS AS PER DETAIL B/MD-1.

**G** PIT CONNECTION  
- NTS



1" SERVICE	NO.	ITEM	ITEM PRODUCT
	1	SERVICE SADDLE	FORD FC202
	2	CORPORATION STOP	FORD F1000-4

**H** WATER MAIN CONNECTION  
- NTS



**I** BACKFLOW PREVENTER DETAIL  
- NTS

C:\pwworking\hmm\water\_wastewater\lee79433\d0555372\MD-1.dwg Current Layout Tab = Layout1 Wed Oct 12, 2022 12:25 Xrefs Attached= S:\CUD\_22X34\_BOR [L:\d0555394\S\CUD\_22X34\_BOR.dwg]

NO.	BY	DATE	SYMBOL	REVISIONS
1	MM	10/2022		GST CONTRACTOR BID PACKAGE

**M**  
MOTT  
MACDONALD  
Mott MacDonald Florida, LLC

Architects Engineers Surveyors  
AA - C0000035 EB - 0000155 LB - 0006783  
10245 Centurion Pkwy, N., Suite 320  
Jacksonville, Florida 32256  
Telephone: (904) 203-1090

DESIGNER: L. TRACEY  
DRAWN BY: B. LEE  
DATE: OCT 2022  
CHECKED BY: L. SAMEL  
DATE: OCT 2022

DESIGN ENGINEER  
LESLIE S. SAMEL, P.E.  
FLORIDA REGISTRATION NO.  
68763

St. Johns County  
Utility Department  
1205 STATE ROAD 16  
ST. AUGUSTINE, FL 32084  
PHONE: (904) 209-2626 FAX: (904) 209-2627

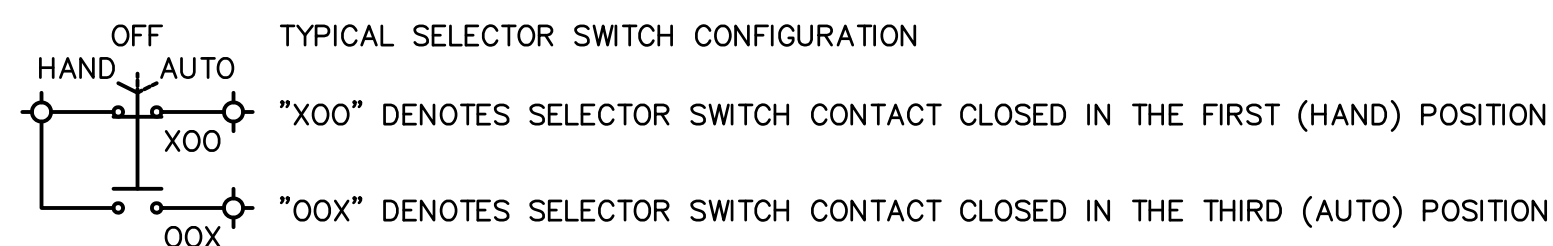
GR-208 GROUND STORAGE TANK  
AND BOOSTER PUMP STATION

MISCELLANEOUS  
MECHANICAL DETAILS

SHEET NO.  
45  
DWG NO.  
MD-1  
GST BID  
PACKAGE

**ELECTRICAL LEGEND**

	P101 CONDUIT "P101" (SEE CONDUIT AND CABLE SCHEDULE)		MCP 100 CIRCUIT BREAKER (FRAME SIZE/TRIP RATING - "MCP" MOTOR CIRCUIT PROTECTOR) MAGNETIC TYPE COMBINATION MOTOR STARTER, NEMA
	CONDUIT RUNS CONCEALED		FVNR SIZE 3 SIZE AS INDICATED ("FV" FULL VOLTAGE, "RV" SOLID STATE REDUCED VOLTAGE, "NR" NON-REVERSING, "R" REVERSING, "2S" TWO SPEED, "1W" SINGLE WINDING "2W" TWO WINDING, "LC" LIGHTING CONTACTOR)
	CONDUIT RUNS EXPOSED		VFD VARIABLE FREQUENCY DRIVE
	CONDUIT RUNS IN DUCT BANKS OR BELOW GRADE		MOTOR (NUMERAL INDICATES HORSEPOWER - "H" SPACE HEATER, "T" WINDING THERMOSTAT, "M" MOISTURE DETECTOR)
	CONDUIT TURNING UP		POTENTIAL TRANSFORMER; CURRENT TRANSFORMER
	CONDUIT TURNING DOWN		PILOT LIGHT ("A" AMBER, "B" BLUE, "C" CLEAR, "G" GREEN, "R" RED, "W" WHITE)
	CHANGE IN CONDUIT ELEVATIONS USING CONDUIT OUTLET BODIES.		KIRK-KEY MECHANICAL INTERLOCK USING KEY "#"
	CONDUIT TERMINATED WITH WATERTIGHT CABLE CONNECTOR		ASSOCIATED DEVICE "REMOTE" FROM MOTOR CONTROL CENTER OR CONTROL PANEL
	BRANCH CIRCUIT HOMERUN (ARROWS INDICATE PANEL CIRCUITS, SHORT STROKES INDICATE PHASE OR SWITCHED CONDUCTORS, LONG STROKE DENOTES NEUTRAL, CURVED STROKE DENOTES GROUND. (NO STROKES INDICATES 3/4" CONDUIT WITH 3#12 PHASE/NEUTRAL/GROUND CONDUCTORS).		H O A HAND/OFF/AUTOMATIC SELECTOR SWITCH CONTROL STATION
	HANDHOLE, OR PULLBOX AS INDICATED ("E" ELECTRICAL, "C" COMMUNICATION)		SO SAFE OFF MOMENTARY PUSHBUTTON CONTROL STATION WITH LOCKING DEVICE
	TYPICAL WIRING DEVICE NOTATIONS ("W" WEATHERPROOF OR "X" EXPLOSION PROOF DEVICE CONNECTED TO PANEL "L" CIRCUIT "5". ENCLOSING SQUARE DENOTES FLOORBOX)		ES EMERGENCY STOP CONTROL STATION WITH SAFETY CABLES
	RECEPTACLE		A AS AMMETER AND AMMETER SWITCH
	SPECIAL PURPOSE OUTLET		H ETM HOURS OF OPERATION; ELAPSED TIME METER
	JUNCTION BOX, PULL BOX		V VS VOLTMETER AND VOLTMETER SWITCH
	SINGLE POLE SWITCH CONTROLS FIXTURES MARKED "b" ("2" 2 POLE, "3" 3 WAY, "T" TIME SWITCH, "M" MANUAL MOTOR STARTER)		CR ICR CONTROL RELAY, INTERPOSING CONTROL RELAY
	THERMOSTAT (LINE VOLTAGE TYPE WITH ON-OFF-AUTO SWITCH UNLESS NOTED).		GF GROUND FAULT PROTECTION SYSTEM
	SAFETY DISCONNECT SWITCH (AMPERAGE RATING/POLES/FUSE RATING - "NF" NON-FUSED, "DT" DOUBLE-THROW)		PM POWER MONITOR
	TELEPHONE OUTLET		TD TIME DELAY RELAY
	TELEPHONE BACKBOARD		PC PRESSURE CONTROLLER
	LOW VOLTAGE PANELBOARD (208/120V)		OL OVERLOAD DEVICE; SURGE CONTROL PANEL
	HIGH VOLTAGE PANELBOARD (480/277V)		LS LEVEL SWITCH
	TYPICAL LIGHTING FIXTURE NOTATIONS (TYPE "E" CONNECTED TO CIRCUIT "2" AND SWITCH "b". SHADING DENOTES EMERGENCY UNIT. BRACKET DENOTES WALL MOUNTING)		ZS ZERO SPEED SWITCH; POSITION SWITCH
	LINEAR/LAY-IN LIGHT FIXTURE		PS PRESSURE SWITCH
	WALL MOUNTED LIGHT FIXTURE		SV VC SOLENOID VALVE; VALVE CONTROL ACTUATOR
	CEILING/PENDANT MOUNTED LIGHT FIXTURE		ALARM HORN
	REFERENCE TO NOTE "#"		TVSS TRANSIENT VOLTAGE SURGE SUPPRESSION
	TIME CLOCK (CYCLE TIME/TIME/MIN. SETTING - "AC" ADJUSTABLE CYCLE, "M" MOMENTARY, "P" PULSE, "RC" REPEAT CYCLE)		MOV MOTOR OPERATED VALVE



**INSTRUMENTATION LEGEND**

	FIELD MOUNTED INSTRUMENT		PANEL MOUNTED INSTRUMENT		BACK OF PANEL MOUNTED DEVICE
--	--------------------------	--	--------------------------	--	------------------------------

**P&ID SIGNAL DESIGNATIONS**

	DISCRETE INPUT SIGNAL
	DISCRETE OUTPUT SIGNAL
	ANALOG INPUT SIGNAL
	ANALOG OUTPUT SIGNAL
	MODBUS TCP COMMUNICATIONS

"XY"	FIRST LETTER	SUCCEEDING LETTERS
A	ANALYTICAL	ALARM
B	BURNER, COMBUSTION	
C		CONTROLLER
D	DIFFERENTIAL	
E	VOLTAGE	SENSOR, PRIMARY ELEMENT
F	FLOW	
G		GLASS, VIEWING DEVICE
H	HAND	HIGH
I	CURRENT	INDICATE
J	POWER	
K	TIME	CONTROL STATION
L	LEVEL	LOW
M		MIDDLE, INTERMEDIATE
N		
O		ORIFICE
P	PRESSURE, VACUUM	POINT
Q	QUANTITY	
R	RADIATION	RECORDER
S	SPEED, FREQUENCY	SWITCH
T	TEMPERATURE	TRANSMITTER
U	MULTIVARIABLE	MULTIFUNCTION
V	VIBRATION	VALVE, DAMPER, LOUVER
W	WEIGHT, FORCE	WELL
X		
Y	EVENT	RELAY, COMPUTE, CONVERTER
Z	POSITION	ACTUATOR

"XYZ"	MISCELLANEOUS ABBREVIATIONS
ACM	ANALOG CONTROL MODULE
AI	ANALOG INPUT SIGNAL
AMM	ANALOG MONITOR MODULE
AO	ANALOG OUTPUT SIGNAL
ARV	AIR RELEASE VALVE
CL	CHLORINE RESIDUAL MEASUREMENT
DCM	DIGITAL CONTROL MODULE
DI	DIGITAL INPUT SIGNAL
DO	DIGITAL OUTPUT SIGNAL
FOR	FORWARD-OFF-REVERSE SELECTOR SWITCH
HOA	HAND-OFF-AUTOMATIC SELECTOR SWITCH
ICP	INSTRUMENTATION/CONTROL PANEL
MCC	MOTOR CONTROL CENTER
MIP	MAIN INSTRUMENTATION PANEL
OI	OPERATOR INTERFACE
PCM	PUMP CONTROL MODULE
PLC	PROGRAMMABLE LOGIC CONTROLLER MODULE
PSM	POWER SUPPLY MODULE
RIM	RADIO INTERFACE MODULE
RTU	REMOTE TELEMETRY UNIT
S/C	SIGNAL CONVERTER
S/I	SIGNAL ISOLATOR
S/P	SURGE PROTECTOR
VFD	VARIABLE FREQUENCY DRIVE
XLPE	CROSS-LINKED POLYETHYLENE

**ELECTRICAL CONNECTED LOAD CALCULATIONS**

BOOSTER PUMP 1	100 HP	124 AMPS
BOOSTER PUMP 2	100 HP	124 AMPS
BOOSTER PUMP 3	100 HP	124 AMPS
BOOSTER PUMP 4	100 HP	124 AMPS
EXHAUST FAN	5 HP	8 AMPS
GST FAN 1 (FUTURE)	5 HP	8 AMPS
GST FAN 2 (FUTURE)	5 HP	8 AMPS
GST FAN 3 (FUTURE)	5 HP	8 AMPS
GST FAN 4 (FUTURE)	5 HP	8 AMPS
<b>TOTAL CONNECTED MOTOR LOAD</b>		<b>536 AMPS</b>
<b>MOTOR DEMAND FACTOR</b>		<b>100 %</b>
<b>TOTAL MOTOR DEMAND LOAD</b>		<b>536 AMPS</b>
LIGHTING PANEL L	30 KVA	36 AMPS
<b>TOTAL CONNECTED LOAD</b>		<b>572 AMPS</b>

**NON-COINCIDENTAL LOAD CALCULATIONS**

BOOSTER PUMP	100 HP	124 AMPS
NON-COINCIDENTAL MOTOR LOAD		124 AMPS
MOTOR DEMAND FACTOR		100 %
NON-COINCIDENTAL MOTOR DEMAND		124 AMPS
LIGHTING PANEL L	5 KVA	6 AMPS
<b>TOTAL NON-COINCIDENTAL LOAD</b>		<b>130 AMPS</b>

**ELECTRICAL SERVICE LOAD CALCULATIONS**

TOTAL CONNECTED LOAD	572 AMPS
TOTAL NON-COINCIDENTAL LOAD	130 AMPS
<b>PEAK DEMAND LOAD</b>	<b>442 AMPS</b>
0.25 X LARGEST MOTOR	31 AMPS
MIN SERVICE AMPACITY	473 AMPS
<b>ELECTRICAL SERVICE:</b>	<b>800 AMP, 480 VOLT, 3 PHASE</b>

**NEW ELECTRICAL SERVICE TRANSFORMER**

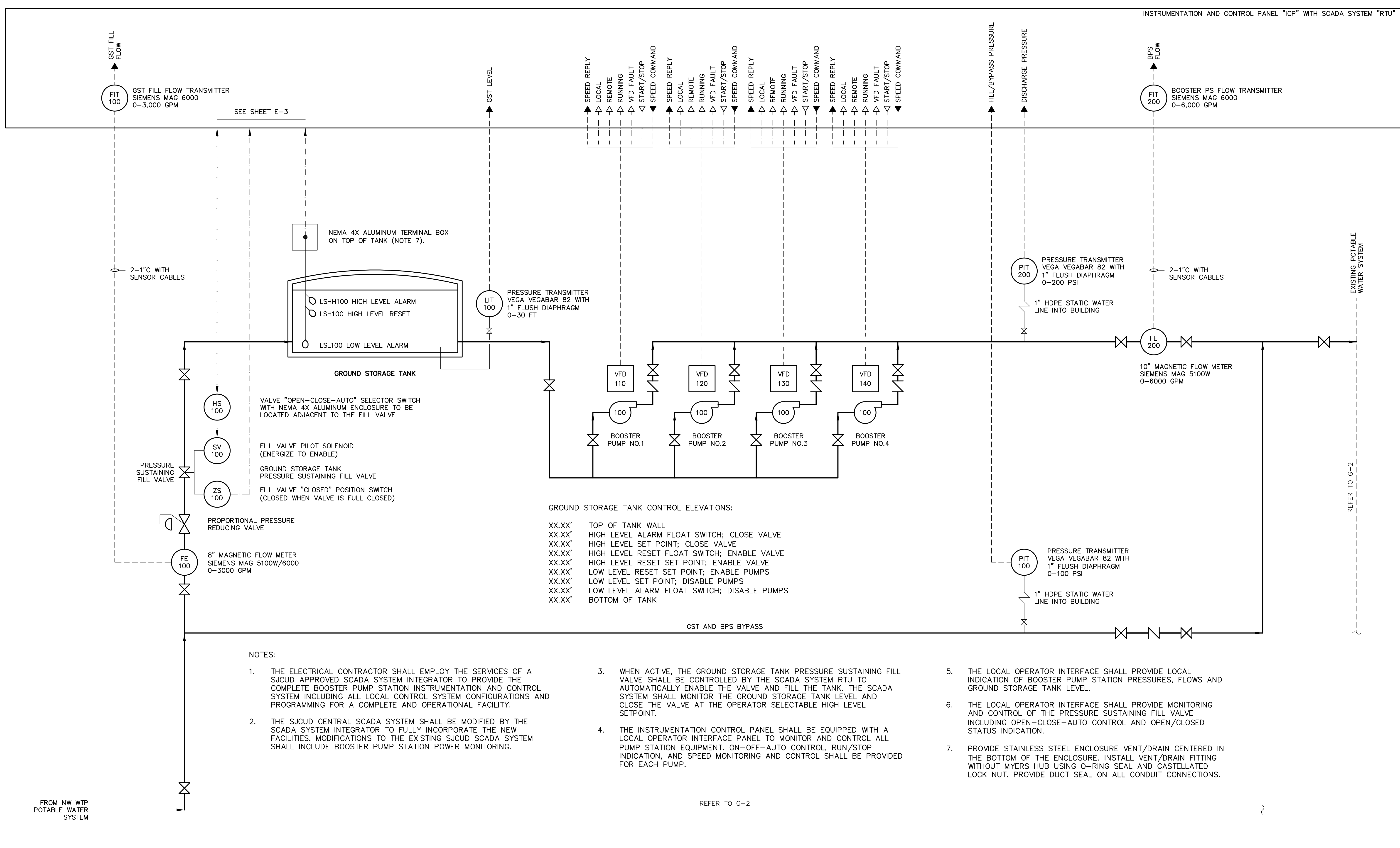
FPL SERVICE TRANSFORMER	XXX KVA
FPL FAULT CURRENT LETTER	XX,XXX AMPS

**FLORIDA BUILDING CODE-ENERGY CONSERVATION, 7TH EDITION (2020) LIGHTING POWER ALLOWANCES - REDUCED LIGHTING POWER**

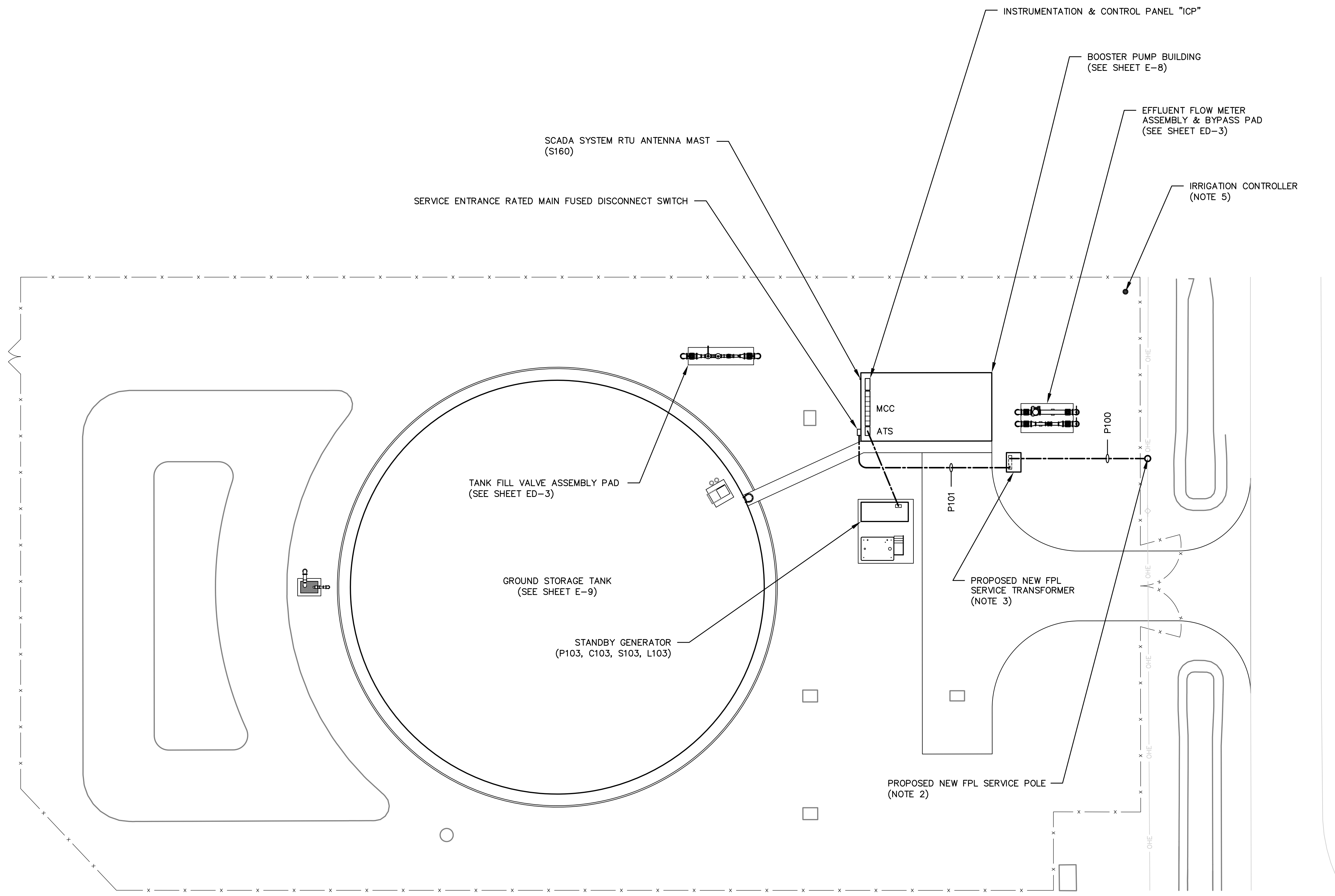
INTERIOR LIGHTING	501 WATTS
BUILDING AREA METHOD	869 SF
TABLE C405.3.2(1)	
BUILDING AREA TYPE	MAX W/FT <sup>2</sup> ACTUAL W/FT <sup>2</sup>
MANUFACTURING FACILITY	0.90 0.58
EXTERIOR LIGHTING	
TABLE C405.4.2(2)	
LIGHTING ZONE 2	MAX WATTS ACTUAL WATTS
	400 94

FAULT CURRENT NOTE: THE PRELIMINARY CALCULATED MAXIMUM AVAILABLE FAULT CURRENT IS < XX kA. FINAL AVAILABLE FAULT CURRENT SHALL BE PROVIDED BY THE SHORT CIRCUIT STUDY SPECIFIED IN SECTION 16015 ELECTRICAL SYSTEM ANALYSIS.





NO.	BY	DATE	SYMBOL	REVISIONS	 <b>MOTT MACDONALD</b> Mott MacDonald Florida, LLC	Architects Engineers Surveyors AA - C0000035 EB - 0000155 LB - 0006783 10245 Centurion Pkwy, N., Suite 320 Jacksonville, Florida 32256 Telephone: (904) 203-1090	DESIGNER: D. LASSETTER	DESIGN ENGINEER	 <b>St. Johns County</b> Utility Department 1205 STATE ROAD 16 ST. AUGUSTINE, FL 32084 PHONE: (904) 209-2626 FAX: (904) 209-2627	<b>GR-208 GROUND STORAGE TANK AND BOOSTER PUMP STATION</b>	<b>INSTRUMENTATION SCHEMATIC DIAGRAM</b>	SHEET NO. 54
6.				DRAWN BY: B. LEE			W. DAVID LASSETTER, P.E.	DWG NO. E-4				
5.				DATE: OCT 2022			FLORIDA REGISTRATION NO. 37971	GST BID PACKAGE				
4.				CHECKED BY: L. SAMEL			3837 Buckskin Trail E Jacksonville, FL 32277					
3.				DATE: OCT 2022			904-743-1585					
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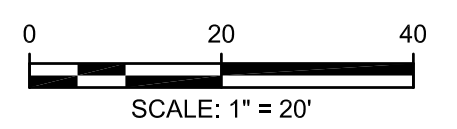
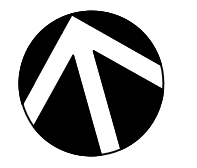


**NOTES:**

1. PROVIDE NEW ELECTRICAL SERVICE IN ACCORDANCE WITH ALL FPL REQUIREMENTS, INCLUDING NEW SERVICE METERING, METER ENCLOSURE, METER MOUNTING SYSTEM, ETC.
2. THE ELECTRICAL CONTRACTOR SHALL PROVIDE NEW UNDERGROUND PRIMARY SERVICE CONDUITS FROM THE NEW SERVICE POINT OF CONNECTION AT THE PROPOSED NEW FPL IN-LINE SERVICE POLE TO THE NEW FPL SERVICE TRANSFORMER IN ACCORDANCE WITH ALL FPL REQUIREMENTS. FPL SHALL PROVIDE THE PRIMARY SERVICE CONDUCTORS. NEW UNDERGROUND PRIMARY SERVICE CONDUITS SHALL BE 2-5" SCH 40 PVC, LONG RADIUS GRS ELLS, MIN. 36" COVER. FPL SHALL FURNISH THE CONDUIT FOR INSTALLATION BY THE ELECTRICAL CONTRACTOR.
3. THE NEW ELECTRICAL SERVICE PAD MOUNTED TRANSFORMER AND THE PRE-CAST CONCRETE TRANSFORMER PAD SHALL BE PROVIDED BY FPL. THE ELECTRICAL CONTRACTOR SHALL INSTALL THE TRANSFORMER PAD AND SHALL PROVIDE BOLLARDS, IN ACCORDANCE WITH FPL REQUIREMENTS.
4. ALL EXTERIOR MATERIAL AND INSTALLATION SHALL BE SUITABLE FOR AND IN ACCORDANCE WITH THE SPECIFICATIONS FOR "CORROSIVE ATMOSPHERES".
5. IRRIGATION CONTROLLER: PROVIDE CONCRETE PEDESTAL WITH DUPLEX TYPE GFI RECEPTACLE WITH WP WHILE IN-USE COVER (L-4, 3/4"C, 3#12).

**GROUNDING NOTES:**

1. GROUNDING ELECTRODE SYSTEM: PROVIDE A GROUND RING PER NEC 250.52, ENCIRCLING THE BOOSTER PUMP STATION BUILDING, CONSISTING OF A CONTINUOUS #4/0 TINNED COPPER CONDUCTOR AT 30" BELOW FINISHED GRADE.
2. PROVIDE GROUND RODS (MINIMUM 3/4" DIAMETER, 20' LONG COPPER CLAD STEEL) BONDED TO EACH CORNER OF THE GROUND RING, AND BETWEEN CORNERS AT MAXIMUM 30' ON CENTER. GROUND ROD SECTIONS SHALL BE COUPLED AND DRIVEN TO ESTABLISH A MAXIMUM RESISTANCE TO GROUND OF 5 OHMS THROUGHOUT THE GROUNDING ELECTRODE SYSTEM.
3. BOND THE GROUND RING TO THE STEEL REINFORCEMENT IN EACH CORNER OF THE BUILDING FOUNDATION WITH MINIMUM #1/0 TINNED COPPER CONDUCTOR.
4. GROUNDING ELECTRODE CONDUCTOR: PROVIDE MINIMUM #2 TINNED COPPER GROUNDING ELECTRODE CONDUCTOR FROM THE GROUND RING TO THE POWER DISTRIBUTION EQUIPMENT (METER, DISCONNECT SWITCH, FUTURE ATS, MCC, AND ICP. INSTALL EACH GROUNDING ELECTRODE CONDUCTOR IN 3/4" SCH 80 PVC CONDUIT SLEEVE FOR MECHANICAL PROTECTION.
5. DRIVE GROUND RODS AT 45° AWAY FROM CENTER OF THE GROUND RING.
6. UPON COMPLETION OF THE ELECTRICAL SERVICE, THE ELECTRICAL CONTRACTOR SHALL MEASURE AND RECORD THE GROUNDING ELECTRODE SYSTEM RESISTANCE TO REMOTE EARTH USING A CLAMP-ON GROUND RESISTANCE TESTER (AMEC 3711, OR APPROVED EQUAL). THE ELECTRICAL CONTRACTOR SHALL MEASURE AND RECORD THE GROUND RESISTANCE OF A SINGLE TEST GROUND ROD CONNECTED TO THE SERVICE NEUTRAL, STARTING AT A DRIVEN DEPTH OF 20', AND AT ADDITIONAL 10' INCREMENTS UNTIL A MAXIMUM VALUE OF 10 OHMS IS OBTAINED.
7. ALL GROUND RODS IN THE GROUNDING ELECTRODE SYSTEM SHALL BE DRIVEN TO THE SAME DEPTH. THE GROUND RODS SHALL BE BONDED TO THE TINNED COPPER GROUNDING ELECTRODE CONDUCTOR TO CREATE THE GROUNDING ELECTRODE SYSTEM. MEASURE AND RECORD THE GROUND RESISTANCE AT EACH EQUIPMENT CONNECTION TO THE GROUNDING ELECTRODE SYSTEM AND CONFIRM GROUND RESISTANCE OF ALL EQUIPMENT GROUNDING CONNECTIONS ARE A MAXIMUM OF 5 OHMS.
8. IF NECESSARY PROVIDE SUPPLEMENTAL GROUNDING, INCLUDING INCREASING THE DRIVEN DEPTH OF ALL GROUND RODS, TO MEET THE 5 OHM MAXIMUM REQUIREMENT.
9. PROVIDE GROUND RODS BONDED TO THE GROUND STORAGE TANK LADDER, MAGNETIC FLOW METER, AND SCADA SYSTEM ANTENNA TOWER. BOND EACH GROUND ROD TO THE GROUND RING WITH MINIMUM #1/0 TINNED COPPER CONDUCTOR.
10. EXTEND THE PUMP BUILDING COUNTERPOISE AND BOND TO THE NEAREST FENCE POST.
11. PROVIDE UL MASTER LABEL LIGHTNING PROTECTION SYSTEM FOR THE BOOSTER PUMP STATION BUILDING. PROVIDE 1" SCH 40 PVC CONDUIT SLEEVES CONCEALED INSIDE THE WALLS AT EACH CORNER OF THE BUILDING FOR INSTALLATION OF THE DOWNLEAD CONDUCTORS.



NO.	BY	DATE	SYMBOL	REVISIONS
6.				
5.				
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1.	MM	10/2022		GST CONTRACTOR BID PACKAGE

**M M**  
**MOTT MACDONALD**  
 Mott MacDonald Florida, LLC

Architects Engineers Surveyors  
 AA - C0000035 EB - 0000155 LB - 0006783  
 10245 Centurion Pkwy, N., Suite 320  
 Jacksonville, Florida 32256  
 Telephone: (904) 203-1090

DESIGNER: D. LASSETTER  
 DRAWN BY: B. LEE  
 DATE: OCT 2022  
 CHECKED BY: L. SAMEL  
 DATE: OCT 2022

DESIGN ENGINEER  
**W. DAVID LASSETTER, P.E.**  
 FLORIDA REGISTRATION NO. 37971  
 3837 Buckskin Trail E  
 Jacksonville, FL 32277 904-743-1585



**St. Johns County**  
**Utility Department**  
 1205 STATE ROAD 16  
 ST. AUGUSTINE, FL 32084  
 PHONE: (904) 209-2626 FAX: (904) 209-2627

**CR-208 GROUND STORAGE TANK AND BOOSTER PUMP STATION**

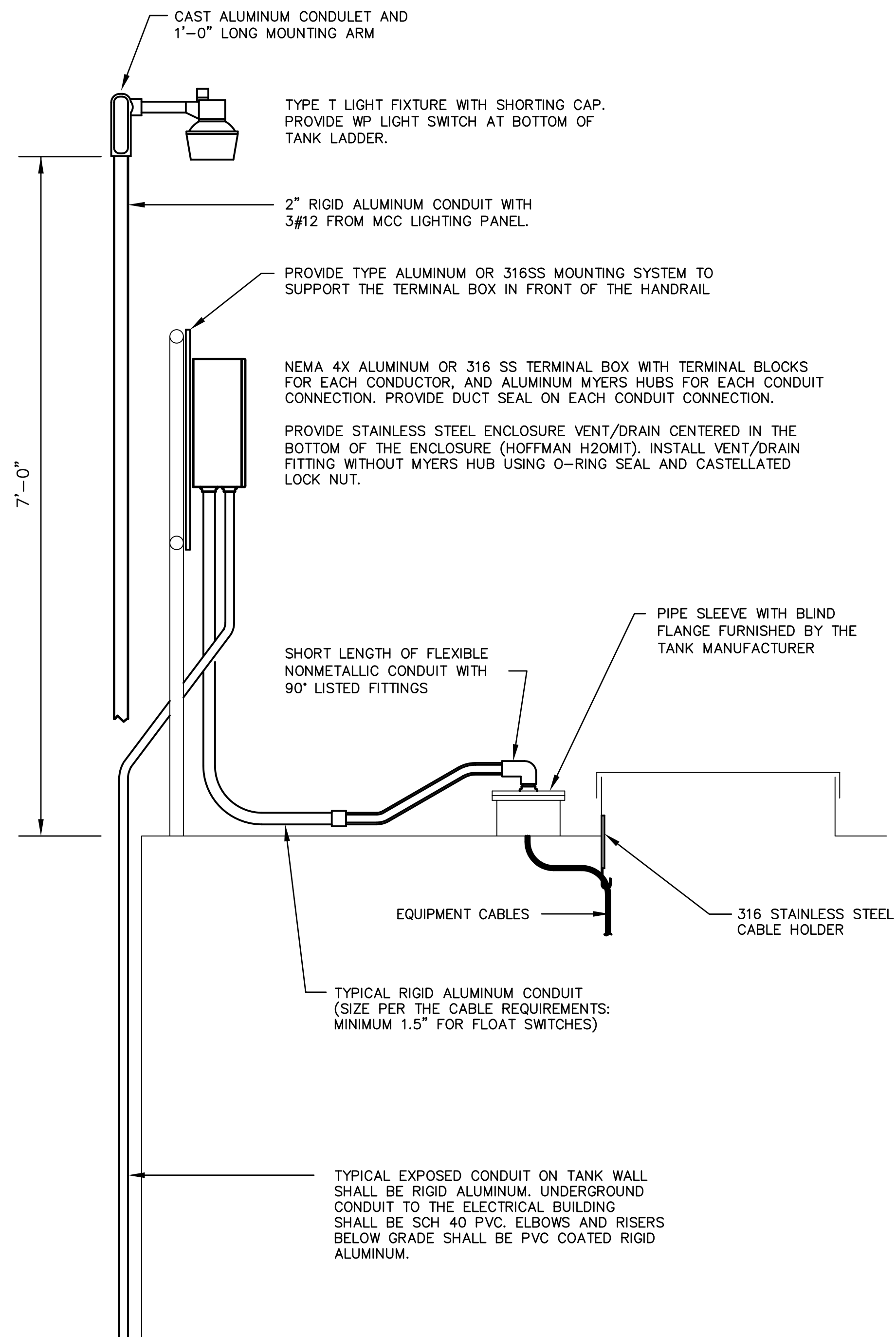
**ELECTRICAL SITE PLAN**

SHEET NO. 57  
 DWG NO. E-7  
 GST BID PACKAGE

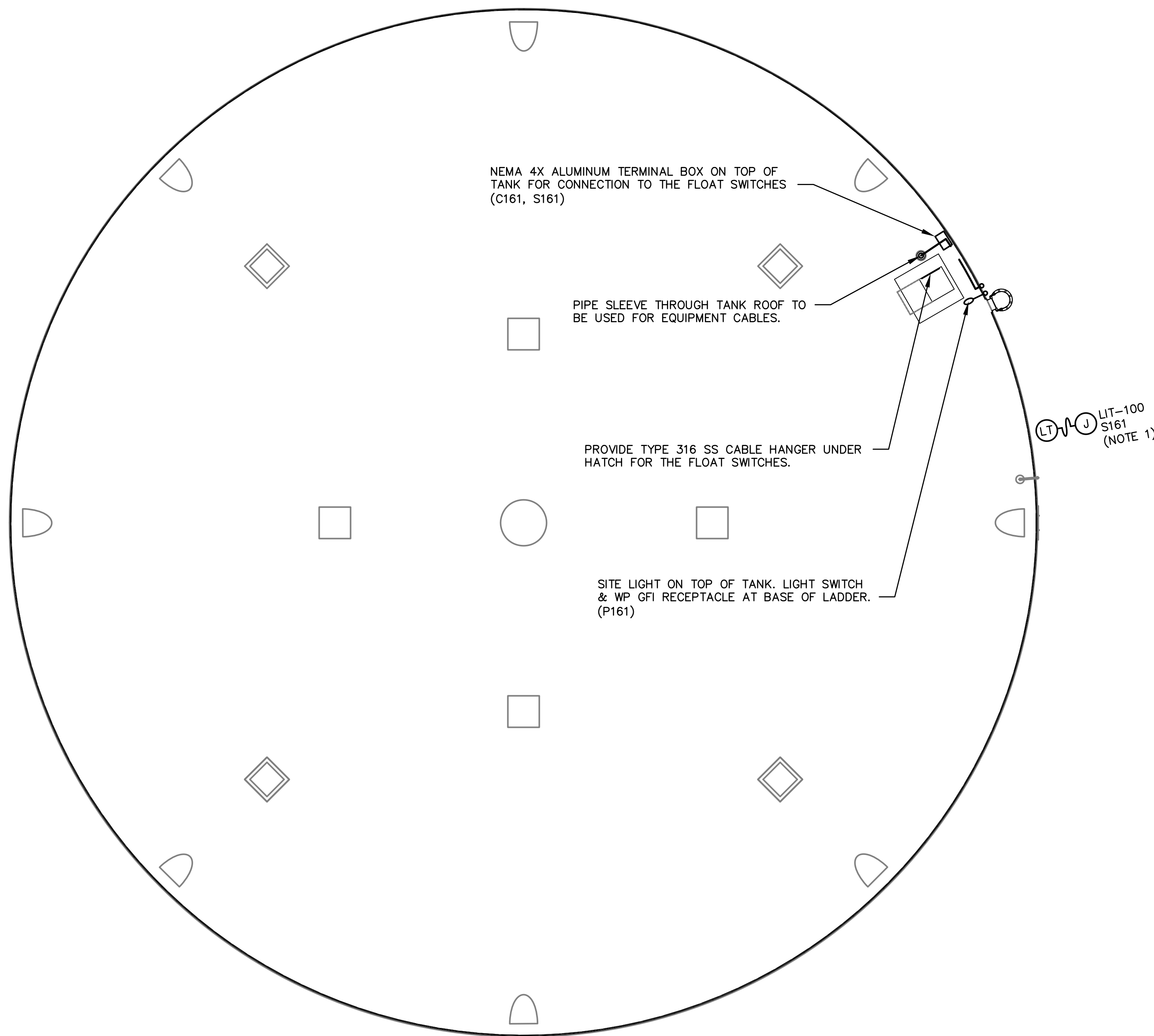


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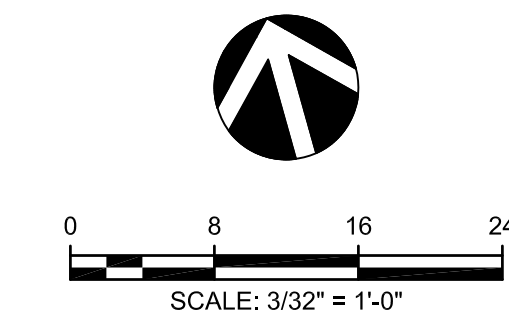
- GROUND STORAGE TANK LEVEL TRANSMITTER: PROVIDE NEMA 4X ALUMINUM TERMINAL BOX WITH ANALOG SURGE PROTECTION FOR THE TANK LEVEL TRANSMITTER. PROVIDE SUPPLEMENTAL GROUND ROD ADJACENT TO THE TERMINAL BOX BONDED TO THE TANK COUNTERPOISE, TERMINAL BOX AND SURGE PROTECTION.



**GST LEVEL SWITCH TERMINAL BOX INSTALLATION DETAIL**  
NOT TO SCALE



**GROUND STORAGE TANK ELECTRICAL PLAN**  
3/32" = 1'-0"



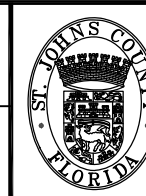
NO.	BY	DATE	SYMBOL	REVISIONS
6.				
5.				
4.				
3.				
2.				
1.	MM	10/2022		GST CONTRACTOR BID PACKAGE



Architects Engineers Surveyors  
AA - C0000035 EB - 0000155 LB - 0006783  
10245 Centurion Pkwy, N., Suite 320  
Jacksonville, Florida 32256  
Telephone: (904) 203-1090

DESIGNER: D. LASSETTER  
DRAWN BY: B. LEE  
DATE: OCT 2022  
CHECKED BY: L. SAMEL  
DATE: OCT 2022

DESIGN ENGINEER  
W. DAVID LASSETTER, P.E.  
FLORIDA REGISTRATION NO. 37971  
3837 Buckskin Trail E  
Jacksonville, FL 32277 904-743-1585



St. Johns County  
Utility Department  
1205 STATE ROAD 16  
ST. AUGUSTINE, FL 32084  
PHONE: (904) 209-2626 FAX: (904) 209-2627

CR-208 GROUND STORAGE TANK  
AND BOOSTER PUMP STATION

ELECTRICAL PLAN  
GROUND STORAGE TANK

SHEET NO. 59  
DWG NO. E-9  
GST BID PACKAGE



# St. Johns County Board of County Commissioners

Purchasing Division

November 22, 2022

## ADDENDUM #1

**To: Prospective Respondent**

**From: St. Johns County Purchasing Department**

**Subject: Bid No. 23-11 CR 208 Water Booster Pump Station – Ground Storage Tank Work**

This Addendum #1 is issued for further Respondent's information and is hereby incorporated into the Bid Documents. Each Respondent will ascertain before submitting a Proposal that he/she has received all Addenda, and **return an original copy of this signed Addendum with the submitted proposal** as provided in the Bid Documents

### Changes to the Specifications

#### **Section 01010: Summary of Work**

1. Paragraph 1.02 D. 2., add "d." as follows "d. Stabilized construction entrance to the site".

#### **Section 01014: Construction Sequence**

1. Paragraph 1.08 B.2, delete the contact information and replace with the following:  
"Mike DeHaven (FPL)  
303 Hastings Rd  
St Augustine, FL 32084  
(386) 329-5102  
[Michael.DeHaven@fpl.com](mailto:Michael.DeHaven@fpl.com)"
2. Paragraph 1.08 B. 3., in the first sentence delete "Chris Wrenn" and replace with "Mike DeHaven" and in the second sentence delete "Chris" and replace with "Mike".

#### **Section 13216: Wire Wrapped Prestressed Concrete Tank**

1. Paragraph 1.01 D. add the following at the end of the paragraph "The TANK CONTRACTOR shall provide the waterstops and weld to the wall pipes provided by the OWNER for the tank slab penetrations."
2. Paragraph 1.01, add G. as follows "G. The TANK CONTRACTOR shall provide all temporary test caps for the drain, overflow and fill piping to perform the water tightness testing."
3. Paragraph 2.02L.3.a.5: Change first coat from "Sherwin Williams Macropoxy 5500 PW" to "Sherwin-Williams DuraPlate 600".
4. Paragraph 2.02L.3.a.6. Change second coat from "Sherwin Williams Macropoxy 5500 PW" to "Sherwin-Williams DuraPlate 600".

5. Paragraph 2.02L.4.a.6: Change first coat from “Tnemec Series N140 Pota-Pox at 6-8 mils” to “Tnemec Series 21 at 6-8 mils DFT.”
6. Paragraph 2.02L.4.a.7: Change second coat from “Series 22 Epoxoline at 20 to 24 mils DFT.” to “Tnemec Series 21 at 6-8 mils DFT.”

**Changes to the Drawings**

**M-6: Ground Storage Tank Details**

1. Delete Detail F – Stainless Steel Vortex Breaker and replace with the following detail.

**ATTACHMENTS**

1. Detail F - Stainless steel vortex breaker

**THE BID DUE DATE REMAINS: December 7, 2022 AT 2:00 P.M.**

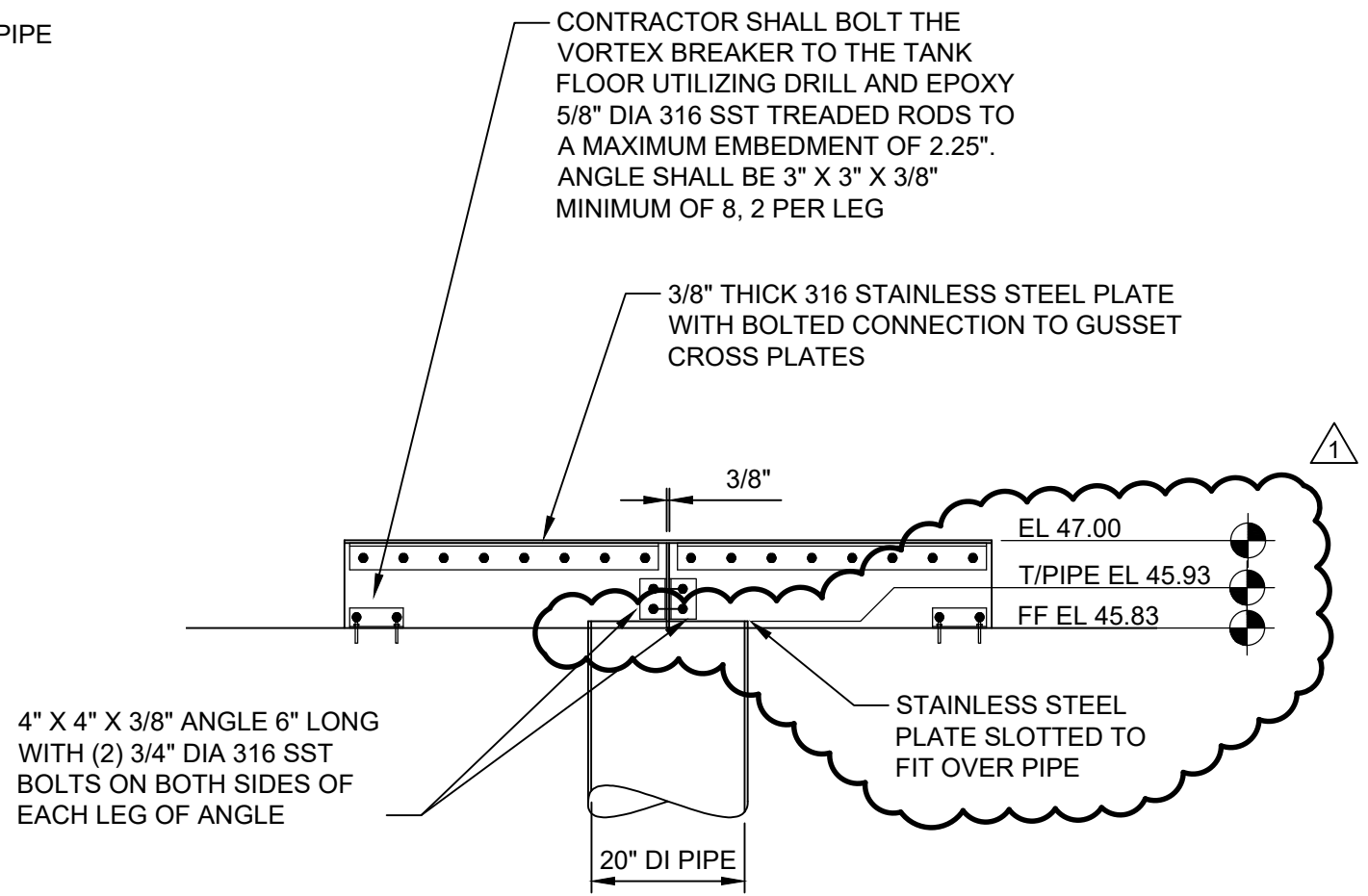
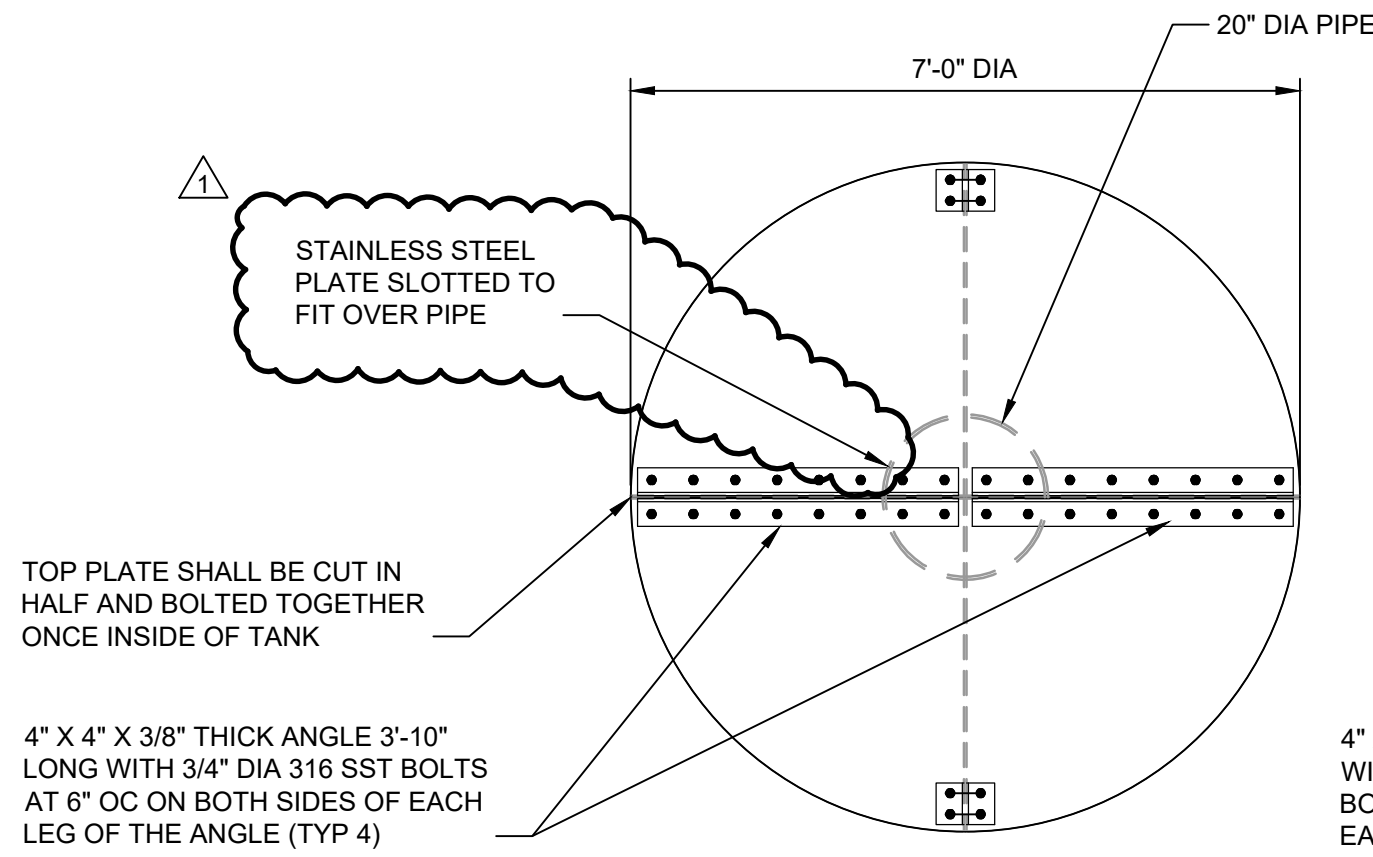
**Respondent Acknowledgment**

\_\_\_\_\_  
Signature and Date

\_\_\_\_\_  
Printed Name/Title

\_\_\_\_\_  
Company Name (Print)

**END OF ADDENDUM NO. 1**



NOTES:

1. ENTIRE UNIT IS TO BE ASSEMBLED IN 6 PIECES INSIDE OF TANK. FABRICATOR SHALL COORDINATE PIECES WITH THE CLEAR OPENING OF THE GST MANWAY.

**F** STAINLESS STEEL VORTEX BREAKER  
- NTS



**Board of County Commissioners  
St. Johns County, Florida**

**INVITATION FOR BIDS NO: 23-11**

**CR 208 WATER BOOSTER PUMP STATION –  
GROUND STORAGE TANK WORK**

**St. Johns County Purchasing Division  
500 San Sebastian View  
St. Augustine FL 32084  
904.209.0150  
[www.sjcfl.us/Purchasing/index.aspx](http://www.sjcfl.us/Purchasing/index.aspx)**

**FINAL: 10/31/22**

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

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**PART I – GENERAL TERMS AND CONDITIONS**

**1) DEFINITIONS**

Terms used within this Invitation for Bids (“IFB”) shall have the meaning as set forth in the St. Johns County Purchasing Policy (“Policy”), or as otherwise defined herein. Any definition provided herein, shall govern over the definitions provided in the Policy.

**2) COMPLIANCE WITH ST. JOHNS COUNTY PURCHASING POLICY**

All provisions of the Policy and associated procedures are incorporated into the Bid Documents by reference, and are fully binding. Bidders are required to submit their Bids, and to conduct their activities in accordance with the Policy and associated procedures.

**3) BIDDER’S REPRESENTATION**

By submitting a Bid, each Bidder represents and warrants that Bidder has read and understands all information and requirements provided herein, and that Bidder is familiar with and understands all conditions related to the work specified herein, and the submitted Bid is based upon all necessary considerations to perform the work in accordance with all specifications and requirements provided herein, or as otherwise provided in an Addendum. Bidder also represents that any and all costs associated with performing the specified work are included in the submitted Bid.

**4) BID DOCUMENTS**

The Bid Documents are those documents which shall govern the solicitation, submittal, consideration and award of submitted Bid(s), which generally includes, but is not limited to: IFB Documents, Specifications, Plans, Drawings, and all issued Addenda.

Bid Documents may be obtained from [www.demandstar.com](http://www.demandstar.com) or SJC Purchasing Division. The Bid Documents shall be used by Bidders to prepare their Bid for submittal. St. Johns County (“County”) shall not assume any responsibility for errors or misrepresentations resulting from the use of complete or incomplete sets of Bid Documents. The County, in making the Bid Documents available, do so only for the purpose of obtaining Bids for the specified purpose and do not confer a license or grant for any other use.

**5) INTERPRETATION OR CORRECTION OF BID DOCUMENTS**

Bidders shall promptly notify the Designated Point of Contact of any ambiguity, inconsistency, or error which they may discover upon examination of the Bid Documents or of the site and local conditions. Bidders requiring clarification or interpretation of the Bid Documents shall make a written request to the Designated Point of Contact by or before the deadline for questions as provided herein.

An interpretation, correction or change of the Bid Documents will be made by Addendum. Interpretations, corrections, or changes of the Bid Documents made in any other manner will not be binding, and Bidders must not rely upon such interpretations, corrections, or changes. No change will be made to the Bid Documents by the County less than seven (7) days prior to the submittal deadline for Bids. The County, however, reserves the right to issue addendums at any time prior to the submittal deadline for Bids in order to serve the best interest of the County.

**6) SUBSTITUTIONS**

The materials, products and equipment described in the Bid Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution. No substitution will be considered unless written request for approval has been received by the Designated Point of Contact at least fourteen (14) calendar days prior to the submittal deadline for Bids. Each such request shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitute, including

drawings, cuts, performance and testing data, and any other information necessary for an evaluation. A statement setting forth any changes in other materials, equipment or work that incorporation of the substitute would require must also be included. The burden of proof of the merit of the proposed substitute is upon the proposer of the substitute. The Project Manager's approval or disapproval of a proposed substitution shall be final.

If County Staff approves any proposed substitution, such approval will be set forth in an Addendum. Bidders must not rely upon approval made in any other manner.

#### 7) DESIGNATED POINT OF CONTACT

The County's Designated Point of Contact for this IFB is Bryan Matus, Senior Procurement Coordinator, St. Johns County Purchasing Division. Any and all questions and/or inquiries shall be directed, *in writing*, via email to [bmatus@sjcfl.us](mailto:bmatus@sjcfl.us). In the event the Designated Point of Contact is absent or otherwise unavailable for more than three (3) business days, firms may contact Justin Tahilramani, Senior Procurement Coordinator, at [jtahilramani@sjcfl.us](mailto:jtahilramani@sjcfl.us).

#### 8) LOBBYING PROHIBITION

In accordance with Section 9 of the Policy, Bidders **SHALL NOT** contact any staff member of the County, including members of the Board of County Commissioners, except the above referenced Designated Point of Contact with regard to this Invitation for Bids. Any such communication is a violation of the Policy and shall result in disqualification and removal from consideration for award under this IFB.

#### 9) PRE-BID MEETING

The County will hold a **NON-MANDATORY** Pre-Bid Meeting on **Wednesday, November 9, 2022, at 9:30AM EST** at the St. Johns County Utility Department, 1205 State Road 16, St. Augustine, FL 32084. Attendance at the Pre-Bid **Meeting is highly recommended for Bidders**. Attendees are requested not to park in designated Customer Service parking spots.

#### 10) QUESTIONS

Any and all questions related to this project shall be directed, *in writing*, to the Designated Point of Contact. Questions are due no later than four o'clock (4:00PM EST) on **Wednesday, November 23, 2022**, so that any necessary addenda may be issued in a timely manner. Any questions received after the above deadline will not be answered unless previously approved by the SJC Purchasing Manager or other designated County Representative.

#### 11) ADDENDA

Any change, clarification, revision, deletion, additional documents or information provided by the County after broadcast of this IFB will be provided via Addendum, and posted to Demandstar ([www.demandstar.com](http://www.demandstar.com)) with the Bid Documents. All planholders for this IFB will be notified of the posted addendum by Demandstar. Planholders may access and download issued Addenda for inclusion in their submitted Bid. Bidders may also request issued addenda from the Designated Point of Contact, in writing. It is the responsibility of the Bidder to acquire any addenda issued by the County. The County is not responsible for a Bidder's failure to obtain any issued Addendum.

Bidders are responsible for incorporating any and all changes, clarifications, revisions, deletions, additional documents and information provided by Addendum into the submitted Bid. Failure by the Bidder to appropriately consider and incorporate the addenda into their submitted Bid may cause the submitted Bid to be considered non-responsive and removed from further consideration. It shall be the sole discretion of the Purchasing Manager or Assistant Director of Purchasing and Contracts to determine whether or not an Addendum is material to the submitted Bid, resulting in disqualification and removal from consideration for award.

Each Bidder shall acknowledge all issued Addenda in the submitted Bid in the space provided on the Official County Bid Form, and provide a copy of each Addendum, signed by the Bidder's authorized representative.



## 12) BID SUBMITTAL REQUIREMENTS

The submittal deadline for Bids shall be no later than **2:00PM EST on Wednesday, December 7, 2022**. Bids must be submitted to:

SJC Purchasing Division  
500 San Sebastian View  
St. Augustine, FL 32084

Each Bidder must submit one (1) original hard copy, and one (1) duplicate of their Bid, in a sealed envelope or container, and plainly marked with the Bidder's full legal company name, mailing address, and recite: "Bid No: 23-11; CR 208 Water Booster Pump Station – Ground Storage Tank Work". A mailing label has been provided herein for Bidders to use to identify their Bid.

All required forms and attachments, including the Official County Bid Form, must be completed, and all required information provided. Information must be typewritten or manually written in blue or black ink. Each Bid must include the Bidder's full legal company name, mailing address, telephone number, and must identify whether the Bidder is a sole proprietor, partnership, corporation or other legal entity. **The submitted Bid should NOT include a fully copy of the Bid Documents.**

Bidder shall assume full responsibility for timely delivery of their submitted Bid at the location designated above for receipt of Bids. Bids shall be delivered to the designated location prior to the submittal deadline provided above, or as revised by addendum. Bids received after the submittal deadline for Bids will not be considered and will be returned to the sender unopened.

Bidders must only submit (1) Bid in response to this IFB. Oral, telephonic, telegraphic, or electronic Bids are invalid and will not receive consideration.

Where so indicated by the makeup of the Bid Form, sums shall be expressed in both words and numerals, and in the case of a discrepancy between the two, the amount expressed in words shall govern. Additionally, where there are unit prices and extended prices, the unit prices shall govern over extended pricing.

Any interlineations, alterations, or erasures by the Bidder on the Bid Form must be initialed by the signer of the Bid. Failure to do so may cause the Bid to be considered non-responsive.

Bidder shall make no stipulation on the Bid Form, nor qualify the submitted Bid in any manner. To do so will classify the Bid as being non-responsive.

Any submitted Bid must be signed by an authorized representative of the Bidder, legally authorized to bind the Bidder to a contract. In the event the Bid is signed by a representative who is not a principal of the Bidder, a Delegation of Authority Letter must be submitted with the Bid, stating the delegation of authority by principal(s), owner(s), or officer(s) of the Bidder for the signing representative. The delegation of authority must be signed by the principal/owner/officer of the Bidder, and must state the limits and duration of the delegation to the signing representative.

A Bid submitted by an agent must have a current Power of Attorney attached, certifying the agent's authority to bind the Bidder.

All Bids submitted in response to this IFB shall become the property of the County and will not be returned to the Bidders. In the event of an award, all documentation produced as part of the award shall become exclusive property of the County.

### 13) BID POSTPONEMENT/CANCELLATION

The County may, at its sole and absolute discretion, postpone or cancel this IFB, and/or resolicit Bids in order to serve the best interest of the County.

### 14) MODIFICATION OR WITHDRAWAL OF BID

A submitted Bid may not be modified, withdrawn or canceled by the Bidder after the submittal deadline specified herein.

Prior to the submittal deadline for Bids, a Bid submitted early may be modified or withdrawn only by written notice to the Designated Point of Contact. Upon notice from a Bidder to modify or withdraw a submitted Bid, provided such notice is received prior to the submittal deadline for Bids, the County shall return the Bid to the Bidder unopened. Any modified Bids must be submitted prior to the submittal deadline specified herein, in order to be considered.

### 15) COSTS INCURRED BY BIDDERS

Bidders are responsible for any and all costs associated with developing and submitting a Bid in response to this IFB. Additionally, Bidders are solely responsible for any and all costs associated with providing any subsequent information requested by the County, attending any meetings with the County, and any other activities related to this solicitation and subsequent award proceedings. It is expressly understood, no Bidder may seek or claim any award and/or reimbursement from the County for any expenses, costs, and/or fees (including attorney's fees) borne by any Bidder, during the IFB process. Such expenses, costs, and/or fees (including attorney's fees) are the sole responsibility of the Bidder.

### 16) CONSIDERATION OF BIDS

**Opening of Bids:** Unless stated otherwise in an Addendum, Bids received by or before the submittal deadline will be opened publicly, immediately after the submittal deadline provided herein. The Bid Tabulation shall be posted to DemandStar, upon verification of Bids and all information.

**Rejection of Bids:** The County reserves the right to reject any or all Bids that are not materially responsive to the requirements provided herein, or if it is determined to be in the best interest of the County. The County may also waive any minor formality or irregularity of any submitted Bid, provided the minor formality or irregularity does not materially impact the submitted Bid.

**Bid Award:** It is the intent of the County to award to the lowest, responsive, responsible Bidder, or lowest responsive, responsible Local Bidder, based upon the Total Bid Price.

If an award is made, it will be made within a minimum of ninety (90) days from the date of the Bid opening, unless stated otherwise in an Addendum. Submitted Bids must remain valid for a minimum of ninety (90) days from the date of the Bid opening, and shall be irrevocable during this time unless otherwise agreed to by the County.

If only one (1) Bid is received, the County reserves the right to negotiate with the responding Bidder, if the submitted Bid is responsive to the requirements provided herein. The Bid may also be rejected and the Bid re-advertised, in order to best serve the needs of the County.

### 17) LOCAL PREFERENCE

The County shall review all submitted Bids to determine whether or not there is a Local Business which submitted a Bid that is within ten percent (10%) of the responsive, responsible, low Bid, provided the low Bid is not from a verified Local Business. If so, the County shall verify the qualification requirements to validate the Bidder as a Local Business, in accordance with Section 16.3 of the Policy. If the lowest Bid from a responsible Local Business is responsive, and the Bid is within ten percent (10%) of the low Bid, the Local Bidder shall have forty-eight (48) hours from notification by the County, to agree, in writing, to match the low Bid amount. If the Local Bidder agrees

to match the low Bid amount within the timeframe provided, the Local Bidder shall be awarded, provided they meet any and all other requirements of the County. If the Local Bidder refuses, or fails to agree to match the low Bid within the timeframe specified, the County shall consider the non-local low Bid for award.

## **18) BID SECURITY**

Each submitted Bid must be accompanied by a Bid Security, submitted on the Bid Bond Form provided herein, or in the form of a certified or cashier's check, in the amount of five percent (5%) of the Total Bid Price submitted on the Official County Bid Form, pledging that the Bidder will enter into a contract with the County on the terms stated in the Bid and will, if required, furnish bonds as described hereunder covering the faithful performance of the Contract and the payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds to the County, if required, the amount of the Bid Security shall be forfeited, not as penalty, but as liquidated damages.

A Bid Security in the form of a certified or cashier's check must be made payable to the Board of County Commissioners of St. Johns County.

A Bid Security in the form of a Bid Bond shall be written on the form provided herein, with an acceptable surety, and the Attorney-in-Fact, who shall execute the bond on behalf of the Surety shall affix to the bond, a certified and current copy of the Power of Attorney. The Surety Company shall meet all requirements as provided below. Any Bidder submitting a Bid Bond (not a certified or cashier's check) must also submit **Attachment "B" – Certificate as to Corporate Principal**.

The County shall have the right to retain the Bid Security until either (a) a Contract is executed and bonds, if required, have been furnished, or (b) the County has rejected all Bids, or (c) the period of time for which Bids are irrevocable has elapsed, so that Bids may be withdrawn.

If this Bid is not accepted within ninety (90) consecutive calendar days of the submittal deadline for Bids, or if the Undersigned delivers the executed Contract, all required documents and the required Bond, as provided in the Bid Documents, the Security shall be returned to the Bidder within seven (7) business days of issuance of Notice to Proceed.

## **19) BID BOND INSTRUCTIONS**

A Bid Bond submitted, on the form provided herein, must be completed as follows:

- Type or Print Bidder's and Surety's names, mailing addresses, in the same language as in the Bid Documents;
- Have authorized representatives of the Bidder and Surety/Surety's Agent sign in the designated spaces;
- Attach a copy of Surety agent's Power of Attorney with an original signature of the Secretary or Assistant Secretary of Surety certifying the copy, unless the Power of Attorney has been recorded in St. Johns County. If it has been recorded, provide book and page number.
- Submit one (1) original and one (1) duplicate, as prescribed herein for Submittal of Bids.

## **20) SURETY REQUIREMENTS**

Any Surety issuing a Bond to the County, must meet the following requirements:

- Surety must be licensed to do business in the State of Florida;
- Surety must have a record of successful continuous operations for at least three (3) years;
- Surety shall not have exposed itself to any loss on any one risk in an amount exceeding twenty percent (20%) of its surplus to policyholders;
- Surety must have fulfilled all of its obligations on all other bonds given to the County;
- Surety must have good underwriting, economic management, adequate reserves for undisclosed liabilities, and net resources for unusual stock and sound investment.

## 21) TAXES

Federal Excise and Florida Sales Tax, as well as any other applicable taxes, levies, duties, and assessments which Bidder is required to pay, must be included in the submitted Bids.

## 22) FORCE MAJEURE

Bidder pledges to perform the specified work barring any delays due to Force Majeure events, which are those events not reasonably foreseeable and beyond the control of both the Bidder and the County, including acts of war, terrorist attacks, labor strikes, floods, earthquakes, epidemics, pandemics, riots, adverse weather conditions, natural disasters, and other acts of God.

## 23) MINIMUM QUALIFICATION REQUIREMENTS

Bidders must be fully licensed and authorized to do business in the State of Florida, must be registered with the State of Florida, Division of Corporations, and must be currently licensed as a Certified General Contractor or Certified Underground Utility Contractor's as of the submittal deadline for Bids.

Bidders must have successfully completed, as a Prime Contractor or Sub-Contractor, at least three (3) projects, in the past seven (7) years, of similar type, size, with a similar scope and dollar value of the project described herein. Bidders must be able to meet all requirements as outlined in the Project Technical Specifications

The tank manufacturer must have designed, constructed, and put into operation a minimum of ten (10) wire wrapped, prestressed concrete tanks, conforming to ANSI/AWWA D110 with Type II core wall(s) within the last ten (10) years. The tanks must be of equal or greater size than that required for this proposed tank, with a diameter and capacity of not less than 75% nor more than 150% of the diameter and capacity of the proposed tank.

The Bidder's staff shall include a full-time professional engineer registered in the state of Florida, having no less than five years of experience in the design and field construction of circular prestressed composite tanks. All working drawings and design calculations shall carry the seal of such registered professional engineer. The full-time staff engineer can be a subcontracted position.

The Foreman supervising the placing of the shotcrete shall have a minimum of five (5) years' experience as a nozzleman. Each shotcrete nozzleman shall have a minimum of five (5) years' experience on similar applications and shall be able to demonstrate by tests, if required, his/her ability to satisfactorily gun shotcrete of the required quality. Each shotcrete nozzleman shall be certified by the American Concrete Institute (ACI) as outlined in the ACI certification publication CP-60.

Bidders shall provide proof of qualifications by completing and submitting **Attachment "F" – Contractor's Qualification Form** and **Attachment "C" – Licenses and Certification List** along with a copy of each license and certificate listed. All licenses and certifications must be valid and current as of the date the Bid is submitted.

Failure by a Bidder to demonstrate meeting or exceeding the minimum qualification requirements stated above, shall be grounds for disqualification and removal from further consideration for award. The County reserves the right to request additional information regarding the qualification and experience of the Bidder in order to determine the responsibility of the Bidder to perform the specified work.

## 24) SUB-CONTRACTORS

Each Bidder shall identify any and all proposed sub-contractors and major material suppliers to be used if awarded a Contract, by completing and submitting **Attachment "D" – List of Proposed Sub-Contractors and Material Suppliers**. Bidders shall also include any and all licenses and certifications held by the proposed sub-contractors and material suppliers, as applicable, to demonstrate their qualifications for the portion(s) of work for which they are proposed. The County reserves the right to reject or disqualify any proposed sub-contractor or material supplier for failure to meet minimum qualification requirements, minimum experience requirements, or for previously documented failure to perform for the County. In the event the County rejects a proposed sub-

contractor or material supplier, the County will notify the Bidder, in writing, and Bidder may, at their option, withdraw their Bid without forfeiture of Bid Security or submit an acceptable substitute at no increase in the submitted Bid Price. If Bidder fails to submit an acceptable substitute within seven (7) calendar days of the original notification, the County then may, at their option, disqualify the Bidder, at no cost to the County.

The County reserves the right to request additional information on any proposed sub-contractor and material supplier in order to determine whether or not the County finds them to be sufficiently qualified and responsible to satisfactorily complete the work for which they are proposed.

## **25) EMPLOYMENT ELIGIBILITY AND MANDATORY USE OF E-VERIFY**

As a condition precedent to entering into the awarded Agreement, and in accordance with section 448.095, F.S., the awarded Contractor and its subcontractors shall register with and use the E-Verify system to verify the work authorization status of all employees hired on or after January 1, 2021 (see **Attachment "I"**).

- a. Contractor shall require each of its subcontractors to provide Contractor with an affidavit stating that the subcontractor does not employ, contract with, or subcontract with an unauthorized alien. Contractor shall maintain a copy of such affidavit for the duration of the awarded Agreement.
- b. The County, Contractor, or any subcontractor who has a good faith belief that a person or entity with which it is contracting has knowingly violated section 448.09(1), F.S. or these provisions regarding employment eligibility shall terminate the contract with the person or entity.
- c. The County, upon good faith belief that a subcontractor knowingly violated these provisions regarding employment eligibility, but Contractor otherwise complied, shall promptly notify Contractor and Contractor shall immediately terminate the contract with the subcontractor.
- d. The County and Contractor hereby acknowledge and mutually agree that, a contract terminated pursuant to these provisions regarding employment eligibility is not a breach of contract and may not be considered as such. Any contract terminated pursuant to these provisions regarding employment eligibility may be challenged in accordance with section 448.095(2)(d), F.S.
- e. Contractor acknowledges that, in the event that the County terminates the awarded Agreement for Contractor's breach of these provisions regarding employment eligibility, then Contractor may not be awarded a public contract for at least one (1) year after such termination. Contractor further acknowledges that Contractor is liable for any additional costs incurred by the County as a result of the County's termination of the awarded Agreement for breach of these provisions regarding employment eligibility.
- f. Contractor shall incorporate in all subcontracts made pursuant to the awarded Agreement the provisions contained herein regarding employment eligibility.

## **26) PUBLIC CONSTRUCTION BOND**

The awarded Contractor shall be required to obtain and submit a recorded Public Construction Bond covering the faithful performance of the Contract and the payment of all obligations arising thereunder in full amount of the awarded Contract, with such acceptable sureties, secured through the Bidder's usual sources as may be agreeable to the parties. The Contractor shall furnish the required bond, after full execution of the awarded Contract. The Bond shall be released upon satisfactory completion of the project.

The Public Construction Bond form will be provided to the awarded Contractor with the fully executed contract. The Contractor shall provide the recorded Public Construction Bond to the County within three (3) business days of receipt of the bond form and executed contract. **The Public Construction Bond must be recorded after the contract is signed by all parties.**

Contractor shall record the Public Construction Bond with the St. Johns County Clerk of Courts, and obtain a certified copy of the recorded bond and provide to the SJC Purchasing Division. No work shall commence until the required bond has been delivered to the Owner. Upon receipt of the certified copy of the recorded bond, the Owner may issue a Notice to Proceed.

Unless otherwise specified in the Bid Documents, the bonds shall be written on the form provided herein. The Bidder shall require the Attorney-in-Fact who executes the required bonds on behalf of the Surety to affix thereto a certified and current copy of his Power of Attorney authorizing his firm to act as agent for the Surety in issuing the bonds.

## 27) CONTRACT TIME

The Contractor shall have ten (10) business days from Contractor's receipt of Notice of Award, to sign and return the awarded Contract". The County intends to sign and return a fully executed Contract no later than seven (7) business days from receipt of all required documents from the Contractor, but no later than seventeen (17) consecutive calendar days from issuance of Notice of Award.

The Contract Time for completion of Work under the awarded Contract shall be commenced within ten (10) business days of the date provided in the Notice to Proceed. Construction of the project shall reach Substantial Completion within **three hundred (300)** consecutive calendar days of the date provided in the Notice to Proceed, and shall reach Final Completion within **thirty (30)** consecutive calendar days of the date of Substantial Completion.

If Contractor fails to achieve Substantial Completion or Final Completion of the Work by its applicable date, then the County shall be entitled to withhold from any amounts otherwise due Contractor or to be paid as a debt due the sum of **one thousand five hundred dollars (\$1,500.00) per day** for each and every calendar day of unexcused delay "Liquidated Damages". The parties agree that such Liquidated Damages are not a penalty but rather a genuine pre-estimate of monetary damages sustained by the County for loss of revenue and/or increased project administration expenses related to this Contract because Contractor failed to perform and complete Work within the time fixed for completion or additional time granted pursuant to the provisions hereof. The assessment of Liquidated Damages is without prejudice to the County's rights of termination and Contractor's obligation to complete the Work.

Should Contractor fall behind the approved Work schedule; the County reserves the right to deduct Liquidated Damages based on an estimated period of late completion. The County need not wait until completion of Work to withhold Liquidated Damages from Contractor's progress payments.

## 28) INDEMNIFICATION

Contractor shall indemnify and hold harmless the County and its officers and employees from liabilities, damages, losses and costs, including, but not limited to, reasonable attorney's fees, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of Contractor and persons employed or utilized by Contractor in the performance of this Contract.

To the extent permitted by, and in accordance with Section 725.06 of the Florida Statutes, Contractor further agrees that "damages, losses and costs", includes fines, citations, court judgments, insurance claims, restoration costs or other liability, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of Contractor and persons employed or utilized by Contractor in the performance of this Contract.

To the extent permitted by, and in accordance with Section 725.06 of the Florida Statutes, for purposes of indemnity, the "persons employed or utilized by Contractor" shall be construed to include, but not be limited to, Contractor, its staff, employees, subcontractors, all deliverers, suppliers, furnishers of materials or services or anyone acting for, on behalf of, or at the request of Contractor.

In Claims against any person or entity indemnified hereunder by an employee of Contractor, any Subcontractor, or subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation shall not be limited by a limitation on the amount or type of damages, compensation or benefits payable by or for Contractor or any Subcontractor or subcontractor under any workers' compensation acts, disability benefits acts or other employee benefit acts.

Contractor's indemnity and hold harmless obligations hereunder shall extend to all Claims against the County by any third party or third-party beneficiary of this Contract and all liabilities, damages, losses and costs related thereto.

This indemnification will not be valid in the instance where the loss is caused by the gross negligence, or willful, wanton or intentional misconduct of any Indemnified Party.

If any provision(s), or portion(s) of a provision(s) of this Section, or the application thereof to any person or circumstance shall, to any extent, be held to be invalid, illegal or unenforceable for any reason whatsoever, the validity, legality and enforceability of the remaining provision(s), or part of the provision(s), shall not in any way be affected or impaired thereby; and shall be interpreted to the fullest extent possible to be enforceable and to give effect to the intent manifested by the provision(s), or portion(s) thereof, held invalid, illegal or unenforceable.

## **29) INSURANCE REQUIREMENTS**

Bidders must include in the submitted Bid, proof of at least the minimum coverage amounts in the type(s) of insurance policies as provided below. Failure to submit proof of current coverage or certification from a qualified insurance provider of the Bidder's ability to obtain the required coverages upon award may be grounds for Bidder being deemed non-responsive and removed from further consideration.

All insurance policies shall be satisfactory to the County and be issued by companies authorized and duly licensed to transact business in the State of Florida. Contractor shall furnish proof of insurance to the County prior to execution of the Contract. No Work shall commence under the awarded Contract until Contractor has obtained all insurance coverages required by the Contract. Certificates of insurance shall clearly indicate Contractor has obtained insurance of the type, amount, and classification as required by the Contract. Required insurance coverage shall be maintained in force, including coverage for Additional Insureds, until Final Completion of all Work including Warranty Work.

No less than ten (10) days written notice shall be provided to the County prior to cancellation, non-renewal or any material change of required insurance policies. Yearly renewal certificates shall be provided to the County within thirty (30) days of expiration of the current policy.

The types and amounts of insurance required under the Contract do not in any way limit the liability of Contractor including under any warranty or indemnity provision of the Contract or any other obligation whatsoever Contractor may have to the County or others. Nothing in the Contract shall limit the Contractor to the minimum required insurance coverages found in the Contract.

The term "Additional Insured" shall mean St. John's County, its elected officials, officers, employees, agents and representatives. Certificates of insurance shall specifically name each Additional Insured for all policies of insurance except Workers' Compensation and Professional Liability. A copy of the endorsement showing the required coverages must accompany the certificate of insurance.

Certificate Holder Address: St. Johns County, a political subdivision of the State of Florida  
500 San Sebastian View  
St. Augustine, FL 32084  
Attn: Purchasing Division

Contractor shall procure and maintain during the life of the awarded Contract, adequate Workers' Compensation Insurance in at least such amounts as is required by law for all of its employees per Florida Statute 440.02.

Contractor shall procure and maintain during the life of the awarded Contract, Comprehensive General Liability Insurance with minimum limits of \$1,000,000 per occurrence, \$2,000,000 aggregate, including bodily injury (including wrongful death), property damage, products, personal & advertising injury, and completed operations. This insurance must provide coverage for all Claims that may arise from the services and/or operations completed under the Contract, whether such services or operations are by Contractor or anyone directly or indirectly employed by them. Such insurance(s) shall also be primary and non-contributory with regard to insurance carried by the Additional Insureds.

Contractor shall procure and maintain during the life of the awarded Contract, Comprehensive Automobile Liability Insurance with minimum limits of \$2,000,000 combined single limit for bodily injury and property damage liability and insuring liability arising out of or in any way related directly or indirectly to the ownership, maintenance or use of any owned, non-owned or rented/hired automobiles.

The required insurance limits identified above may be satisfied by a combination of a primary policy and/or Umbrella or Excess Liability Insurance policy. Contractor shall require each lower-tier subcontractor to comply with all insurance requirements appropriate for its scope of work, and any deficiency shall not relieve Contractor of its responsibility herein. Upon written request, Contractor shall provide County with copies of lower-tier subcontractor certificates of insurance.

Providing and maintaining adequate insurance coverage is a material obligation of Contractor. County has no obligation or duty to advise Contractor of any non-compliance with the insurance requirements contained in this Section. If Contractor fails to obtain and maintain all of the insurance coverages required herein, Contractor shall indemnify and hold harmless the Additional Insureds from and against any and all Claims that would have been covered by such insurance had Contractor complied with its obligations herein.

County reserves the right to adjust the above minimum insurance requirements or require additional insurance coverages to address other insurable hazards.

### **30) FORM OF AGREEMENT BETWEEN COUNTY AND CONTRACTOR**

Unless otherwise provided by the County, the Agreement for completion of the specified work shall be written on the County's Master Construction Agreement.

### **31) GOVERNING LAWS & REGULATIONS**

The Contractor shall be responsible for being familiar and complying with any and all federal, state, and local laws, ordinances, rules and regulations that, in any manner, affect the work required under the awarded Contract. The awarded Contract shall be governed by the laws of the State of Florida and St. Johns County both as to interpretation and performance.

### **32) OSHA REQUIREMENTS**

The Contractor warrants that the product, products, or services supplied to St. Johns County shall conform in all respects to the standards set forth in the Occupational Safety and Health Act (OSHA) of 1970 as amended and the failure to comply will be considered a breach of contract. St. Johns County shall be held harmless against any unsafe conditions and contractor employee incidents.

### **33) COMPLIANCE WITH OCCUPATIONAL SAFETY AND HEALTH ACT**

Contractor certifies that all material, equipment, services, etc., furnished in this bid meets all OSHA requirements for the applicable Sectors. Bidder further certifies that, if he is the successful bidder, and the material, equipment, service, etc., delivered or provided is subsequently found to be deficient in any OSHA requirement in effect on date of delivery or service fulfillment date, all costs necessary to bring the material, equipment, service, etc., into



compliance with the aforementioned requirements shall be borne by the bidder. All Personal Protective Equipment used by the contractor and their employees shall be ANSI certified and meet OSHA standards.

#### **34) TRAINING AND EDUCATION (APPLICABLE ONLY WITH CONSTRUCTION SERVICES)**

Contractors will ensure that Contractor employees are trained appropriately for their work tasking. The minimum requirements are found in Federal and State Regulations. Examples of this training are (but not limited to):

- Lockout Tagout
- Fall Protection
- Electrical Safety and the National Electrical Code (NEC)
- Confined Space Entry
- Welding/Cutting/Brazing
- Specific Chemical Hazards
- Excavations and Trenching
- Heavy Equipment Operation

Special emphasis should be given towards training and compliance with the Construction industry's "Focus Four" established by OSHA as an outreach program to the construction industry and its workers. Training, education, and awareness should be provided in the areas of: 1) Fall Hazards 2) Caught-In and Between Hazards 3) Struck-By Hazards and 4) Electrocutation Hazards.

#### **35) TOXIC SUBSTANCES/FEDERAL HAZARD COMMUNICATION "RIGHT TO KNOW AND UNDERSTAND" REGULATIONS**

The Federal "Right to Know and Understand" Regulation (also known as the Hazard Communication / Globally Harmonized System of Classification and Labeling of Chemicals (GHS) implemented by OSHA requires employers to inform their employees of any toxic substances to which they may be exposed in the workplace, and to provide training in safe chemical storage, labeling, handling practices and emergency procedures.

Accordingly, the Contractor(s) performing under this contract shall be required to provide two (2) complete sets of Safety Data Sheets (SDS) to each of the departments utilizing the awarded products. This information should be provided at the time when the initial delivery is made, on a department-by-department basis. If performing work on site, it is preferred that each contractor bring their hazardous communication program and SDS in a binder labeled with the contractor's name and identified as a Hazardous Communication/GHS Program. Upon leaving the jobsite and the removal of all hazardous materials, contractors shall take their information with them.

The transport, use, and disposal of toxic substances must be conducted in accordance with DEP/EPA regulations.

Upon request, contractors working at St. Johns County facilities or jobsites will be given access to the written Hazardous Communication Program and informed where to locate SDS.

#### **36) TEMPORARY TRAFFIC CONTROL (TTC) / MAINTENANCE OF TRAFFIC (MOT) (APPLICABLE ONLY WITH CONSTRUCTION SERVICES)**

The Contractor must comply with the Florida Department of Transportation's (DOT) Temporary Traffic Control (TTC) and the Manual on Uniform Traffic Control Devices (MUTCD) in the planning, development, design, implementation, operation, enforcement and inspection of work zone related transportation management and temporary traffic control on streets and highways within the State Highway System right-of-way. Training in the Advanced, Intermediate, and Flagger categories must be completed by the Contractor for their employee when performing right-of-way work while under contract with St. Johns County. Contractor employees must wear a Class II (daytime), Class III (night/limited visibility) high-visibility safety vest or equivalent high-visibility apparel while performing any work that places them in the right-of-way.

#### **37) OWNER DIRECT PURCHASES**

St. Johns County reserves the right to Owner Direct Purchase materials or equipment in accordance with Section 6.2.12 of the Policy, or implement other means in order to achieve related sales tax and other cost savings.

### **38) PUBLIC RECORDS**

- A. The cost of reproduction, access to, disclosure, non-disclosure, or exemption of records, data, documents, and/or materials, associated with this Agreement shall be subject to the applicable provisions of the Florida Public Records Law (Chapter 119, Florida Statutes), and other applicable State and Federal provisions. Access to such public records, may not be blocked, thwarted, and/or hindered by placing the public records in the possession of a third party, or an unaffiliated party.
  
- B. In accordance with Florida law, to the extent that Contractor's performance under this Contract constitutes an act on behalf of the County, Contractor shall comply with all requirements of Florida's public records law. Specifically, if Contractor is expressly authorized, and acts on behalf of the County under this Agreement, Contractor shall:
  - (1) Keep and maintain public records that ordinarily and necessarily would be required by the County in order to perform the Services;
  - (2) Upon request from the County's custodian of public records, provide the County with a copy of the requested records or allow the records to be inspected or copied within a reasonable time at a cost that does not exceed the cost as provided in Chapter 119, Florida Statutes, or as otherwise provided by law;
  - (3) Ensure that public records related to this Agreement that are exempt or confidential and exempt from public records disclosure requirements are not disclosed except as authorized by applicable law for the duration of this Agreement and following completion of this Agreement if the Contractor does not transfer the records to the County; and
  - (4) Upon completion of this Agreement, transfer, at no cost, to the County all public records in possession of the Contractor or keep and maintain public records required by the County to perform the Services.
  
- C. If the Contractor transfers all public records to the County upon completion of this Agreement, the Contractor shall destroy any duplicate public records that are exempt or confidential and exempt from public records disclosure requirements. If the Contractor keeps and maintains public records upon completion of this Agreement, the Contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the County, upon request from the County's custodian of public records, in a format that is compatible with the County's information technology systems.
  
- D. Failure by the Contractor to comply with the requirements of this section shall be grounds for immediate, unilateral termination of this Agreement by the County.

**IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO ITS DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS AGREEMENT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT: 500 San Sebastian View, St. Augustine, FL 32084, Phone: (904) 209-0805, Email: [publicrecords@sjcfl.us](mailto:publicrecords@sjcfl.us)**

**END OF SECTION**

**OFFICIAL COUNTY BID FORM  
WITH ATTACHMENTS**

**BID NO: 23-11**

**OFFICIAL COUNTY BID FORM  
ST. JOHNS COUNTY, FLORIDA**

**TO:** THE BOARD OF COUNTY COMMISSIONERS OF ST. JOHNS COUNTY, FLORIDA

DATE SUBMITTED: \_\_\_\_\_

**BID PROPOSAL OF**

\_\_\_\_\_  
Full Legal Company Name of Bidder

\_\_\_\_\_  
Mailing Address

\_\_\_\_\_  
Telephone Number

\_\_\_\_\_  
Fax Number

Bidders: Having become familiar with requirements of the project, and having carefully examined the Bid Documents entitled for **Bid No: 23-11, CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK** in St. Johns County, Florida, the undersigned proposes to furnish all materials, labor and equipment, supervision and all other requirements necessary to complete the required Work for the following Total Bid Price:

**LUMP SUM BID PRICE:** All cost for all labor, materials, equipment, supplies, taxes, other miscellaneous costs, profit, and overhead, both direct and indirect, for completion of all Work except for those Bid Items herein listed separately.

\$ \_\_\_\_\_

Lump Sum Bid Price (Written in Numerals)

\$ \_\_\_\_\_ /Dollars

Lump Sum Bid Price (Written in Words)

**UNIT PRICE TOTAL COST:** Supplying, hauling, backfilling and compacting structural fill for GST. Payment will be based on actual quantities for the Unit Price item.

\$ \_\_\_\_\_ X 550 CY (Estimated) = \$ \_\_\_\_\_

**ALLOWANCE 1:** Allowance for Materials Testing \$ 5,000.00

**ALLOWANCE 2:** Allowance for Permitting \$ 5,000.00

**TOTAL BID PRICE:** Total amount calculated by adding the Lump Sum Bid Price, Unit Price Total Cost, Allowance 1, and Allowance 2 amounts together to determine the Total Bid Price for completion of this Project.

\$ \_\_\_\_\_

Total Bid Price (Written in Numerals)

\$ \_\_\_\_\_ /Dollars

Total Bid Price (Written in Words)

Bidder shall insert the Lump Sum Bid Price and the Total Bid Price above, in numerals and in words. The Total Bid Price shall consist of the lump sum price for the project, unit pricing request, and allowances.

During the preparation of the Bid, the following addenda, if any, were received:

No.: _____	Date Received: _____	No: _____	Date Received: _____
No.: _____	Date Received: _____	No.: _____	Date Received: _____
No.: _____	Date Received: _____	No: _____	Date Received: _____

The Undersigned hereby declares that no person or persons, firm, or corporation, other than the undersigned are interested in this submitted Bid, as principals, and that this Bid is made without collusion with any person, firm, or corporation, and the undersigned has carefully examined, is thoroughly familiar with, and has incorporated the requirements and specifications of the Bid Documents in this submitted Bid.

The Undersigned certifies that a full examination of the locations of the required work and the sources of supply of materials has been completed, and agrees to furnish all necessary labor, equipment and materials, fully understanding that any quantities shown herein are approximate only, and will fully complete all work in accordance with all requirements specified in the Bid Documents.

The Undersigned declares that the statements and representations made in this Bid are true in every respect and that the Bid is, in all respects, fair and made without collusion or fraud, and that no member of the St. Johns County Board, or any other agent or employee of the County, directly or indirectly, is interested in this Bid or in any profits expected to accrue therefrom.

**CORPORATE/COMPANY**

Full Legal Company Name: \_\_\_\_\_ (Seal)

By: \_\_\_\_\_  
Signature of Authorized Representative (Name & Title typed or printed)

Address: \_\_\_\_\_

Telephone No.: (\_\_\_\_) \_\_\_\_\_ Fax No.: (\_\_\_\_) \_\_\_\_\_

Email Address for Authorized Company Representative: \_\_\_\_\_

Federal I.D. Tax Number: \_\_\_\_\_ DUNS #: \_\_\_\_\_  
(If applicable)

**INDIVIDUAL**

Name: \_\_\_\_\_  
(Signature) (Name typed or printed) (Title)

Address: \_\_\_\_\_

Telephone No.: (\_\_\_\_) \_\_\_\_\_ Fax No.: \_\_\_\_\_

Email Address: \_\_\_\_\_

Federal I.D. Tax Number: \_\_\_\_\_

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

**ATTACHMENT "A"**  
**ST. JOHNS COUNTY AFFIDAVIT**

Bidder hereby issues the sworn statement below, which must be incorporated into the submitted Bid. This sworn statement shall be an affidavit in the following form, executed by an officer of the firm, association, or corporation submitting the Bid, and shall be sworn to before a person who is authorized by law to administer oaths.

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

The Undersigned authority, \_\_\_\_\_ ("Affiant"), who being duly sworn, deposes and states that he/she is the \_\_\_\_\_ (Title) of the firm of \_\_\_\_\_ (Full Legal Name of Bidder) submitting the attached Bid for the completion of work specified in the Bid Documents for Bid No: 23-11 CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK, in St. Johns County, Florida.

The Affiant further states that no more than one Bid will be submitted in response to the above IFB from the Affiant, the bidding firm, or corporation under the same or different name, and that such Bidder has no financial interest in any other bidding firm submitting a Bid in response to the above IFB. That neither the Affiant, his/her firm, association, nor corporation has either directly or indirectly entered into any agreement, participated in any collusion, nor otherwise taken any action in restraint of free competitive bidding in connection with this Bid. Furthermore, neither the Bidder nor any of its officers are barred from participating in public contract lettings in the State of Florida or any other state.

DATED this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Signature of Affiant

\_\_\_\_\_  
Printed Name & Title of Affiant

\_\_\_\_\_  
Full Legal Name of Bidder

Sworn to (or affirmed) and subscribed before me by means of  physical presence or  online notarization, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by Affiant who is personally known to me or has produced \_\_\_\_\_ as identification. Type and number of I.D. produced: \_\_\_\_\_.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

**BIDDER MUST EXECUTE AND ATTACH THIS AFFADAVIT TO SUBMITTED BID.**

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

**ATTACHMENT "B"**  
**CERTIFICATE AS TO CORPORATE PRINCIPAL**

I, \_\_\_\_\_, certify that I am the Secretary of the corporation named as Principal in the foregoing; that \_\_\_\_\_, (Authorized Representative of Bidder) who signed the Bond(s) on behalf of the Bidder, was then \_\_\_\_\_ (Title) of said corporation; that I know his/her signature; and his/her signature thereto is genuine; and that said bond(s) was duly signed, sealed, and attested to on behalf of said corporation by authority of its governing body.

\_\_\_\_\_  
Signature of Secretary

\_\_\_\_\_  
Full Legal Name of Bidder

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

Before and by me, a Notary Public duly commissioned, qualified and acting personally, being duly sworn upon oath by means of  physical presence or  online notarization, Affiant states that he/she is authorized to execute the foregoing Bid Bond on behalf of the Bidder named therein in favor of St. Johns County, Florida.

Subscribed and sworn to me on this \_\_\_ day of \_\_\_\_\_, 2022, by the Authorized Representative of Bidder, who is personally known to me or has produced \_\_\_\_\_ as identification. Type and Number of I.D. produced: \_\_\_\_\_.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

(Attach Power of Attorney to original Bid Bond and Financial Statement of Surety Company)

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

**ATTACHMENT "C"**  
**LICENSE / CERTIFICATION LIST**

Bidder shall list all **current** licenses and certifications held by the firm and/or Key Personnel of the Bidder. Failure to demonstrate any required licenses or certifications which are stated as a minimum qualification, shall be grounds for disqualification and removal from further consideration. A copy of each license or associated document(s) shall be attached to this form and submitted with the Bid.

License Name	License #	Issuing Agency	Expiration Date
State of Florida Business License			
FL Certified General Contractor's License			
FL Certified Underground Utility Contractor			



**ATTACHMENT "D"**  
**LIST OF PROPOSED SUB-CONTRACTORS / SUPPLIER LIST**

Bidder shall submit any and all proposed sub-contractors and major material suppliers below for review/approval by the County. Bidder shall attach any and all licenses or certifications required for the proposed sub-contractor to perform the intended portion of the Work as stated below. All subcontractors and major materials suppliers are subject to approval of County.

<b>Company Name</b>	<b>Division/Discipline</b>	<b>Primary Contact Name</b>	<b>Contact Number and Email Address</b>

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

**ATTACHMENT "E"  
CONFLICT OF INTEREST DISCLOSURE FORM**

Project (BID) Number/Description: Bid No: 23-11 CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK

The term "conflict of interest" refers to situations in which financial or other considerations may adversely affect, or have the appearance of adversely affecting a Bidder's professional judgment in completing work for the benefit of St. Johns County ("County"). The bias such conflicts could conceivably impart may inappropriately affect the goals, processes, methods of analysis or outcomes desired by the County.

Contractors are expected to safeguard their ability to make objective, fair, and impartial decisions when performing work for the benefit of the County. Contractors, therefore must there avoid situations in which financial or other considerations may adversely affect, or have the appearance of adversely affecting the consultant's/contractor's professional judgement when completing work for the benefit of the County.

The mere appearance of a conflict may be as serious and potentially damaging as an actual distortion of goals, processes, methods of analysis or outcomes. Reports of conflicts based upon appearances can undermine public trust in ways that may not be adequately restored even when the mitigating facts of a situation are brought to light. Apparent conflicts, therefore, should be disclosed and evaluated with the same vigor as actual conflicts.

It is expressly understood that failure to disclose conflicts of interest as described herein may result in immediate disqualification from evaluation or immediate termination from work for the County.

---

Please check the appropriate statement:

- I hereby attest that the undersigned Bidder has no actual or potential conflict of interest due to any other clients, contracts, or property interests for completing work on the above referenced project.
- The undersigned Bidder, by attachment to this form, submits information which may be a potential conflict of interest due to other clients, contracts or property interests for completing work on the above referenced project.

Full Legal Name of Bidder: \_\_\_\_\_

Authorized Representative(s): \_\_\_\_\_

Signature

Print Name/Title

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

**ATTACHMENT "F"**  
**CONTRACTOR'S QUALIFICATIONS FORM**

Bidder certifies, and has attached to the submitted Bid proof of current and valid licensure to perform the Work in the State of Florida and St. Johns County, and as specified in the Bid Documents. Any material misrepresentation, as determined by the County, shall result in disqualification.

By: \_\_\_\_\_

Full Legal Name of Bidder

\_\_\_\_\_  
 Authorized Representative Signature

\_\_\_\_\_  
 Date

**Contractor's Project Experience**

Bidder must be fully licensed to do business in the State of Florida and hold a current Certified General Contractor's or Certified Underground Utility Contractor's license at the time the bid is due. Bidders must have successfully completed, as a Prime Contractor or Sub-Contractor, at least three (3) projects, in the past seven (7) years, of similar type, size, with a similar scope and dollar value of the project described herein.

<b>Contractor's Project Experience Details</b>	
<b>Project No. 1</b>	
Name of Project:	
Project Manager Name:	
Superintendent Name:	
Project Description:	
<b>Owner Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	
<b>Engineer/Architect Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	
<b>Contract Dates</b>	

<b>Contractor's Project Experience Details Project No. 1</b>	
Started:	
Original Contractual Completion:	
Final Contractual Completion:	
Actual Completion:	
<b>Contract Value</b>	
Original Contract Value:	
Final Contract Value:	
Value of Change Orders to Date:	
Value of Outstanding Claims to Date:	
<b>Bonding Company Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	
<b>Major Subcontractor Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	
Name:	
Address:	
Contact Person:	
Telephone Number:	
Name:	
Address:	
Contact Person:	
Telephone Number:	

<b>Contractor's Project Experience Details Project No. 2</b>	
Name of Project:	
Project Manager Name:	
Superintendent Name:	
Project Description:	
<b>Owner Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	
<b>Engineer/Architect Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	
<b>Contract Dates</b>	
Started:	
Original Contractual Completion:	
Final Contractual Completion:	
Actual Completion:	
<b>Contract Value</b>	
Original Contract Value:	
Final Contract Value:	
Value of Change Orders to Date:	
Value of Outstanding Claims to Date:	
<b>Bonding Company Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	

**Contractor's Project Experience Details  
Project No. 2**

**Major Subcontractor Information**

Name:	
Address:	
Contact Person:	
Telephone Number:	
Name:	
Address:	
Contact Person:	
Telephone Number:	
Name:	
Address:	
Contact Person:	
Telephone Number:	



<b>Contractor's Project Experience Details Project No. 3</b>	
Name of Project:	
Project Manager Name:	
Superintendent Name:	
Project Description:	
<b>Owner Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	
<b>Engineer/Architect Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	
<b>Contract Dates</b>	
Started:	
Original Contractual Completion:	
Final Contractual Completion:	
Actual Completion:	
<b>Contract Value</b>	
Original Contract Value:	
Final Contract Value:	
Value of Change Orders to Date:	
Value of Outstanding Claims to Date:	
<b>Bonding Company Information</b>	
Name:	
Address:	
Contact Person:	
Telephone Number:	

Contractor's Project Experience Details Project No. 3	
Major Subcontractor Information	
Name:	
Address:	
Contact Person:	
Telephone Number:	
Name:	
Address:	
Contact Person:	
Telephone Number:	
Name:	
Address:	
Contact Person:	
Telephone Number:	

**Ground Storage Tank Experience:**

The Bidder shall provide evidence of successfully designing, constructing, and placing into operation a minimum of ten (10) wire wrapped prestressed concrete tanks conforming to ANSI/AWWA D110 with Type II core wall(s) that have been put into service within the last 10 years of similar size of that being proposed.

Ground Storage Tank Experience Details Tank No. 1:	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

<b>Ground Storage Tank Experience Details Tank No. 2:</b>	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

<b>Ground Storage Tank Experience Details Tank No. 3:</b>	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

<b>Ground Storage Tank Experience Details Tank No. 4:</b>	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

<b>Ground Storage Tank Experience Details Tank No. 5:</b>	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

<b>Ground Storage Tank Experience Details Tank No. 6:</b>	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

<b>Ground Storage Tank Experience Details Tank No. 7:</b>	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

<b>Ground Storage Tank Experience Details Tank No. 8:</b>	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

<b>Ground Storage Tank Experience Details Tank No. 9:</b>	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

<b>Ground Storage Tank Experience Details</b> <b>Tank No. 10:</b>	
Project Name:	
Address/Location:	
Owner Name:	
Owner Contract:	
Owner Phone #:	
General Project Description:	
Contract Value:	
Completion Date:	

**Staff Experience:**

As part of the minimum qualifications, the Bidder shall provide resumes of the following staff members:

- Full-time professional engineer registered in the state of Florida, having no less than five (5) years of experience in the design and field construction of circular prestressed composite tanks.
- Foreman supervising the placing of the shotcrete having no less than five (5) years of experience as a nozzleman.
- Shotcrete nozzleman having no less than five (5) years of experience on similar application.

Resumes should include any licenses, certificates and credentials along with a copy of each document that provide evidence of qualifications as stated in the minimum qualifications section of this Bid.



**ATTACHMENT "G"**  
**DRUG-FREE WORKPLACE FORM**

The undersigned firm, in accordance with Florida Statute 287.087 hereby certifies that

\_\_\_\_\_ does:

Name of Firm

1. Publish a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the workplace and specifying the actions that will be taken against employees for violations of such prohibition.
2. Inform employees about the danger of drug abuse in the workplace, the business' policy of maintaining a drug-free workplace, any available drug counseling, rehabilitation, employee assistance programs and the penalties that may be imposed upon employees for drug abuse violations.
3. Give each employee engaged in providing the contractual services that are described in St. Johns County's request for proposals to provide bond underwriter services a copy of the statement specified in paragraph 1.
4. In the statement specified in paragraph 1, notify the employees that, as a condition of working on the contractual services described in paragraph 3, the employee will abide by the terms of the statement and will notify the employer of any conviction of, or plea of guilty or nolo contendere to, any violation of Florida Statute 893, as amended, or of any controlled substance law of the United States or any state, for a violation occurring in the workplace no later than five (5) days after such conviction or plea.
5. Impose a sanction on, or require the satisfactory participation in a drug abuse assistance or rehabilitation program if such is available in the employee's community by, any employee who is so convicted.
6. Consistent with applicable provisions with State or Federal law, rule, or regulation, make a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs 1 through 5.

As the person authorized to sign this statement, I certify that this firm complies fully with the above requirements.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

**ATTACHMENT "H"**  
**CLAIMS, LIENS, LITIGATION HISTORY**  
(Complete and Submit)

1. Within the past 7 years, has your organization filed suit or a formal claim against a project owner (as a prime or subconsultant) or been sued by or had a formal claim filed by an owner, subconsultant or supplier resulting from a construction dispute? Yes \_\_\_ No \_\_\_ If yes, please attach additional sheet(s) to include:

Description of every action Captions of the Litigation or Arbitration

Amount at issue: \_\_\_\_\_ Name (s) of the attorneys representing all parties:

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Amount actually recovered, if any: \_\_\_\_\_

Name(s) of the project owner(s)/manager(s) to include address and phone number:

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2. List all pending litigation and or arbitration.

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3. List and explain all litigation and arbitration within the past seven (7) years - pending, resolved, dismissed, etc.

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4. Within the past 7 years, please list all Liens, including Federal, State and Local, which have been filed against your Company. List in detail the type of Lien, date, amount and current status of each Lien.

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5. Have you ever abandoned a job, been terminated or had a performance/surety bond called to complete a job?

Yes \_\_\_ No \_\_\_ If yes, please explain in detail:

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6. For all claims filed against your company within the past five (5) years, have all been resolved satisfactorily with final judgment in favor of your company within 90 days of the date the judgment became final? Yes \_\_\_ No \_\_\_ If no, please explain why?

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7. List the status of all pending claims currently filed against your company:

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**Liquidated Damages**

1. Has a project owner ever withheld retainage, issued liquidated damages or made a claim against any Performance and Payment Bonds? Yes \_\_\_\_\_ No \_\_\_\_\_ If yes, please explain in detail:

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**(Use additional or supplemental pages as needed)**

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

**ATTACHMENT "I"**  
**E-VERIFY AFFIDAVIT**

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

I, \_\_\_\_\_ ("Affiant"), being duly authorized by and on behalf of \_\_\_\_\_ ("Bidder") hereby swears or affirms as follows:

1. Bidder understands that E-Verify, authorized by Illegal Immigration Reform and Immigrant Responsibility Act of 1996 (IIRIRA), is a web-based system provided by the United States Department of Homeland Security, through which employers electronically confirm the employment eligibility of their employees.
2. For the duration of Contract No. \_\_\_\_\_ (hereinafter "Agreement"), in accordance with section 448.095, F.S., Bidder shall utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired by the Bidder and shall expressly require any subcontractors performing work or providing services pursuant to the Agreement to likewise utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired by the subcontractor.
3. Bidder shall comply with all applicable provisions of section 448.095, F.S., and will incorporate in all subcontracts the obligation to comply with section 448.095, F.S.
4. Bidder understands and agrees that its failure to comply with all applicable provisions of section 448.095, F.S. or its failure to ensure that all employees and subcontractors performing work under the Agreement are legally authorized to work in the United States and the State of Florida constitute a breach of the Agreement for which St. Johns County may immediately terminate the Agreement without notice and without penalty. The Bidder further understands and agrees that in the event of such termination, Bidder shall be liable to the St. Johns County for any costs incurred by the St. Johns County resulting from Bidder's breach.

DATED this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Signature of Affiant

\_\_\_\_\_  
Printed Name & Title of Affiant

\_\_\_\_\_  
Full Legal Name of Bidder

Sworn to (or affirmed) and subscribed before me by means of  physical presence or  online notarization, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by Affiant, who is personally known to me or has produced \_\_\_\_\_ as identification.

\_\_\_\_\_  
Notary Public  
My Commission Expires: \_\_\_\_\_

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

**ATTACHMENT "J"**  
**LOCAL PREFERENCE**

Any Bidder that meets the criteria of a Local Business, in accordance with Section 16.3 of the SJC Purchasing Policy, must complete and sign this form to indicate their qualification to receive local preference. All required documentation to demonstrate that the Bidder meets all qualification criteria as a local business must be included in the submitted Bid.

In order to qualify for local preference Respondent must provide sufficient documentation to demonstrate:

- A physical, brick and mortar place of business located within the geographic boundaries of St. Johns County, with a valid mailing address, in an area zoned for the conduct of such business, from which the Supplier has operated or performed business on a day-to-day basis that is substantially similar to those specified in the solicitation for a period of at least one (1) calendar year prior to the issuance of the solicitation. No PO Boxes shall be accepted.
- Local address above must be registered as the Supplier’s principal place of business with the Divisions of Corporations Florida Department of State for at least one (1) calendar year prior to the issuance of this BID.
- Submit current and valid Local Business Tax Receipt, and must have Local Business Tax Receipts issued by the St. Johns County Tax Collector from at least one (1) calendar year prior to issuance of this BID.
- Must qualify as a local business as shown above **AND** self-perform a minimum of fifty percent (50%) of all services under the awarded Contract, or must have a minimum of fifty percent (50%) of all services performed by qualified local businesses as sub-contractors or sub-consultants.

If qualifying for local preference through the use of qualified local sub-contractors, Bidder must submit all required documentation to demonstrate the above requirements of all proposed sub-contractors and sub-consultants for local preference consideration with the submitted proposal.

Bidder is a Local Business as defined in Section 16.3, SJC Purchasing Policy \_\_\_\_\_

Bidder is **not** a Local Business as defined in Section 16.3, SJC Purchasing Policy \_\_\_\_\_

\_\_\_\_\_  
Signature – Authorized Respondent Representative

\_\_\_\_\_  
Printed Name & Title

\_\_\_\_\_  
Date of Signature

**BID NO: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK**

**BID BOND**

STATE OF \_\_\_\_\_

COUNTY OF \_\_\_\_\_

KNOW ALL PERSONS BY THESE PRESENTS, that we, the undersigned \_\_\_\_\_ (Full Legal Name of Bidder) as Principal, at \_\_\_\_\_ (Address) and \_\_\_\_\_ as Surety, hereby hold and firmly bind ourselves, our heirs, executors, administrators, and successors and assigns, jointly and severally, by these presents, unto St. Johns County, Florida, as Obligee, in the penal sum of five percent (5%) of the Total Bid Price, or \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) lawful money of the United States.

WHEREAS, the Principal has submitted a Bid for **Bid No: 23-11; CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK** dated \_\_\_\_\_, 2022:

- (a) If the Principal shall not withdraw said Bid within ninety (90) days of the opening of Bids by the Owner, and shall enter into a written Contract with the County within ten (10) business days after prescribed forms are provided to Principal for signature, in accordance with the Bid Documents, and give Bond with good and sufficient Surety or Sureties, as may be required, for the faithful performance and proper fulfillment of such Contract, then the above obligations shall be void and of no effect, otherwise to remain in full force and effect.
- (b) In the event of the withdrawal of said Bid within the period specified, or the failure to enter into such Contract and give such Bond within the time specified, the Principal shall pay the County the lesser of the following amounts: 1) the amount of this bond as hereinabove set forth, of 2) the difference between the amount specified in the Principal's Bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid including the administrative costs to effect such contract, then this obligation shall be void and of no effect, otherwise to remain in full force and effect.

IN WITNESS WHEREOF, the above bound parties have signed and sealed this instrument under their several seals, on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, the name and corporate seal of Principal and Surety being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

WITNESSES:

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**PRINCIPAL:**

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Full Legal Name of Principal

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Signature of Authorized Officer

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Printed Name & Title of Signing Officer

---

Mailing Address

---

City, State, Zip Code

---

Email Address of Signing Officer

**SURETY:**

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Full Legal Name of Surety

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Signature of Authorized Surety Agent

---

Mailing Address of Local Agency

---

City, State, Zip Code

---

Email Address of Surety Agent


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Attorney-In-Fact Signature



**SEALED BID MAILING LABEL**

<b>SEALED BID • DO NOT OPEN</b>	
IFB NO.:	<b>23-11</b>
IFB TITLE:	<b>CR 208 WATER BOOSTER PUMP STATION - GROUND STORAGE TANK WORK</b>
SUBMITTAL DEADLINE:	<b>By 2:00PM – December 7, 2022</b>
SUBMITTED BY:	
	Company Name
	Company Address
	Company Address
DELIVER TO:	St. Johns County Purchasing Division 500 San Sebastian View St. Augustine FL 32084



**END OF DOCUMENT**



# **Technical Specifications**

**for**

## **CR-208 GROUND STORAGE TANK AND BOOSTER PUMP STATION**

**SJCUD Project No.: 4488-56302-6264-56302**

**Mott MacDonald Project No. 502100379-007**

**Tank Contractor Package  
October 2022**



**10245 Centurion Parkway North, Suite 320  
Jacksonville, FL 32256  
Tel: (904) 203-1090  
EB-0000155**

# CR-208 GROUND STORAGE TANK AND BOOSTER PUMP STATION

## TANK CONTRACTOR TECHNICAL SPECIFICATIONS

### TABLE OF CONTENTS

#### **DIVISION 1                    GENERAL REQUIREMENTS**

01010	Summary of Work
01014	Construction Sequence
01015	Measurement and Payment
01050	Project Controls (Surveying)
01110	Environmental Protection Procedures
01200	Project Meetings
01300	Submittals
01310	Construction Scheduling
01370	Schedule of Values & Schedule of Assets
01390	Construction Photographs and Videotaping
01410	Testing and Testing Laboratory Services
01465	Equipment Testing and Startup
01500	Temporary Facilities
01501	Control of Work
01580	Project Identification and Signs
01600	Delivery, Storage, and Handling
01700	Contract Closeout
01710	Cleaning
01720	Project Record Documents
01730	Operating and Maintenance Data
01740	Warranties

#### **DIVISION 2                    SITE WORK**

02100	Site Preparation
02140	Dewatering
02220	Excavating, Backfilling, and Grading for Structures
02221	Trenching, Bedding, and Backfill for Pipes, and Site Earthwork
02282	Termite Control
02400	Graded Aggregate Base
02500	Superpave Asphalt Concrete
02605	Precast Concrete Structures
02610	Site Drainage
02910	Sodding

#### **DIVISION 3                    CONCRETE**

03300	Cast-In-Place Concrete
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#### **DIVISION 4                    MORTAR AND MASONRY**

04230	Reinforced Unit Masonry
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#### **DIVISION 5                    METALS**

# CR-208 GROUND STORAGE TANK AND BOOSTER PUMP STATION

## TANK CONTRACTOR TECHNICAL SPECIFICATIONS

### TABLE OF CONTENTS

05120	Structural Steel
05210	Steel Joists
05310	Steel Deck
05500	Metal Fabrications

#### **DIVISION 6                    CARPENTRY**

06100	Rough Carpentry
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#### **DIVISION 7                    THERMAL AND MOISTURE PROTECTION**

07131	Self-Adhering Sheet Waterproofing
07132	Vertical Sub Surface Waterproofing
07133	Horizontal Sub Surface Waterproofing
07190	Water Repellent
07210	Building Insulation
07265	Underslab Vapor Protection
07270	Air and vapor barrier system
07552	(SBS) Modified Bituminous Membrane Roofing
07600	Flashing and Sheet Metal
07625	Sheet Metal Gutters and Downspouts
07710	Roof Specialties
07720	Roof Hatch
07900	Joint Sealers

#### **DIVISION 8                    DOORS AND WINDOWS**

08110	FRP Doors and Panels
08331	Overhead Coiling Doors
08710	Door Hardware
08800	Glazing

#### **DIVISION 9                    FINISHES**

09110	Non-Load-Bearing Steel Framing
09260	Gypsum Wallboard and Sheathing Assemblies
09512	Acoustical Tile Ceilings
09650	Resilient Base
09900	Painting

#### **DIVISION 10                  SPECIALTIES**

10200	Louvers and Vents
10520	Fire-Protection Specialties

#### **DIVISION 11                  EQUIPMENT**

# CR-208 GROUND STORAGE TANK AND BOOSTER PUMP STATION

## TANK CONTRACTOR TECHNICAL SPECIFICATIONS

### TABLE OF CONTENTS

11214 Vertical Turbine Can Pumps (Owner Furnished Equipment)

**DIVISION 12 NOT USED**

**DIVISION 13 SPECIAL CONSTRUCTION**

13216 Wire Wrapped Prestressed Concrete Tank

**DIVISION 15 MECHANICAL**

15060 Hangers and Supports HVAC  
15064 Plastic Pipe and Fittings  
15066 Stainless Steel Pipe and Fittings  
15072 Ductile Iron Pipe and Fittings  
15076 HVAC Piping and Equipment Identification  
15081 Piping Insulation  
15090 Pipe Support Systems  
15100 Valves and Appurtenances  
15120 Piping Specialties  
15141 Disinfection  
15506 Refrigerant Piping Systems  
15738 Split System Heat Pumps Units  
15810 Ductwork and Duct Accessories  
15815 Duct Insulation  
15830 Fans  
15910 HVAC Instrumentation and Control Devices  
15951 Testing, Adjusting and Balancing

**DIVISION 16 ELECTRICAL**

16000 Electrical Work - General  
16015 Electrical Systems Analysis  
16150 Electric Motors  
16200 Electrical Generation Equipment (Owner Furnished Equipment)  
16400 Electrical Apparatus  
16600 Grounding System  
16900 Instrumentation and Controls

### APPENDICES

Appendix A – Geotechnical Report  
Appendix B – Permits  
Appendix C – Piping and Fitting Pre-Purchase Quantities

## SECTION 01010

### SUMMARY OF WORK

#### PART 1- GENERAL

##### 1.01 LOCATION OF WORK

- A. The work for this Contract is located on property owned by St. Johns County Utility Department (SJCUD) at 3575 Agriculture Center Drive St. Augustine, Florida, within County easements, and within St. Johns County (SJC) right-of-ways (ROWs).

##### 1.02 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required to access the site, construct a new 3.0 MG (nominal volume; 2.8 MG useable volume) potable water ground storage tank, install the water main and reclaimed water main, and construct the new booster pump station and electrical building as shown on the Drawings and as specified herein.
1. A geotechnical investigation and report was completed and is attached in **Appendix A**.
- B. The project will be executed through three separate contracts – Contract 1 includes the construction of the prestressed concrete ground storage tank by the TANK CONTRACTOR, Contract 2 includes electrical and I&C procurement and installation by the ELECTRICAL CONTRACTOR, and Contract 3 includes the construction of the booster pump facility and all other associated work as shown on the Drawings. The CONTRACTOR will be required and should include in their base bid all costs associated with coordinating their work with the TANK CONTRACTOR and ELECTRICAL CONTRACTOR including scheduling of work that is to be completed on the tanks after it is constructed and sequencing the ELECTRICAL CONTRACTOR's work with their own.
- C. The following equipment and materials have been pre-purchased by the OWNER, but it is the responsibility of the CONTRACTOR, TANK CONTRACTOR, and/or ELECTRICAL CONTRACTOR to coordinate with each manufacturer/supplier, ENGINEER and OWNER to receive, unload, install, and test.
1. Four vertical turbine can pumps
  2. PVC and ductile iron pipe and fittings. (A detailed bill of materials and drawing showing what piping was pre-purchased is provided in **Appendix C**). The CONTRACTOR or TANK CONTRACTOR shall be responsible for providing all other piping, fittings, sleeves and valves as required on the project.
  3. Generator and fuel tank including the automatic transfer switch.
- D. The following items will be the responsibility of the TANK CONTRACTOR but is not necessarily limited to the following:
1. Mobilization/demobilization, general requirements, bonds, and insurance
  2. Site work
    - a. Clearing and grubbing for the entire site property
    - b. Excavation of pond from existing grade and import of structural fill for GST construction
    - c. Sedimentation and erosion control measures
  3. 3.0 MG nominal volume GST including all appurtenances as described in Section 13216

## SECTION 01010

### SUMMARY OF WORK

4. Installation of all “under” piping related to the GST. **Appendix C** provides a summary of what piping and fittings have been pre-purchased by the OWNER and will be provided to the TANK CONTRACTOR for installation. All other piping related to the tank shall be provided by the TANK CONTRACTOR.
  5. Unloading, storage, and installation of any piping and fittings pre-purchased by the OWNER for construction of the tank
  6. All materials testing required during construction
  7. All permits necessary to complete the work
  8. Coordination efforts with CONTRACTOR and ELECTRICAL CONTRACTOR
- E. The following items will be the responsibility of the CONTRACTOR but is not necessarily limited to the following:
1. Mobilization/demobilization, general requirements, bonds, and insurance
  2. Site work
    - a. Import of structural and common fill for the site (outside of the tank area), final grading, seeding, and sodding
    - b. Sedimentation and erosion control measures
    - c. Paving and sidewalks
    - d. Stormwater improvements including stormwater inlets, piping, wet detention pond, piping and structures
    - e. Landscaping, fencing, access gates, and irrigation system
    - f. Overflow/drain vault for the GST and the concrete curb and gravel around the GST
  3. Yard piping including yard valves, fittings, and connections to piping
    - a. New reclaimed water piping from CR-208 ROW northwest of the project site, through the utility easement and the site, and ending in the Agriculture Center Drive ROW. The new reclaimed water main will be capped in CR-208 and Agriculture Center Drive for future connections.
    - b. New finished water supply from the existing water main within CR-208 ROW northwest from the project site to an existing water main within Agriculture Center Drive ROW southeast of the project site. Piping installation required by the CONTRACTOR versus the TANK CONTRACTOR is reflected on the drawings. CONTRACTOR shall coordinate with the TANK CONTRACTOR for tank fill and pump suction connections.
  4. New split face cavity wall booster pump station building including the following:
    - a. Electrical room
    - b. Pump room including four vertical turbine can pumps
    - c. Process piping, valves, and appurtenances
    - d. HVAC system including fans, louvers, and associated duct work
  5. Concrete pads for generator and fuel storage tank, tank fill and discharge flow meter concrete pads, HVAC and electrical equipment pads and concrete curb wireway.
  6. Unloading, storage, and installation of any piping and equipment pre-purchased by the OWNER
  7. All performance and materials testing required during construction
  8. All permits necessary to complete the work
  9. Coordination efforts with TANK CONTRACTOR and ELECTRICAL CONTRACTOR



## SECTION 01010

### SUMMARY OF WORK

- F. The following items will be the responsibility of the ELECTRICAL CONTRACTOR to purchase, unload, store, install, and test. It is the responsibility of the CONTRACTOR to coordinate with the ELECTRICAL CONTRACTOR regarding schedule and general coordination efforts to provide a fully functioning system.
1. Mobilization/demobilization, general requirements, bonds, and insurance
  2. New electrical service including coordination with FP&L
  3. All instrumentation and electrical components including conduit, wires, cabling, level instruments, level floats, flow meters, and other field instruments for a fully functioning system
  4. All programming for the control panel and SCADA system
  5. For the new booster pump station:
    - a. Instrumentation and control panel and PLC control system equipment
    - b. Motor control centers and VFDs
    - c. Low voltage power distribution equipment
    - d. Lighting and receptacles
    - e. Lightning protection system
  6. Unloading, storage, and installation of electrical equipment pre-purchased by the OWNER
  7. All performance and equipment testing required during construction
  8. All permits necessary to complete the work
  9. Coordination efforts with CONTRACTOR and TANK CONTRACTOR

#### 1.03 PERMITS AND REGULATIONS

- A. Each CONTRACTOR'S responsibility includes compliance with federal, state, and local regulations which in any way affect the work or implementation of the Project.
1. Copies of permits already obtained by the ENGINEER and OWNER are attached in **Appendix B**.

#### 1.04 WORK BY OTHERS

- A. It is anticipated that work will be completed by others on the property prior to construction. CONTRACTOR shall coordinate with the OWNER and the TANK CONTRACTOR for construction access and schedule. The CONTRACTOR shall include in their bid price coordination efforts for work within the site alongside the TANK CONTRACTOR.
- B. An ELECTRICAL CONTRACTOR will be contracted with SJCUD as part of execution of this Contract. The CONTRACTOR shall coordinate with the OWNER and ELECTRICAL CONTRACTOR for coordination of work efforts and schedule.

#### 1.05 WORK DESCRIPTION AND SEQUENCE

- A. Perform work in a sequence to ensure completion of the Work in the Contract Time. Completion dates of the various stages shall be in accordance with the approved construction schedule submitted by the CONTRACTOR.
- B. The CONTRACTOR shall submit a written schedule to the ENGINEER for approval prior to commencing work. Completion dates of the various stages shall be in accordance with the approved construction schedule submitted by the CONTRACTOR.

## SECTION 01010

### SUMMARY OF WORK

- C. Specific schedule constraints shall be outlined in Section 01014 Construction Sequence.
- D. CONTRACTOR'S Substantial Completion and Final Completion: The project will include two separate major milestones including:
  - 1. Substantial completion: Requires a five-day consecutive 24-hour day period of successful operation of the system as per Section 01465.
  - 2. Final completion: The last stage of construction shall be final construction and shall include the final remaining items subject to ENGINEER'S approval as well as all items listed in Section 01700, Contract Closeout. A total of 30 days has been allotted for final completion after substantial completion.
- E. TANK CONTRACTOR'S Substantial and final completion will be granted based on completion of all work related to the tank construction, testing, and acceptance.

#### 1.06 CONTRACTOR'S USE OF PREMISES

- A. CONTRACTOR shall have complete use of the premises for the performance of the Work. CONTRACTOR shall coordinate activities with any other CONTRACTOR who will be performing work in the same general area.
  - 1. Coordination of work within the site will be required with the TANK CONTRACTOR and ELECTRICAL CONTRACTOR.
- B. CONTRACTOR shall limit the use of the premises for his/her Work and for storage to allow for:
  - 1. Work by other contractors
  - 2. Public Use
- C. Coordinate uses of premises with OWNER and other CONTRACTORS. The CONTRACTOR will have to work with the TANK CONTRACTOR and ELECTRICAL CONTRACTOR for location of trailers, storage of materials, and coordination of work efforts.
- D. CONTRACTOR shall assume full responsibility for security of all his/her and his/her subcontractor's materials and equipment stored on the site.
- E. If directed by the OWNER or ENGINEER, move any stored items which interfere with operations of OWNER or other CONTRACTORS.
- F. Obtain and pay for use of additional storage or work areas if needed to perform the Work.

#### 1.07 CONTRACTOR'S STAGING, STORAGE, AND STOCKPILE AREA

- A. Limited areas on the site are available for the CONTRACTOR's staging, storage, stockpile, and trailer areas. The available areas for the staging, storage, and trailers area at the project site will be agreed upon by the CONTRACTOR and OWNER at the start of construction. Should the CONTRACTOR require additional space for trailers or storage this shall be obtained by them and at their cost or included in the base bid.

## SECTION 01010

### SUMMARY OF WORK

#### 1.08 SECURITY

- A. The CONTRACTOR shall ensure that each employee, representative, Supplier, and others acting for the CONTRACTOR use designated staging areas and parking areas.
- B. The CONTRACTOR shall employ watchmen on the work when necessary and shall erect and maintain strong and suitable barriers and lights as necessary to prevent the happening of any accident to a person, to the property, to the work, and to any materials stored onsite.
- C. The CONTRACTOR shall employ any additional temporary fencing and gates to adequately protect the work and shall provide all access required by the ENGINEER and the OWNER.
- D. Stored materials shall be kept in a neat and orderly manner. Materials that are subject to deteriorations by exposure to the sun, rain, or other elements shall be kept adequately covered and protected. Refer to Section 01600 for additional details.
- E. The CONTRACTOR shall be responsible for protecting all stored materials and the project site safe from theft and vandalism. The CONTRACTOR shall employ security personnel and erect additional fences as necessary at no additional cost to the OWNER.

#### 1.09 BASIS OF DESIGN AND MODIFICATIONS FOR ALTERNATE EQUIPMENT

- A. Drawings indicate the extent and general arrangement of the Work. If any departures from the Drawings are deemed necessary by the CONTRACTOR and/or the ELECTRICAL CONTRACTOR to accommodate the materials and equipment he proposes to furnish, details of such departures and reasons therefore shall be submitted. No such departures shall be made without the prior written approval of the ENGINEER and OWNER. Approved changes shall be made without additional cost to the OWNER.
- B. The specific equipment proposed for use by the CONTRACTOR and/or the ELECTRICAL CONTRACTOR on the project may require changes to structures, auxiliary equipment, piping, electrical, mechanical, controls, or other work to provide a completely satisfactory operating installation. The CONTRACTOR shall submit to the ENGINEER for approval all necessary Drawings and details showing such changes to verify conformance with the overall project structural and architectural requirements and overall project operating performance. The lump sum bid price shall include all costs in connection with the preparation of new drawings and details and all changes in construction work to accommodate the proposed equipment, including increase in the costs.
- C. In the event that the ENGINEER is required to provide additional engineering services as a result of substitution of materials or equipment, which are not listed as "or equal", or changes by the CONTRACTOR and/or the ELECTRICAL CONTRACTOR in dimension, weight, power requirements, etc. of the equipment accessories furnished, or if the ENGINEER is required to examine and evaluate any changes proposed by the CONTRACTOR for the convenience of the

SECTION 01010

SUMMARY OF WORK

CONTRACTOR, then the ENGINEER'S charges in connection with such additional services shall be charged to the CONTRACTOR by the OWNER.

PART 2- GENERAL PRODUCTS (NOT USED)

PART 3- GENERAL EXECUTION (NOT USED)

END OF SECTION 01010

## SECTION 01014

### CONSTRUCTION SEQUENCE

#### PART 1 – GENERAL

##### 1.01 GENERAL REQUIREMENTS

- A. This project consists of work on the OWNER's property located at 3575 Agriculture Center Drive St. Augustine, Florida, within easements owned by the County, and within SJC right-of-way. Work will include construction of the booster pump station building, ground storage tank, large diameter water and reclaimed water mains and additional items as shown on the Drawings. All coordination of phasing and sequencing of construction shall be approved and confirmed in writing by the OWNER and ENGINEER to be considered valid.
- B. The project will be executed in with three separate contracts as noted in Section 01010 – Summary of Work. Contract 1 includes the construction of the prestressed concrete ground storage tank by the TANK CONTRACTOR, Contract 2 includes electrical and I&C procurement and installation by the ELECTRICAL CONTRACTOR, and Contract 3 includes the construction of the booster pump facility and all other associated work as shown on the Drawings. Additionally, the OWNER will be pre-purchasing the vertical turbine pumps, PVC and ductile iron pipe and fittings, generator, fuel tank, and ATS as described herein and as shown on the Drawings. The CONTRACTOR will be required and should include in his base bid all costs associated with coordinating his work with the TANK CONTRACTOR and ELECTRICAL CONTRACTOR including scheduling of work that is to be completed on the tanks after it is constructed, installation of electrical equipment, and coordination and testing of electrical equipment. The tank construction is scheduled to be substantially complete by end of November 2023.
- C. The construction progress schedule required under Section 01310 shall reflect the construction sequences and constraints presented in this section.
- D. See Sections 01465 and 01730 for additional requirements and Division 11 through 16 on specific equipment startup and testing requirements.
- E. The OWNER reserves the right to postpone connections to existing utilities due to operational and/or weather-related concerns.

##### 1.02 DEFINITIONS AND TERMS

- A. Construction Scheduling Constraints: Constraints for performance of the Work, required because of special sequencing with other parts of the Work, OWNER system operation requirements, calendar time constraints and special testing, commissioning and procedures are identified in this Section. These constraints are in addition to the standard procedures such as maintaining working drawings, testing, commissioning, training, etc. These constraints shall be included in the CONTRACTOR's progress schedule.
- B. Special Conditions: Certain special conditions related to performance of the Work are identified in this Section and shall be included in the CONTRACTOR's progress schedule.

## SECTION 01014

### CONSTRUCTION SEQUENCE

#### 1.03 NOTIFICATION REQUIREMENTS

- A. The CONTRACTOR shall give a **minimum of 14 working days advance written notice** to the OWNER and ENGINEER of each component proposed for tie-in or disruption, all of which shall be subject to OWNER's prior approval and limitations. Tie-ins or disruptions specifically mentioned in this Section must conform to this requirement and any others requested by the ENGINEER or OWNER.
- B. No work which affects or could affect the pressure in the existing water main shall be performed without a specific work and implementation plan written by the CONTRACTOR and approved in advance by the ENGINEER and the OWNER.

#### 1.04 SUBMITTAL REQUIREMENTS

- A. CONTRACTOR shall submit shop drawings and working drawings in accordance with Section 01300 to show schedules and details of all temporary services, bypasses, tie-ins, and connections to existing systems.
- B. No shutdowns are anticipated for this project. CONTRACTOR shall submit an RFI if they believe any shutdowns are required.

#### 1.05 SITE CONDITIONS

- A. The CONTRACTOR shall submit to the ENGINEER and the OWNER a description and schedule as to how the common areas will be utilized. Coordinate uses of premises with OWNER and other contractors. The CONTRACTOR will have to work with the TANK CONTRACTOR and ELECTRICAL CONTRACTOR for location of trailers, storage of materials, and coordination of work efforts.
- B. Various components of construction may involve work near or under roads, utility structures (such as power and communication poles), and underground utilities requiring the CONTRACTOR to field verify the connections intended on the Drawings. Furthermore, the CONTRACTOR shall provide any corrective measure or temporary facilities necessary to perform the work at no additional cost to the OWNER. Where temporary shoring/sheeting is required to allow new construction to proceed while protecting adjacent existing structures, the CONTRACTOR shall engage the services of a company to design and install engineered systems signed and sealed by a Florida PE.
- C. Where potable water is required in large quantity for preoperational or watertightness testing or other use, the CONTRACTOR and/or TANK CONTRACTOR shall provide all necessary facilities and pay all costs associated with delivering water from the point of supply to the point of use. The OWNER will provide the water free of charge. The CONTRACTOR and/or TANK CONTRACTOR shall be responsible for temporary installation of the water meter, back flow preventer, and piping for use on an interim basis until any newly proposed systems are installed, tested, and put into service.
- D. The CONTRACTOR shall bear responsibility for ensuring a complete and fully operational tank and BPS. All coordination efforts required for getting the

## SECTION 01014

### CONSTRUCTION SEQUENCE

MANUFACTURERS or other CONTRACTORS on site for startup and testing of equipment shall be included in the CONTRACTOR's base bid. During all start-up and performance testing activities, the CONTRACTOR shall make available onsite the manpower, equipment, and manufacturer's representatives required to make any necessary adjustments and OWNER staff training. The CONTRACTOR shall provide all disinfection chemicals of suitable quantity to test the operation of the new facilities. Fuel shall be provided by the CONTRACTOR to demonstrate performance of each system. The OWNER shall provide a full tank volume of fuel at the time of generator startup. The CONTRACTOR shall be responsible for offloading, installing, and providing any additional fuel for the generator necessary if any other equipment testing occurs prior to having permanent power to the pump station.

- E. The CONTRACTOR shall submit their disinfection and sampling plan, including all proposed sample points to the OWNER and ENGINEER for approval. The CONTRACTOR shall be responsible for the coordinating the sample taking and testing at a FDEP or FDOH certified lab and providing the results to the OWNER and ENGINEER in a timely manner. No installed, constructed, or off-line facilities shall be made operational until they have been approved for service by the FDEP in accordance with FAC 62-555.340.
- F. Dust-tight and noise dampening partitions, or other methods approved by the ENGINEER to contain dust, debris, rain, noise, etc., from construction areas shall be provided. Protective, sanitary covers for equipment, furnishings, and water filled basins shall be provided by the CONTRACTOR in areas of work within existing buildings and structures.

#### 1.06 CONSTRUCTION CONSTRAINTS

- A. The CONTRACTOR shall meet the constraints below and shall consider these constraints when developing their overall plan of construction. The list is not all inclusive or intended to release the CONTRACTOR from the responsibility to coordinate the Work in any manner which will ensure project completion within the time allowed. The following areas are not necessarily listed in their required sequence of construction. A suggested sequence within each area, where necessary, is included. However, the overall general sequence outlining the critical items is provided below. Should the CONTRACTOR wish to deviate from this overall sequence they shall obtain the OWNER and ENGINEER's permission and approval prior to proceeding. CONTRACTOR shall coordinate with the TANK CONTRACTOR and ELECTRICAL CONTRACTOR on any deviations from this overall sequence.
  - 1. Yard piping, including the connection and construction of the finished water main, and construction of the reclaimed water main, shall be performed at an agreed upon time by the CONTRACTOR.
  - 2. Construct access road for the site, either to the requirements of the Drawings or temporary measures until the proposed access road is installed. CONTRACTOR shall coordinate with the TANK CONTRACTOR on utilization of the access drive.
  - 3. Construct stormwater improvements on the site to ensure that any dewatering activities and drainage on the site is maintained throughout construction activities. Construction of the stormwater pond shall not impede completion of the ground storage tank. CONTRACTOR shall coordinate with the TANK



## SECTION 01014

### CONSTRUCTION SEQUENCE

CONTRACTOR to ensure both parties agree upon the sequencing prior to submitting the schedule to the OWNER and ENGINEER.

4. Install new service transformer and power to the site as required to facilitate temporary construction power and startup/commissioning activities.
5. The construction of the tank shall be performed by the TANK CONTRACTOR after subgrade has been deemed acceptable. All connecting piping shall be completed after post-loading of the tank.
6. Construct the new booster pump and electrical building.
7. Perform remaining civil work including yard piping up to existing connection points, storm drainage, grading, and paving.
8. Schedule of tie-ins and piping connections shall be coordinated with OWNER to complete the work.
9. Coordinate with the ELECTRICAL CONTRACTOR to perform field operational tests including all SCADA and automatic functions prior to startup. This shall be implemented and demonstrated to confirm that the station is ready to begin the 5-day operational test required for substantial completion. Operation in "hand" without all instruments, SCADA, and controls in place is not an acceptable means and does not dictate startup. All programming and controls shall be performed by an approved Instrumentation System Supplier (ISS).
10. All potable water disinfection testing approval of sampling through FDEP shall be completed prior to starting the 5-day operational testing period.
11. Once the new facility is on-line and deemed ready for operation, test the system as per requirements of Division 1, technical specifications, and Drawings.
12. Complete all landscaping and fencing.

#### B. Sitework

1. The TANK CONTRACTOR shall perform all clearing and grubbing, site preparation, and tree and brush removal as required to perform the work shown on the Drawings.
2. Cut and fill site as necessary to obtain the elevations reflected on the Drawings. The TANK CONTRACTOR will only be responsible for the fill required to construct the tank. Any fill required outside of the limits of the tank shall be the responsibility of the CONTRACTOR. The TANK CONTRACTOR shall excavate the pond for use of a portion of the fill required for the GST. Any unused soil will be stockpiled onsite and can be used by the CONTRACTOR for common or structural fill as deemed suitable on the site.
3. Erosion control, temporary fencing of all construction areas, and tree protection shall be installed within 30 days after the Notice to Proceed. All such devices shown on the Drawings shall be installed prior to any onsite work commencing.
4. Since work will be occurring around active, existing pipes, the CONTRACTOR shall prepare working drawings of existing and proposed new work to scale and submit to the ENGINEER in advance of excavation. This will require additional utility pot-holing and excavations to locate and determine pipe elevations. The ENGINEER has provided all known existing information to the CONTRACTOR.
5. The CONTRACTOR's field office shall be set up, fully equipped, and all utilities connected for occupancy within 45 days from the Notice to Proceed. The office shall not be removed earlier than the date of substantial completion and not later than the date of final payment.

## SECTION 01014

### CONSTRUCTION SEQUENCE

6. All site and underground pipe and structures installation work shall be organized and scheduled to accomplish the following:
  - a. All underground work shall be performed concurrently to avoid subsequent trenching through the same areas to a reasonable extent. This is especially critical during the installation of the piping in the CR-208 ROW, under CR-208, and through the utility easement.
  - b. Yard electrical work and piping work shall be shown on the same working drawings and fully coordinated horizontally and vertically.
  - c. Existing systems shall remain fully operational. No outages shall be allowed without pre-planned, scheduled, and organized temporary outages that have been approved by the OWNER and ENGINEER through the RFI process.
7. New slabs or pavement shall not be installed until all piping, cables, conduits, and duct banks under the paved area have been installed. Roads shall be stabilized with crushed stone until that time. Any weak areas in base course or existing pavement shall be removed and replaced prior to the final surface course installation.
8. Locations and numbers of sedimentation control facilities shall be adjusted as the work progresses so that all site runoff flows through sedimentation control facilities at all times. Facilities shown are minimums only. At no time shall silt-laden water be allowed to leave the site. Maintenance and upgrading of facilities shall be scheduled weekly and after all rain events.
  - a. The CONTRACTOR/TANK CONTRACTOR shall check the stormwater daily for sedimentation and erosion control and shall provide additional measures or means to minimize any impacts to adjacent property.
9. The installation of temporary stormwater and sedimentation facilities shall be constructed and stabilized prior to onsite excavation, backfilling, and compaction of soils in accordance with the project's requirements and geotechnical recommendations for piping, foundations, pads, drives, walks, ground storage tank and all other structures shown on the project plans.
  - a. Construction of the permanent or temporary stormwater management system is encouraged to properly maintain site drainage during construction.
  - b. The CONTRACTOR/TANK CONTRACTOR shall also include in his bid sufficient funds to maintain the new system throughout the construction process and base his maintenance budget on a normal annual rainfall for the geographical region.
10. Dewatering activities shall be properly protected and desilted and permitted. Refer to the geotechnical report in **Appendix A** as well as Section 02140 for additional details.
  - a. The CONTRACTOR/TANK CONTRACTOR shall submit a Notice of Intent to Use Noticed General Permit for Short Term Construction Dewatering to the St. Johns River Water Management District prior to starting dewatering activity at the project site.
11. Except as noted for removal, all existing trees on the site around and/or adjacent to the construction area shall be protected and remain undamaged at all times. If the CONTRACTOR/TANK CONTRACTOR anticipates damage to a tree due to construction activities, the CONTRACTOR/TANK CONTRACTOR shall contact the ENGINEER immediately and prior to commencing work in that area.

## SECTION 01014

### CONSTRUCTION SEQUENCE

- C. **Booster Pump Station Access Driveway**
1. A new site access driveway as reflected on the Drawings shall be constructed by the CONTRACTOR. Any additional stone or stabilization required for daily construction shall be provided by the CONTRACTOR/TANK CONTRACTOR. Construction of any temporary roads or access including stabilization as part of the project, these costs shall be included in the CONTRACTOR's base bid. No additional monies will be provided for access to and during the site during construction.
- D. **Booster Pump and Electrical Building Construction**
1. Construction of the booster pump building can begin after the necessary site clearing and necessary fill has occurred in the area of the building.
  2. Once the building has been deemed ready for operation and all electrical, controls, and SCADA components and pumping systems have been preliminarily tested the performance testing and startup can begin.
  3. CONTRACTOR shall coordinate with OWNER on pre-purchased vertical turbine pumps, piping, and fittings for installation and with the ELECTRICAL CONTRACTOR on installation and testing of all electrical equipment.
- E. **Ground Storage Tank**
1. The ground storage tank will be constructed by the TANK CONTRACTOR, under Contract 1.
  2. ELECTRICAL CONTRACTOR shall be responsible for all electrical and instrumentation related to, located on, or adjacent to the tank. CONTRACTOR shall be responsible for coordination with other CONTRACTORS, all piping connections, and other work necessary to commission the GST.
  3. The CONTRACTOR shall include sufficient time and monies to coordinate their work with the work of the TANK CONTRACTOR.
- F. **Testing**
1. All facilities and systems shall be tested as a condition precedent to substantial completion. See Section 01465 and equipment specifications for additional requirements. Start-up plans for the facility and equipment shall be submitted, reviewed, and approved by the ENGINEER.
  2. Testing shall be coordinated by the CONTRACTOR with the TANK CONTRACTOR and ELECTRICAL CONTRACTOR.
  3. All equipment and facilities shall be tested according to respective process component specifications herein and more specifically:
    - a. **Pre-startup Testing:** All components, subsystems, and systems in each process component and associated process component shall be checked before electrical and process fluids are applied, and these checks shall verify completeness, leakage, electrical, and instrumentation connections and circuit correctness, and correct installation. Equipment suppliers and all trades must certify that the respective systems are ready for operation. The ENGINEER shall inspect and must agree that each system is ready for energizing and process fluids. The ENGINEER and OWNER shall be present for verification of pre-startup testing. All systems in contact with potable water shall be properly disinfected in accordance with the OWNER's and the state of Florida disinfection procedures.

## SECTION 01014

### CONSTRUCTION SEQUENCE

- b. Operational Testing: All process systems shall be operated with clean water to verify that all components, sub-systems, and systems operate correctly and meet individual performance requirements and that electrical, control, and instrumentation systems function satisfactorily. Corrections, adjustments, replacements, calibrations, and OWNER staff training shall take place during this stage. All systems must be functionally complete and 100 percent satisfactory and ready for process start-up and continuous operation at the conclusion of this stage. Details on operational testing requirements are specified in the respective process component specifications. The ENGINEER and OWNER shall be present for verification of operational testing. Final OWNER staff training shall take place during operational testing. Failure to achieve satisfactory results may require that the CONTRACTOR go back and retest and/or re-disinfect the system.
  - c. Performance Testing: Performance testing shall be conducted after the respective process systems and all associated process systems have been started and are operating continuously and satisfactorily. Demonstration of successful performance testing shall be a condition precedent to final completion. Details on performance testing requirements are included in the respective process component specification and herein. The ENGINEER and OWNER shall be present for verification of performance testing.
- G. Final Piping Connections and Pressure Testing
- 1. Final connections will be required to existing pipes within ROWs. All connections shall be coordinated with the OWNER's operating staff and scheduled a minimum of two weeks in advance with the OWNER. The CONTRACTOR shall pressure test and disinfect all piping prior to making connections. The CONTRACTOR shall coordinate with the OWNER to complete all bacteriological testing on all new facilities individually to place into service after OWNER, ENGINEER and FDEP approval as per FAC 62-555.340.
- H. Electrical and Booster Pump Building Testing
- 1. The CONTRACTOR shall submit a plan for testing operation of the building including all HVAC, pumps, electrical equipment, and all controls.
  - 2. The CONTRACTOR shall test the pumps with potable water and certify that that the pumps met the operating conditions outlined in Section 11214. Controls to automatically operate the system shall be in place.
  - 3. After the connections are made, the CONTRACTOR shall operate the system in automatic mode for five consecutive days without any interruption and perform performance testing requirements.

#### 1.07 PERMITS

- A. The CONTRACTOR/TANK CONTRACTOR shall arrange for all required regulatory agency inspections and coordinate their schedule with the OWNER and ENGINEER. The CONTRACTOR/TANK CONTRACTOR shall close out the issued regulatory permits at the end of the Contract and provide the OWNER and ENGINEER with copies of all submitted documentation, in addition to all specified documentation required by the Contract for its Final Completion.

SECTION 01014

CONSTRUCTION SEQUENCE

B. A copy of any approved permits is attached in Appendix B.

1.08 FPL SERVICE

A. FPL is the electric service provider for this site. FPL prefers to initiate the process 12 weeks prior to the required in service date.

B. Mott MacDonald recommends installation of the new service transformer early in the project to mitigate potential conflicts during the electrical construction portion of the project. CONTRACTOR shall make application for new service within 1 month of receiving notice to proceed according to the following:

1. Apply for new service at [www.fpl.com/construction](http://www.fpl.com/construction)
2. Within 48 hours contact:

Chris Wrenn (FPL)  
303 Hastings Rd  
St Augustine, FL 32084  
(904) 824-7659  
[christopher.wrenn@fpl.com](mailto:christopher.wrenn@fpl.com)

3. Chris Wrenn will initiate FPL Engineering process, which is typically 2 to 3 weeks. During FPL Engineering process, Chris will request completion of an Easement Form, Underground Contract, and prepare any invoicing for payments.
4. FPL Construction process will commence upon completion of FPL Engineering process. Construction typically takes less than 8 weeks.
5. Upon completion of FPL Construction process, CONTRACTOR shall transfer all responsibility, documentation, and permits to the OWNER.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01014

## SECTION 01015

### MEASUREMENT AND PAYMENT

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

- A. The scope of this section defines the items included in each bid item in the Bid Form of these Specifications. 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 Schedule of Prices section will be full compensation for all labor, materials, tools, equipment, and incidentals necessary to complete the CR 208 Ground Storage Tank and Booster Pump Station project TANK CONTRACTOR portion 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 Schedule of Prices will constitute full compensation for all work shown and/or specified to be performed under this project.

#### PART 2 – PRODUCTS (NOT USED)

#### PART 3 – EXECUTION

##### 3.01 DESCRIPTION OF BID ITEM MEASUREMENT AND PAYMENT

- A. All costs for all labor, materials, equipment, supplies, taxes, other miscellaneous costs, profit, and overhead, both direct and indirect, for completion of all Work by the TANK CONTRACTOR except for those Bid Items hereinafter listed separately (Item No. 1).
  - 1. Measurement
    - a. Measurement of the work of Item No. 1 shall be on a lump sum basis.
  - 2. Payment
    - a. Payment to the TANK CONTRACTOR of the total price bid for Item No. 1, in the Schedule of Prices will be made and shall fully compensate the TANK CONTRACTOR for furnishing all labor, materials, equipment, incidentals, taxes, overhead and profit, and other miscellaneous costs required to complete the work as shown on the Drawings and as specified with the exception of items 2 through 4 below.
    - b. Payment shall also fully compensate the TANK CONTRACTOR for any other work which is not specified or shown but which is required to complete the work of Item Nos. 1 through 4 as shown on the Drawings and as specified herein. This shall include any work necessary in addition to the specifically described work included in the price for Items 2-4. Items 2-4 makes reference to work not included in these pay items that must be included in Pay Item No. 1. It is the TANK CONTRACTOR'S responsibility during the bidding of this project to

## SECTION 01015

### MEASUREMENT AND PAYMENT

make sure all required work has been included in their bid; there will not be any consideration given to a request for additional funds because the various material supplier and labor trades make a claim that it was unclear who was to supply and/or perform. The TANK CONTRACTOR'S responsibility during bidding is to verify and include all costs.

- B. Allowance for materials testing (Item No. 2)
  - 1. Measurement
    - a. The materials testing allowance (Item No. 2) is to provide payment for concrete and soils testing in accordance with Section 01410 and Section 13216. The materials testing allowance shall be \$5,000.00 as specified in the Schedule of Prices.
  - 2. Payment
    - a. Payment to the TANK CONTRACTOR shall be for the direct material testing firm's invoice costs for the testing required for all passing tests. Any allowance fee not utilized shall be credited back to the OWNER.
  
- C. Allowance for permitting (Item No. 3)
  - 1. Measurement
    - a. The permit fee allowance (Item No. 3) is to provide payment for permit fees associated with the project. The permit fee allowance shall be \$5,000.00 as specified in the Schedule of Prices.
  - 2. Payment
    - a. Payment to the TANK CONTRACTOR shall be based on the actual cost of permit fees required to complete the project. Any allowance not utilized shall be credited back to the OWNER.
  
- D. Hauling, supplying, backfilling and compaction of structural soils to the site (Item No. 4)
  - 1. Measurement
    - a. The hauling, supplying, backfilling, and compaction of structural soils to the site (Item No. 4) is to provide payment for new fill to construct the GST. This soil is in addition to the fill that will be excavated and used by the TANK CONTRACTOR during excavation of the stormwater pond of which shall be part of the TANK CONTRACTOR's base bid and Item No.1. Measurement shall be on a price per cubic yard basis for all work related for the hauling of the material, and subsequent backfill and compaction of the soils. The work under this item shall include any of the associated labor, coordination, overhead, profit, etc. by the TANK CONTRACTOR to complete this work.
  - 2. Payment
    - a. Payment to the TANK CONTRACTOR for this work will be made for the quantity as determined at the price per cubic yards to fully compensate for any labor and materials to haul, supply, backfill and compact.

END OF SECTION 01015

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## SECTION 01050

### PROJECT CONTROLS (SURVEYING)

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

- A. Provide and pay for field engineering services required for project, including but not limited to:
  - 1. Survey work required for project controls and layout and to execute project.
  - 2. Certified as-built surveys specified herein.
  - 3. Civil, structural, or other professional engineering services specified or required to execute CONTRACTOR/TANK CONTRACTOR's construction methods.
  
- B. Retain the services of a registered land surveyor licensed in the state of Florida to:
  - 1. Identify existing control points and property line corners indicated on the Drawings.
  - 2. Verify and record all existing structure locations in the vicinity of, or adjacent to, the proposed Work; and the locations of all proposed structures and facilities.
  - 3. Maintain an accurate record of locations of all new buried and above-ground piping, valves, and duct banks and existing buried piping and other buried existing facilities (piping, conduits, and structures) encountered and/or relocated during construction of the new work.
  - 4. Maintain accurate locations of all new structures, including corner locations, and equipment locations within the project site.
  
- C. All survey work as described herein shall be completed by the registered land surveyor on a monthly basis and provided at each monthly progress meeting.

##### 1.02 RELATED WORK

- A. Project Record Documents is included in Section 01720.
  
- B. Summary of Work is included in Section 01010.
  
- C. Contract Closeout is included in Section 01700.

##### 1.03 SUBMITTALS

- A. Submit, to the ENGINEER, the name, address and state registration and license number of proposed registered land surveyor.
  
- B. On request of the ENGINEER, submit documentation to verify accuracy of field engineering work.



## SECTION 01050

### PROJECT CONTROLS (SURVEYING)

- C. At the end of the project, and prior to final payment, submit certified as-built drawing(s) (with the Surveyor's title block, signed and sealed by registered Land Surveyor) of the items listed throughout this Section. All surveys shall be tied to the applicable grid system and shall indicate all pre-existing and new project benchmarks. Vertical control shall conform to the project elevation datum designated on the plans.
1. Certified site survey at 1-inch = 40-ft scale or larger, but not greater than 1-inch = 20-ft scale, on 22-inch by 34-inch sheet(s) and electronic (PDF) version, indicating the building corners, sidewalks, paved areas and location of all above ground structures within the project site or limits of construction.
  2. Certified survey, drawn to the same scale as the ENGINEER's yard piping drawings, showing the locations, lines and grades in plan and profile views of all below-grade lines (piping and all electrical ducts) exterior to buildings and other buried facilities (e.g., valves, tanks, etc.). This requirement includes all utilities installed as a part of the scope of this project, as well as existing pipes encountered during the installation of the new Work.
  3. Certified survey showing the location, pipes and grades of all pipes 2 inches in diameter and larger buried and exterior to buildings and other buried facilities (e.g. valves, tanks, vaults, etc.) installed as a result of the work. This shall be at the same scale as the ENGINEER's yard piping drawing.
  4. Certified survey showing elevations of all flow control points, such as weirs, elevations of all new structures and equipment etc. in the wastewater treatment plant.

#### 1.04 QUALIFICATIONS OF SURVEYOR

- A. Registered land surveyor, licensed in the state of Florida.

#### 1.05 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 points during construction.
1. Make no changes or relocations without prior written notice to and approval by 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 the surveyor to correctly replace project control points which may be lost or destroyed. Establish replacements based on original survey control.

## SECTION 01050

### PROJECT CONTROLS (SURVEYING)

#### 1.06 PROJECT SURVEY REQUIREMENTS

- A. Establish a minimum of two permanent benchmarks on site, referenced to data established by survey control points.
  - 1. Record locations, with horizontal and vertical data, on the as-built survey.
  - 2. Permanent benchmarks shall be installed and spaced for convenient reference and use at locations along the pipeline route and/or on the plant site.
  - 3. Benchmarks shall be installed to North American Vertical Datum (NAVD 1988) standards and shall include horizontal and vertical data, as well as the installation date.
  
- B. Establish lines and levels; locate and lay out:
  - 1. Site improvements.
    - a. Stakes for grading, fill and topsoil placement.
    - b. Utility slopes and invert elevations.
    - c. Sidewalks, pavement, fencing, storm drainage facilities, and other finish surface work.
    - d. Locations, sizes, and depths of manholes, valves, and fittings.
  - 2. Batter boards for structures.
  - 3. Building foundation, column locations and floor levels.
  - 4. Controlling lines and levels required for mechanical and electrical trades.
  - 5. Slabs and floor levels.
  
- C. If lines, levels, or layouts are lost or destroyed, or if required by the OWNER or ENGINEER, verify layouts by same methods.
  
- D. Establish all lines and grades prior to construction of pipe work for all pressurized mains, storm drainage piping, gravity sewers and other new utility lines at 100-ft increments, at defined breaks in grade, and at manholes.

The following dimensional references must be depicted on the as-built drawings.

- 1. Depths of various elements of foundation in relation to finish first floor datum.
- 2. All underground piping with elevations and dimensions. Changes to piping location. Horizontal and vertical locations of all underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc. All pipes and valves shall be labeled using the method as per the contract drawings.
- 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. Equipment and piping relocations.

## SECTION 01050

### PROJECT CONTROLS (SURVEYING)

8. All underground duct banks with elevations and dimensions, horizontal and vertical locations of underground duct banks, and manholes along duct banks.
  9. All underground cable elevations and horizontal locations of underground cables.
  10. All existing and new structures clearly indicated.
  11. All elevations of new structures (including weirs) clearly indicated.
- E. All work will be performed in accordance with the Minimum Technical Standards set forth by the Florida Board of Land Surveyors.
- F. As a condition of completing the County permit, after approval, and upon completion of the proposed project, an "As-Built" survey is required. The as-built will show all easements, all on and off-site physical improvements (i.e., paving, buildings, walkways, buffer, fencing, dumpster enclosures accessible routes) and identify street names and shall be in compliance with Part 6.04.00 C of the Land Development Code (LDC) prior to issuance of any Certificates of Occupancy (COs). A copy of these requirements can be obtained from Section 15.0 As-Built in the Development Review Manual whose link is <http://www.sjcfi.us/DevelopmentReview/DRManual.aspx>. St. Johns County Development Review inspector shall be contacted 24 hours prior to all necessary site work inspections and 5 days prior to the final inspection.

### PART 2 – PRODUCTS (NOT USED)

### PART 3 – EXECUTION

#### 3.01 RECORDS

- A. Maintain a complete, accurate log of all control and survey work as it progresses.
- B. Update the project as-built survey on a monthly basis, based on the work performed during the month. Submit one copy of up to date as-built documentation with Contractor's monthly applications for payment.
- C. Maintain an accurate record of new and existing piping, conduit and structure changes, revisions, relocations, and modifications.

END OF SECTION 01050

## SECTION 01110

### ENVIRONMENTAL PROTECTION PROCEDURES

#### PART 1 – 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 Section, 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. These are general guidelines. It is the CONTRACTOR's responsibility to determine the specific construction techniques to meet these guidelines.
- B. The control of environmental pollution requires consideration of air, water and land, and involves management of noise and solid waste, as well as other pollutants.
- C. CONTRACTOR shall schedule and conduct all work in a manner that will minimize the erosion of soils in the area of the work. CONTRACTOR shall 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 to prevent silting and muddying of adjacent property. All erosion control measures shall be in place in an area prior to any construction activity in that area. Specific requirements for erosion and sedimentation controls are provided in the contract drawings.
- D. All phases of sedimentation and erosion control shall comply with and be subject to the laws of the State of Florida. CONTRACTOR shall prepare a sedimentation and erosion control drawing meeting the requirements of the law. Furnish two copies of the approved Drawing to the ENGINEER no less than two weeks prior to starting the work.
- E. CONTRACTOR shall coordinate with the TANK CONTRACTOR on associated responsibilities. TANK CONTRACTOR shall be equally responsible for requirements in this section for work that is defined in their contract.

##### 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 ENGINEER will notify the CONTRACTOR in writing 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

## SECTION 01110

### ENVIRONMENTAL PROTECTION PROCEDURES

aspects of the environmental protection requirements shall notify the CONTRACTOR in writing, through the ENGINEER, of any non-compliance with State or local requirements. 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 ENGINEER or 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, CONTRACTOR shall meet with the ENGINEER to develop mutual understandings relative to compliance with these provisions and administration of the environmental pollution control program.
- B. CONTRACTOR shall remove temporary environmental control features, when approved by the ENGINEER 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. CONTRACTOR shall 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 STREAMS AND SURFACE WATERS

- A. Care shall be taken to prevent, or reduce to a minimum, any damage to any stream or surface water from pollution by debris, sediment, or other material, or from the manipulation of equipment and/or materials in or near such streams. Water that has been used for washing or processing, or that contains oils or sediments that will reduce the quality of the water in the stream, shall not be directly returned to the stream. Such waters shall be diverted through a settling basin or filter before being directed into streams or surface waters.

## SECTION 01110

### ENVIRONMENTAL PROTECTION PROCEDURES

- B. The CONTRACTOR shall not discharge water from dewatering operations directly into any live or intermittent stream, channel, wetlands, surface water or any storm sewer. Water from dewatering operations shall be treated by filtration, settling basins, or other approved method to reduce the amount of sediment contained in the water to allowable levels.
- C. All preventative measures shall be taken to avoid spillage of petroleum products and other pollutants. In the event of any spillage, prompt remedial action shall be taken in accordance with a contingency action plan approved by the Florida Department of Environmental Protection and the US EPA. The CONTRACTOR shall submit two copies of approved contingency plans to the ENGINEER.
- D. Water being flushed from structures or pipelines after disinfection, with Cl<sub>2</sub>, shall be treated with a dechlorination solution, in a method approved by the ENGINEER, prior to discharge.

### 3.03 PROTECTION OF LAND RESOURCES

- A. Restore land resources within the project boundaries and outside the limits of permanent work 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. 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. Protect trees or monuments that may possibly be defaced, bruised, injured, or otherwise damaged by the construction equipment, dumping or other operations, by placing boards, planks, or poles around them.
- E. The locations of the CONTRACTOR'S storage and other construction activities, required temporarily in the performance of the work, shall be cleared portions of the job site or areas to be cleared as by the OWNER and ENGINEER and shall not be within wetlands or floodplains. The Contractor shall submit a layout of the proposed storage areas to the OWNER and ENGINEER for approval at least 10 days prior to scheduled start. Drawings showing storage facilities shall be submitted for approval of the ENGINEER.

## SECTION 01110

### ENVIRONMENTAL PROTECTION PROCEDURES

- F. If the CONTRACTOR proposes to construct temporary roads or embankments and excavations for work areas, he shall submit the following for approval at least ten days prior to scheduled start of such temporary work.
  - 1. A layout of all temporary roads, excavations, embankments and drainage 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.
  
- G. CONTRACTOR shall 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 directed by the ENGINEER. It is anticipated that excavation, filling and plowing of roadways will be required to restore the area to near natural conditions which will permit the growth of vegetation thereon. The disturbed areas shall be prepared and seeded as approved by the ENGINEER or Owner.
  
- H. All debris and excess material will be disposed of outside wetland or floodplain areas in an environmentally sound manner.

#### 3.04 PROTECTION OF AIR QUALITY

- A. Burning – The use of burning at the project site for the disposal of refuse and debris will not be permitted unless authorized by the OWNER and a Large Land Clearing Burning Permit is acquired under the State of Florida.
  
- B. Dust Control - Maintain all excavations, embankment, stockpiles, access roads, plant sites, 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. CONTRACTOR shall control dust resulting from clearing and grubbing operations to prevent nuisance to adjacent property owners and the general public. CONTRACTOR shall use dust control methods and materials approved by the ENGINEER.
  
- 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 approval from the ENGINEER.
  
- D. Sprinkling, to be approved by the ENGINEER, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the CONTRACTOR shall have sufficient competent equipment on the job to accomplish this. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs, as determined by the OWNER.

## SECTION 01110

### ENVIRONMENTAL PROTECTION PROCEDURES

#### 3.05 NOISE CONTROL

- A. CONTRACTOR shall make every effort to minimize noises caused by the construction operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with Federal and State regulations. CONTRACTOR shall meet the local ordinances regarding noise control.
- B. All equipment to be furnished under this Contract, unless specified otherwise in the technical specifications, shall be designed to ensure that the sound pressure level does not exceed 85 decibels over a frequency range of 37.8 to 9600 cycles per second at a distance of 3-ft from any portion of the equipment, under any load condition, when tested using standard equipment and methods. Noise levels shall include the noise from the motor. Mufflers or external baffles shall not be acceptable for the purpose of reducing noise. Data on noise levels shall be included with the shop drawing submittal.

#### 3.06 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

- A. During the life of this contract, CONTRACTOR shall 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.

#### 3.07 ENVIRONMENTAL AND PUBLIC NUISANCE

- A. CONTRACTOR shall not create a public nuisance including but not limited to encroachment on adjacent lands, flooding of adjacent lands, or excessive noise or dust. CONTRACTOR shall eliminate noise to as great an extent as practicable at all times.

END OF SECTION 01110



SECTION 01200

PROJECT MEETINGS

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

- A. The ENGINEER shall schedule, administer, and prepare meeting minutes for the pre-construction meeting, periodic progress meetings, and specially called meetings throughout progress of the work.
- 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 RELATED REQUIREMENTS

- A. Section 01300: Submittals
- B. Section 01310: Construction Scheduling
- C. Section 01720: Project Record Documents
- D. Section 01730: Operating and Maintenance Data

1.03 PRE-CONSTRUCTION MEETING

- A. Location: A central site, convenient for all parties, designated by the OWNER.
- B. A pre-construction meeting will be held for each of the three contracts.
- C. Attendance
  - 1. Owner's representative
  - 2. ENGINEER and professional consultants
  - 3. Resident project representative
  - 4. CONTRACTOR'S superintendent
  - 5. Major SUBCONTRACTORS
  - 6. Major suppliers
  - 7. Others as appropriate
  - 8. Tank CONTRACTOR
  - 9. Electrical SUBCONTRACTOR
- D. Suggested Agenda
  - 1. Distribution and discussion of:
    - a. List of major SUBCONTRACTORS and suppliers
    - b. Projected construction schedules
  - 2. Critical work sequencing
  - 3. Major equipment deliveries and priorities
  - 4. Project coordination
    - a. Designation of responsible personnel

## SECTION 01200

### PROJECT MEETINGS

- b. Submittals
- c. Applications for payment
5. Procedures and processing of:
  - a. Field Decisions
  - b. Proposal requests
  - c. Submittals
  - d. Change orders
  - e. Application for payment
6. Adequacy of distribution of Contract Documents
7. Procedures for maintaining Record Documents
8. Use of premises:
  - a. Office, work, and storage areas
  - b. OWNER's requirements
9. Construction facilities, controls and construction aids
10. Temporary utilities
11. Housekeeping procedures

#### 1.04 PROGRESS MEETINGS

- A. Schedule regular periodic meetings. A total of 11 progress meetings have been allocated over the entire construction period and will be scheduled by the ENGINEER after the schedule has been reviewed. These meetings will be required by both the CONTRACTOR and ELECTRICAL CONTRACTOR. A total of 6 progress meetings have been allocated over the construction period and will be scheduled by the ENGINEER after the schedule has been reviewed for the TANK CONTRACTOR.
- B. Hold called meetings as required by progress of the work.
- C. Location of the meetings: A central site, convenient for all parties, designated by the OWNER.
- D. Attendance shall be similar to pre-construction meeting and as deemed appropriate by the ENGINEER or OWNER.
- E. Suggested Agenda
  1. Review, approval of minutes of previous meeting
  2. Review of work progress since previous meeting
  3. Field observations, problems, and/or conflicts
  4. Problems which impede construction schedule
  5. Review of offsite 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

SECTION 01200

PROJECT MEETINGS

- 14. Other business
- 15. Critical/long lead item
  
- F. The CONTRACTOR shall attend progress meetings and is to study previous meeting minutes and current agenda items so they are prepared to discuss pertinent topics such as deliveries of materials and equipment, progress of the work, etc.
  
- G. The CONTRACTOR shall provide a summary of work performed since the last meeting and anticipated work to be performed over the next 30 to 45 days at each progress meeting.
  
- H. The CONTRACTOR shall provide an updated schedule at each progress meeting for the remaining work.
  
- I. The CONTRACTOR shall coordinate with the ELECTRICAL CONTRACTOR for schedule updates to be included with documents for progress meetings.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01200

## SECTION 01300

### SUBMITTALS

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

- A. This Section specifies the general methods and requirements of submissions applicable to Shop Drawings, Product Data, Samples and Operations and Maintenance Manuals. Detailed submittal requirements are specified in the Technical Sections.
- B. CONTRACTOR shall coordinate with electrical CONTRACTOR on all electrical submittals.
- C. CONTRACTOR shall coordinate with the tank CONTRACTOR on all work related to their contract
- D. CONTRACTOR shall include in their base bid coordination with the ELECTRICAL CONTRACTOR and TANK CONTRACTOR as necessary for all required submittals. For example, any startup plan that required input from the ELECTRICAL CONTRACTOR should be fully coordinated through the CONTRACTOR and the CONTRACTOR shall be responsible for reviewing and incorporating the ELECTRICAL CONTRACTOR's startup schedule into their overall startup schedule.
- E. Submittals are categorized into two types: Action Submittals and Informational Submittals, as follows:
  1. Action Submittals: Written and graphic information submitted by the CONTRACTOR that requires the ENGINEER'S approval. The following are examples of action submittals:
    - a. Shop drawings (including working drawings and product data)
    - b. Samples
    - c. Operation and maintenance manuals
    - d. Site usage plan (CONTRACTOR's staging – including trailer siting and material laydown area)
    - e. Schedule of values
    - f. Payment application format
  2. Informational Submittal: Information submitted by the CONTRACTOR that is required to be reviewed by the ENGINEER prior to work being completed. ENGINEER will provide review comments that may require revisions. Informational submittals will be marked "Reviewed" by the ENGINEER when submittal is considered acceptable. The following are examples of informational submittals:
    - a. Shop drawing schedule
    - b. Construction schedule
    - c. Statements of qualifications
    - d. Health and Safety Plans
    - e. Construction photography and videography
    - f. Work plans
    - g. Outage requests
    - h. Proposed testing procedures
    - i. Test records and reports

## SECTION 01300

### SUBMITTALS

- j. Vendor training outlines/plans
  - k. Test and start-up reports
  - l. Certifications
  - m. Record Drawings
  - n. Record Shop Drawings
  - o. Submittals required by laws, regulations and governing agencies
  - p. Submittals required by funding agencies
  - q. Other requirements found within the technical specifications
  - r. Warranties and bonds
  - s. As-Built surveys
  - t. Contract close-out documents
- F. All submittals shall be delivered directly to the Mott MacDonald office located at: 10245 Centurion Parkway North, Suite 320, Jacksonville, FL 32256.
- G. All submittals shall be clearly identified by reference to section number, paragraph, drawing, or detail, as applicable.
- H. Submittals shall be clean and legible and of sufficient size for presentation of data.
- I. Submittal reviews after the "B" submittal will be back-charged to the CONTRACTOR for the ENGINEER'S time by the OWNER for each additional review. This shall be tracked monthly by the ENGINEER and deducted from each monthly pay application. The OWNER will then reimburse the ENGINEER for these additional services through an amendment.

#### 1.02 RELATED WORK

- A. Additional requirements may be specified in the General Conditions for the Contract.
- B. Additional submittal requirements may be specified in the respective technical Specification Sections.
- C. Operation and Maintenance manuals are included in Section 01730.

#### 1.03 CONTRACTOR'S RESPONSIBILITIES

- A. All submittals shall be clearly identified as follows:
  - 1. Date of submission
  - 2. Project number
  - 3. Project Name
  - 4. Contractor identification
    - a. Contractor
    - b. Supplier
    - c. Manufacturer
    - d. Manufacturer or supplier representative
  - 5. Identification of the product
  - 6. Reference to Contract drawing(s)
  - 7. Reference to specification section number, page and paragraph(s)

## SECTION 01300

### SUBMITTALS

8. Reference to applicable standards, such as ASTM or Federal Standards numbers
  9. Indication of CONTRACTOR's approval
  10. CONTRACTOR's Certification statement
  11. Identification of deviations from the Contract Documents, if any
  12. Reference to previous submittal (for resubmittals)
- B. Submittals shall be clear and legible, and of sufficient size for legibility and clarity of the presented data.
- C. Submittal Log  
Maintain a log of all submittals. The submittal log shall be kept accurate and up to date. This log should include the following items (as applicable):
1. Description
  2. Submittal number
  3. Date transmitted to the ENGINEER
  4. Date returned to CONTRACTOR (from ENGINEER)
  5. Status of Submittal (Approved/Not Approved/etc.)
  6. Date of Resubmittal to ENGINEER and Return from ENGINEER (if applicable and repeat as necessary)
  7. Date material released for fabrication
  8. Projected (or actual) delivery date
- D. Numbering System  
Utilize a 9-character submittal identification numbering system in the following manner:
1. The first character shall be a D, S, M or I which represents Shop Drawing (including working drawings and product data), Sample, Manual (Operation & Maintenance) or Informational, respectively.
  2. The next five digits shall be the applicable Specification Section.
  3. The next two digits shall be the numbers 01 to 99 to sequentially number each separate item or drawing submitted under each specific Specification Section, in the order submitted.
  4. The last character shall be a letter, A to Z, indication the submission (or resubmission) of the same submittal, i.e., "A" = 1<sup>st</sup> submission, "B" = 2<sup>nd</sup> submission, "C" = 3<sup>rd</sup> submission, etc. A typical submittal would be as follows:  
  
D-03300-08-B  
  
D = Shop Drawing  
03300 = Section for Concrete  
08 = the eighth different submittal under this section  
B = the second submission (first resubmission) of the particular Shop Drawing
- E. Variances  
Notify the ENGINEER in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents.

## SECTION 01300

### SUBMITTALS

#### F. Action Submittals

1. Shop Drawings, Working Drawings, Product Data and Samples
  - a. Shop drawings as defined in the General Conditions, and as specified in individual Sections include, but are not necessarily limited to, custom prepared data such as fabrication and erection/installation (working) drawings, scheduled information, setting diagrams, actual shop work manufacturing instructions, custom templates, wiring diagrams, coordination drawings, equipment inspection and test reports, including performance curves and certificates, as applicable to the work.
  - b. CONTRACTOR shall verify all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and coordinate each item with other related shop drawings and the Contract requirements.
  - c. All details on shop drawings shall show clearly the relation of the various parts to the main members and lines of the structure and where correct fabrication of the work depends upon field measurements shall be made and noted on the drawings before being submitted.
  - d. All shop drawings submitted by subcontractors and vendors shall be reviewed by the CONTRACTOR for field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and that it has been coordinated with other related shop drawings and the Contract requirements. Submittals directly from subcontractors or vendors will not be accepted by the ENGINEER.
  - e. The CONTRACTOR shall be responsible the accuracy of the subcontractor's or vendor's submittal; and, for their submission in a timely manner to support the requirements of the CONTRACTOR's construction schedule. Shop drawings found to be inaccurate or otherwise in error shall be returned to the subcontractor or vendor to correct before submission to the ENGINEER. All shop drawings shall be approved by the CONTRACTOR.
  - f. Delays to construction due to the untimely submission of submittals will constitute inexcusable delays, for which CONTRACTOR shall not be eligible for additional cost nor additional contract time. Inexcusable delays consist of any delay within the CONTRACTOR's control.
  - g. Submittals for equipment specified under Divisions 11, 15 and 16 shall include a listing of installations where identical or similar equipment manufactured by that manufacturer has been installed and in operation for a period of at least five years.
2. Working Drawings
  - a. Detailed installation drawings (equipment, piping, electrical conduits and controls, HVAC work, and plumbing, etc.) shall be prepared and submitted for review and approval by the ENGINEER prior to installing such work. Installation drawings shall be to-scale and shall be fully dimensioned.
  - b. Piping working drawings shall show the laying dimensions of all pipes, fittings, valves, as well as the equipment to which it is being connected. In addition, all pipe supports shall be shown.

## SECTION 01300

### SUBMITTALS

- c. Equipment working drawings shall show all equipment dimensions, anchor bolts, support pads, piping connections and electrical connections. In addition, show clearances required around such equipment for maintenance of the equipment.
  - d. Electrical working drawings shall show conduits, junction boxes, disconnects, control devices, lighting fixtures, support details, control panels, lighting and power panels, and Motor Control Centers. Coordinate all locations with the Contract Documents and the CONTRACTOR's other working drawings.
3. Product Data
- a. Product data, as specified individual Specification Sections, include, but are not limited to, the manufacturer's standard prepared data for manufactured products (catalog data), such as the product specifications, installation instructions, availability of colors and patterns, rough-in diagrams and templates, product photographs (or diagrams), wiring diagrams, performance curves, quality control inspection and reports, certifications of compliance (as specified or otherwise required), mill reports, product operating and maintenance instructions, recommended spare parts and product warranties, as applicable.
4. Samples
- a. Furnish, samples required by the Contract Documents for the ENGINEER's approval. Samples shall be delivered to the ENGINEER as specified or directed. Unless specified otherwise, provide at least two samples of each required item. Materials or equipment for which samples are required shall not be used in the work unless and until approved by the ENGINEER.
  - b. Samples specified in individual Specification Sections, include, but are not limited to: physical examples of the work (such as sections 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 other specified units of work.
  - c. 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 and Contact 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 which fail testing or are not approved will be returned to the CONTRACTOR at his expense, if so requested at time of submission.
5. Professional Engineer (P.E.) Certification Form
- a. If specifically required in any of the technical Sections, submit a Professional Engineer (P.E) Certification for each item required, signed and sealed by the P.E. licensed or registered in the state wherein the work is located.



## SECTION 01300

### SUBMITTALS

6. CONTRACTOR's Certification
  - a. Each shop drawing, working drawings, product data, and sample shall have affixed to it the following Certification Statement: *"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."*
  - b. Shop drawings, working drawings, and product data sheets 11-inch x 17-inch and smaller shall be bound together in an orderly fashion and bear above Certification Statement on the cover sheet. The transmittal cover sheet for each identified shop drawing shall fully describe the packaged data and include a listing of all items within the package.
7. The review and approval of shop drawings, working drawings, product data, or samples by the ENGINEER shall not relieve the CONTRACTOR from the responsibility for the fulfillment of the terms of the Contract. All risks of error and omissions are assumed by the CONTRACTOR and the ENGINEER will have no responsibility therefor.
8. Project work, materials, fabrications, and installation shall conform to approved shop drawings (including working drawings and product data) and applicable supplies.
9. No portion of the work requiring a shop drawing (including working drawings and product data) or sample shall be started, nor shall any materials be fabricated or installed before approval of such item. Procurement, fabrication, delivery or installation of products or materials that do not conform to approved shop drawings shall be at the CONTRACTOR's risk. Furthermore, such products or materials delivered or installed without approved shop drawings, or in non-conformance with the approved shop drawings will not be eligible for progress payment until such time as the product or material is approved or brought into compliance with approved shop drawings. Neither the OWNER nor ENGINEER will be liable for any expense or delay due to corrections or remedies required to accomplish conformity.
10. Operation and Maintenance Data
  - a. Operation and maintenance data shall be submitted in assembled manuals as specified. Such manuals shall include detailed instructions for OWNER personnel on safe operation procedures, controls, start-up, shut down, emergency procedures, storage, protection, lubrication, testing, trouble shooting, adjustments, repair procedures, and other maintenance requirements.
11. Payment Application Format
  - a. If an application form is included in the Contract Documents, use that form unless otherwise approved by the ENGINEER and OWNER. If an application form is not included in the Contract Documents, CONTRACTOR may propose a form for approval.
12. Site Usage
  - a. Submit a proposed site staging plan, including but not limited to the location of office trailers, storage trailers and material laydown. Such a plan shall be a graphic presentation (drawing) of the proposed

## SECTION 01300

### SUBMITTALS

locations; and shall include on-site traffic modifications, and temporary utilities, as may be applicable.

#### G. Informational Submittals

1. Shop Drawing Schedule
  - a. Prepare and submit a schedule indicating when shop drawings are required to be submitted to support the as-planned construction schedule. The submittal schedule shall allow sufficient time for preparation and submittal, review and approval, and fabrication and delivery to support the construction schedule.
2. Construction Schedule
  - a. Prepare and submit construction schedules and monthly status reports as specified.
3. Statements of Qualifications
  - a. Provide evidence of qualification, certification, or registration, as required in the Contract Documents, to verify qualifications of licensed land surveyor, professional engineer, materials testing laboratory, specialty subcontractor, technical specialist, consultant, specialty installer, and other professionals.
4. Health and Safety Plans
  - a. When specified, prepare and submit a general company Health and Safety Plan (HSP), modified or supplemented to include job-specific considerations.
5. Construction Photography and Videography
  - a. Provide periodic construction photographs and videography as specified – including but not limited to preconstruction photographs and/or video, monthly progress photos and/or video and post-construction photographs and/or videos.
6. Work Plans
  - a. Prepare and submit copies of all work plans needed to demonstrate to the OWNER that CONTRACTOR has adequately through-out the means and methods of construction and their interface with existing facilities.
7. Outage Requests
  - a. Provide sufficient notification of any outages (electrical, flow processes, etc.) as may be required to tie-in new work into existing facilities. Unless specified otherwise elsewhere, a minimum of seven calendar days' notice shall be provided.
8. Proposed Testing Procedures
  - a. Prepare and submit testing procedures it proposes to use to preform testing required by the various technical specifications.
9. Test Records and Reports
  - a. Provide copies of all test records and reports as specified in the various technical specifications.
10. Vendor Training Outlines/Plans
  - a. At least two weeks before scheduled training of OWNER's personnel, provide lesson plans for vendor training in accordance with the specification for O&M manuals.

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### SUBMITTALS

11. Test and Start-Up Reports
  - a. Manufacturer shall perform all pre-start up installation inspection, calibrations, alignments, and performance testing as specified in the respective Specification Section. Provide copies of all such test and start up reports.
12. Certifications
  - a. Provide various certifications as required by the technical specifications. Such certifications shall be signed by an officer (of the Firm) or other individual authorized to sign documents on behalf of that entity.
  - b. Certifications may include, but are not limited to:
    - 1) Welding certifications and welders qualifications.
    - 2) Certifications of Installation, Testing and Training for all equipment.
    - 3) Material Testing reports furnished by an independent testing firm.
    - 4) Certifications from manufacturer(s) for specified factory testing.
    - 5) Certifications required indicating compliance with any sustainability or LEEDS accreditation requirements indicated in the Contract Documents.
13. Record Drawings
  - a. No later than Substantial Completion, submit a record of all changes during construction not already incorporated into drawings in accordance with specification on Project Record Documents.
14. Submittals Required by Laws, Regulations, and Governing Agencies
  - a. Prepare and submit all documentation required by state or local law, regulation or government agency directly to the applicable agency. This includes, but is not limited to, notifications, reports, certifications, certified payroll (for projects subject to wage requirements) and other documentation required to satisfy all requirements. Provide to ENGINEER one copy of each submittal made in accordance with this paragraph.
15. Submittals Required by Funding Agencies
  - a. Prepare and submit all documentation required by funding agencies. This includes but is not limited to segregated pay applications and change orders when required to properly allocate funds to different funding sources; and certified payrolls for projects subject to wage requirements. Provide one copy of each submittal made in accordance with this paragraph to the ENGINEER.
16. Other Requirements of the Technical Specifications Sections
  - a. Comply with all other requirements of the technical specifications.
17. Warranties
  - a. Assemble a book(let) of all warranties as specified in the various technical specifications and in accordance with the specification on Warranties and provide to the ENGINEER.
18. As-Built Surveys
  - a. Engage the services of a licensed land surveyor in accordance with the Project Controls specification. Prior to Final Completion, provide an As-Built survey of the constructed facility, as specified.
19. Contract Close-Out Documents
  - a. Submit Contract documentation as indicated in the specification for Contract Close-out.

## SECTION 01300

### SUBMITTALS

#### PART 2- PRODUCTS (NOT USED)

#### PART 3- EXECUTION

##### 3.01 SUBMITTAL SCHEDULE

- A. Provide an initial submittal schedule at the pre-construction meeting for review by OWNER and ENGINEER. Incorporate comments from OWNER or ENGINEER into a revised submittal schedule.
- B. Maintain the submittal schedule and provide sufficient copies for review by OWNER and ENGINEER. An up-to-date submittal schedule shall be provided at each project progress meeting.

##### 3.02 TRANSMITTALS

- A. Prepare separate transmittal sheets for each submittal. Each transmittal sheet shall include at least the following: the CONTRACTOR's name and address, OWNER's name, project name, project number, submittal number, description of submittal, and number of copies submitted.
- B. Submittals shall be transmitted or delivered directly to the office of the ENGINEER, as indicated in the Contract Documents or as otherwise directed by the ENGINEER.

##### 3.03 PROCEDURES

- A. Action Submittals
  - 1. CONTRACTOR's Responsibilities
    - a. Coordination of Submittal Times: 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 of other related Sections, so that the installation will not be delayed by processing times including disapproval and resubmittal (if required). Coordinate with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. Extensions to the Contract Time will not be approved for the CONTRACTOR's failure to transmit submittals sufficiently in advance of the Work.
    - b. The submittals of all shop drawings (including working drawings and product data) shall be sufficiently in advance of construction requirements to allow for possible need of re-submittals, including the specified review time for the ENGINEER.
    - c. ENGINEER's review time for shop drawings and O&M manuals shall be no more than 30 calendar days. Resubmittals will be subject to the same review time.
    - d. Submittals of operation and maintenance data should be provided within 30 days of approval of the related shop drawing(s).
    - e. Before submission to the ENGINEER, review shop drawings as follows:
      - 1) Make corrections and add field measurements, as required.

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### SUBMITTALS

- 2) Use any color for its notations except red (reserved for the ENGINEER's notations) and black (to be able to distinguish notations on black and white documents).
  - 3) Identify and describe each deviation or variation from Contract Documents.
  - 4) Include the required CONTRACTOR's certification statement.
  - 5) Provide field measurements (as needed).
  - 6) Coordinate with other submittals.
  - 7) Indicate relationships to other features of the Work.
  - 8) Highlight information applicable to the Work and/or delete information not applicable to the Work.
- f. Submit the following number of copies:
- 1) Shop drawings (including working drawings and product data)- CONTRACTOR shall submit three hard copies of the submittals to be kept by the OWNER and ENGINEER. If the CONTRACTOR would like a copy returned, then the CONTRACTOR shall submit four hard copies of the submittals.
  - 2) Product Data – three copies
  - 3) Samples – as stated in the representative Sections.
  - 4) Site Usage Plan – One copy.
  - 5) Schedule of Values – One copy.
  - 6) Payment application format –One copy.
- g. If CONTRACTOR considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, provide written notice thereof to the ENGINEER immediately; and do not release for manufacture before such notice has been received by the ENGINEER.
- h. When the shop drawings have been completed to the satisfaction of the ENGINEER, carry out the construction in accordance therewith; and make no further changes therein except upon written instructions from the ENGINEER.
2. Engineer's Responsibilities
- a. ENGINEER will not review shop drawings (including working drawings and product data) that do not include the CONTRACTOR's approval stamp. Such submittals will be returned to the CONTRACTOR, without action, for correction.
  - b. Partial shop drawings (including working drawings and product data) will not be reviewed. If, in the opinion of the ENGINEER, a submittal is incomplete, that submittal will be returned to the CONTRACTOR for completion. Such submittals may be returned with comments from ENGINEER indicating the deficiencies requiring correction.
  - c. If shop drawings (including working drawings and product data) meet the submittal requirements, ENGINEER will forward copies to appropriate reviewer(s). Otherwise, noncompliant submittals will be returned to the CONTRACTOR without action – with the ENGINEER retaining one copy.
  - d. Submittals which are transmitted in accordance with the specified requirements will be reviewed by the ENGINEER within the time specified herein. The time for review will commence upon receipt of submittal by ENGINEER.

## SECTION 01300

### SUBMITTALS

3. Review of Shop Drawings (Including Working Drawings and Product Data) and Samples
  - a. The review of shop drawings, working drawings, data and samples will be for general conformance with the design concept and Contract Documents. 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.
  - b. The CONTRACTOR remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.
  - c. If the shop drawings (including working drawings and product data) or samples as submitted describe variations and indicate a deviation from the Contract requirements that, in the opinion of the ENGINEER are in the interest of the OWNER and are so minor as not to involve a change in Contract Price or Contract Time, the ENGINEER may return the reviewed drawings without noting an exception.
  - d. Only the ENGINEER will utilize the color "RED" in marking submittals.
  - e. Shop drawings will be returned to the CONTRACTOR with one of the following codes:
    - 1) Code 1 – "APPROVED" – This code is assigned when there are no notations or comments on the submittal. When returned under this code the CONTRACTOR may release the equipment and/or material for manufacture.
    - 2) Code 2 – "APPROVED AS NOTED" – This code is assigned when a confirmation of the notations and comments IS NOT required by the CONTRACTOR. The CONTRACTOR may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.
    - 3) Code 3 – "APPROVED AS NOTED/CONFIRM" – This combination of codes is assigned when a confirmation of the notations and comments is required by the CONTRACTOR. The CONTRACTOR may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by the ENGINEER, within 15 calendar days of the date of the ENGINEER's transmittal requiring the confirmation.
    - 4) Code 4 – "APPROVED AS NOTED/RESUBMIT" – This combination of codes is assigned when notations and comments are extensive enough to require a resubmittal of the entire package. This resubmittal is to address all comments, omissions and non-conforming items that were noted. Resubmittal is to be received by the ENGINEER within 30 calendar days of the date of the ENGINEER's transmittal requiring the resubmittal.

## SECTION 01300

### SUBMITTALS

- 5) Code 5 – “NOT APPROVED/RESUBMIT” – This code is assigned when the submittal does not meet the intent of the contract documents. The CONTRACTOR must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the requirements of the contract documents.
  - 6) Code 6 – “REVIEWED” – This code is assigned to acknowledge receipt of a submittal that is not subject to the ENGINEER’s review and approval and is being filed for informational purposes only or the submittal contains signed and sealed drawings or calculations from another engineer.
  - 7) Codes 7 – “REVIEWED/RESUBMIT” – This code is assigned to a submittal that is incomplete or does not meet the intent of the contract documents. The CONTRACTOR must resubmit the entire package revised to bring the submittal into conformance.
4. Electronic Transmission
- a. ACTION SUBMITTALS may be transmitted by electronic means provided the following conditions are met:
    - 1) The above-specified transmittal form is included.
    - 2) All other requirements specified above have been met including, but not limited to, coordination by the CONTRACTOR, review and approval by the CONTRACTOR, and the CONTRACTOR’s Certification.
    - 3) The submittal contains no pages or sheets larger than 11 x 17 inches.
    - 4) With the exception of the transmittal sheet, the entire submittal is included in a single file.
    - 5) The electronic files are PDF format (with printing enabled).
    - 6) In addition, transmit three hard copy (paper) originals to the ENGINEER.
    - 7) The ENGINEER’s review time will commence upon receipt of the hard copies of the submittal.
    - 8) Submittals that require certification, corporate seal, or professional embossment (i.e. P.E.’s, Surveyors, etc.) transmit at least two hard-copy originals to the ENGINEER. In addition, provide additional photocopied or scanned copies, as specified above, showing the required certification, corporate seal, or professional seal.
- B. Informational Submittals
1. CONTRACTOR’s Responsibilities
    - a. Number of copies: Submit three copies, unless otherwise indicated in individual Specification sections.
    - b. Refer to individual technical Specification Sections for specific submittal requirements.
  2. Engineer’s Responsibilities
    - a. The ENGINEER will review each informational submittal within 10 days. If the informational submittal complies with the Contract requirements, ENGINEER will file for the project record and transmit a copy to the

## SECTION 01300

### SUBMITTALS

- OWNER. ENGINEER may elect not to respond to CONTRACTOR regarding informational submittals meeting the Contract requirements.
- b. If an informational submittal does not comply with the Contract requirements, ENGINEER will respond accordingly to the CONTRACTOR within 15 days. Thereafter, the CONTRACTOR shall perform the required corrective action, including retesting, if needed, until the submittal, in the opinion of the ENGINEER, is in conformance with the Contract Documents.
3. Electronic Transmission
- a. INFORMATIONAL SUBMITTALS may be transmitted by electronic means providing all of the following conditions are met:
    - 1) The above-specified transmittal form is included.
    - 2) The submittal contains no pages or sheets larger than 11 x 17 inches.
    - 3) With the exception of the transmittal sheet, the entire submittal is included in a single file.
    - 4) The electronic files are PDF format (printing enabled).
    - 5) Submittals that require certification, corporate seal, or professional embossment (i.e. P.E.'s, Surveyors, etc.) transmit two hard-copy originals to the ENGINEER.

END OF SECTION 01300



SECTION 01300

SUBMITTALS

ATTACHMENT A

Professional Design Services Performance Certification

1. My name is \_\_\_\_\_

2. My Florida State Professional Engineering License number is \_\_\_\_\_

3. My license expires \_\_\_\_\_, \_\_\_\_\_

4. The Project for which I have performed professional design services is described as:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. The Specification Section(s) under which I have performed my services is/are:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. The name and address of the individual or entity for whom I have performed my professional design services is:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

SECTION 01300

SUBMITTALS

ATTACHMENT A (continued)

Professional Design Services Performance Certification (continued)

7. I hereby certify that, to the best of my knowledge, information and belief, I have performed or supervised the performance of the professional design services hereunder, and that said services have been performed in accordance with all applicable local, state and federal codes, rules and regulations and in accordance with the standard of care currently expected of professional engineers/architects performing similar services for projects of similar size and complexity in the State of Florida.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Typed or Printed Name

\_\_\_\_\_  
Name of Firm

\_\_\_\_\_  
Street Address

[ SEAL] \_\_\_\_\_  
City/State/Zip Code

Telephone: \_\_\_\_\_

Fax: \_\_\_\_\_

## SECTION 01310

### CONSTRUCTION SCHEDULING

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

- A. A Critical Path Method (CPM) construction schedule shall be used to control the work of this Contract and to provide a definitive basis for determining job progress. The construction schedule shall be prepared and maintained by the CONTRACTOR/TANK CONTRACTOR. All work shall be done in accordance with the established CPM schedule; and, the CONTRACTOR and all SUBCONTRACTORS shall be responsible for cooperating fully in effectively utilizing the CPM schedule.
  - 1. The CONTRACTOR shall coordinate with the electrical CONTRACTOR and tank CONTRACTOR on the project schedule throughout the duration of the project.
- B. The CPM schedule to be prepared and submitted by the CONTRACTOR shall consist of a CPM network (diagram of activities), a computer-generated schedule (print-out), and reports as specified herein.
- C. Computer-based schedule shall be completed in either Oracle-Primavera, P6 Profession Project Management, or Microsoft Project.

##### 1.02 QUALIFICATIONS

- A. The CONTRACTOR shall have the capability of preparing and utilizing the specified CPM scheduling technique. A written statement of CPM capability shall be submitted by the successful bidder that will verify 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/her consultant has successfully applied the CPM scheduling technique and which were 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.

##### 1.03 NETWORK REQUIREMENTS

- A. The network of activities shall show the order and inter-dependence of activities and the sequence in which the work is to be accomplished as planned by the CONTRACTOR. The basic concept of a network analysis diagram shall be followed to show how the start of a given activity is dependent on the completion of preceding activities and its completion restricts the start of following activities.
- B. Detailed network activities shall include: the procurement of major materials and equipment, fabrication of materials and equipment and their delivery, construction activities, installation and testing, start-up and training. Break the work into activities with durations no longer than 20 working days each, except as to non-construction activities (such as procurement of materials and delivery of equipment) and any other activities for which the ENGINEER may concur showing longer duration. To the

## SECTION 01310

### CONSTRUCTION SCHEDULING

extent feasible, activities related to a specific physical area of the work shall be grouped on the network for ease of understanding and simplification.

- C. Separate activities shall be provided for each significant identifiable function in each trade area in each facility. Activities shall be so identified to clearly indicate the work included in each activity.
- D. Each activity on the network shall have the following indicated:
  - 1. Unique activity identification number
  - 2. Activity description
  - 3. Original duration
  - 4. Remaining duration
  - 5. Early start date
  - 6. Early finish date
  - 7. Late start date
  - 8. Late finish date
  - 9. Total float
- E. The selection and number of activities shall be subject to the ENGINEER's approval.
- F. The ENGINEER's review will only be for conformance with the Contract time and those sequences of work indicated in or required by the contract documents. After review, the ENGINEER will return the CPM schedule submittal to the CONTRACTOR as either "Amend and Resubmit" or "No Exceptions Taken". Submittal stamped as "No Exceptions Taken" will represent the most-current Contract Schedule as of the date of the submittal. Neither the ENGINEER's review of a CPM Schedule, nor the ENGINEER's statement of "No Exceptions Taken", will relieve the CONTRACTOR from responsibility for complying with the Contract Time required by the Contract Documents, or from completing any omitted Work within the Contract Time(s).

#### 1.04 SUBMITTALS

- A. Submit as per Section 01300. Each computer-generated schedule submittal from the CPM activity network shall include the following minimum items:
  - 1. Activity details (specified in Paragraph 1.03 D)
  - 2. Graphic presentation of the CPM network
  - 3. Project information
  - 4. Schedule shall show the following:
    - a. Duration
    - b. Start date (effective date of the Notice to Proceed)
    - c. Fixed milestones (completion dates)
    - d. Floating milestones (phasing or staging goals, as specified)
    - e. Special construction sequences, as specified
    - f. Substantial and final completion
    - g. Identify the critical path
    - h. Identify work calendar (work days vs. calendar days)
    - i. Allowances for normal weather
    - j. Holidays to be observed by the CONTRACTOR's workforce

## SECTION 01310

### CONSTRUCTION SCHEDULING

- B. Each schedule submitted shall include the following reports:
  1. List of Activities (sorted by activity number)
  2. Early Start
  3. Total Float
  4. Predecessors/Successors

#### 1.05 IMPLEMENTATION SCHEDULE

- A. Within 15 days following the receipt of the Notice to Proceed, submit an Interim Schedule indicating the planned operations during the first 60 calendar days after Notice to Proceed. The general approach for the balance of the project shall be indicated.
- B. Within 30 days following the receipt of Notice to Proceed, provide a detailed schedule showing the entire Scope of Work.
- 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. Upon acceptance of, or concurrence by the OWNER of the CONTRACTOR's Detailed Schedule, the Detailed Schedule shall be recognized as the CONTRACTOR's baseline or as-planned project schedule. The baseline or as-planned schedule shall not include any actual progress earned during its development.
- E. Once the baseline or as-planned schedule is complete, updates of the Interim Schedule shall be discontinued and subsequent schedule updates shall be based on the baseline schedule.
- F. Any requests to changes that affect the schedule for the project shall be submitted with justification and within the timelines as per SJCUD general conditions.

#### 1.06 PROGRESS REPORTING

- A. CONTRACTOR shall submit monthly status reports (updates) of the CPM schedule. At each monthly progress meeting, the CONTRACTOR and ENGINEER shall meet at the jobsite and jointly evaluate the status of each activity on which work has started or is due to start, based on the preceding CPM schedule; to show actual progress, to identify those activities started and those completed during the previous period, to show the estimated time required to complete or the percent complete of each activity started but not yet completed and to reflect any changes indicated for the network. Activities shall not be considered to be complete until they are, in fact, 100 percent complete.

## SECTION 01310

### CONSTRUCTION SCHEDULING

- B. At each progress meeting, submit a narrative report based on the CPM schedule evaluation described above, in a format agreed upon by the CONTRACTOR and the ENGINEER. The report shall include a description of the progress during the previous period in terms of completed activities, an explanation of each activity which is showing a delay, a description of problem areas, current and anticipated delaying factors and their estimated impact on performance of other activities and completion dates and an explanation of corrective action taken or proposed. This report, as well as the CPM Status Report, will be discussed at each progress meeting.

#### 1.07 RESPONSIBILITY FOR SCHEDULE COMPLIANCE

- A. Whenever it becomes apparent from the current CPM schedule and CPM Status Report that delays to the critical path have resulted and the contract completion date will not be met, or when so directed by the ENGINEER, take some or all of the following actions at no additional cost to the OWNER. Submit to the ENGINEER for approval, a written statement of the steps intended to take to remove or arrest the delay to the critical path in the approved schedule.
  1. Increase construction manpower in such quantities and crafts as will substantially eliminate the backlog of work.
  2. Increase the number of working hours per shift, shifts per day, working days per week, the amount of construction equipment, or any combination of the foregoing, sufficiently to substantially eliminate the backlog of work.
  3. Reschedule activities to achieve maximum practical concurrence of accomplishment of activities and comply with the revised schedule.
- B. If when so requested by the ENGINEER, failure to submit a written statement of the steps intended to take or should fail to take such steps as approved by the ENGINEER, the ENGINEER may direct the CONTRACTOR to increase the level of effort in man-power (trades), equipment and work schedule (overtime, weekend and holiday work, etc.) to be employed by the CONTRACTOR in order to remove or arrest the delay to the critical path in the approved schedule and the CONTRACTOR shall promptly provide such level of effort at no additional cost to the OWNER.

#### 1.08 ADJUSTMENT OF CONTRACT SCHEDULE AND COMPLETION TIME

- A. If the CONTRACTOR desires to make changes in his/her method of operating which affect the current contract CPM schedule, the CONTRACTOR shall notify the ENGINEER in writing stating what changes are proposed and the reason for the change. After the ENGINEER reviews the changes, the CONTRACTOR shall revise and submit the network schedule, without additional cost to the OWNER, all of the affected portions of the CPM network. The CPM schedule shall be adjusted by the CONTRACTOR only after prior review of his/her proposed changes by the ENGINEER. Adjustments may consist of changing portions of the activity sequence, activity durations, division of approved activities, or other adjustments. The addition of extraneous, non-working activities and activities which add unapproved restraints to the CPM schedule are not allowed.
- B. If the completion of any activity, whether or not critical, falls more than 100 percent behind its current schedule duration, submit a schedule adjustment showing each such activity divided into two activities reflecting completed versus uncompleted work.

## SECTION 01310

### CONSTRUCTION SCHEDULING

- C. Shop drawings which are not approved on the first submittal or within the schedule time and equipment which do not pass the specified tests shall be immediately rescheduled.
- D. 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/she shall furnish such justification and supporting evidence as the ENGINEER may deem necessary to determine whether the CONTRACTOR is entitled to an extension of time under the provisions of this Contract. The 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, the ENGINEER's determination as to the total number of days extension shall be based upon the current contract CPM schedule and on all data relevant to the extension. Such data shall be included in the next updating of the schedule. Actual delays in activities which, according to the CPM schedule, do not affect any contract completion date shown by the critical path in the network will not be the basis for a change therein.
- E. Each request for change in any contract completion date shall be submitted by the CONTRACTOR to the ENGINEER within 30 days after the beginning of the delay for which a time extension is requested but before the date of final payment under this Contract. No time extension will be granted for requests which are not submitted within the foregoing time limit.
  - 1. From time to time it may be necessary for the contract schedule or completion time to be adjusted by the OWNER to reflect the effects of job conditions, unusual weather, technical difficulties, strikes, unavoidable delays on the part of the OWNER or its representatives and other unforeseeable conditions which may indicate schedule adjustments or completion time extensions. Under such conditions, the ENGINEER will direct the CONTRACTOR to reschedule the work or contract completion time to reflect the changed conditions and the CONTRACTOR shall revise his/her schedule accordingly. No additional compensation will be made to the CONTRACTOR for such schedule changes except for unavoidable overall contract time extensions beyond the actual completion of all unaffected work, in which case the CONTRACTOR shall take all possible action to minimize any time extension and any additional cost to the OWNER. Available float time in the CPM schedule may be used by the OWNER as defined by the ENGINEER, as well as by the CONTRACTOR.
- F. The OWNER controls the float time in the contract CPM network and, therefore, without obligation to extend either the overall completion date or any intermediate completion dates set out in the CPM network, the OWNER may initiate changes to the work that absorb float time only. OWNER initiated changes that affect the critical path on the approved CPM network shall be the sole grounds for extending (or contracting) said completion dates. CONTRACTOR- initiated changes that encroach on the float time identified in the approved CPM network may be accomplished with the OWNER's concurrence. Such changes, however, shall give way to OWNER-initiated changes competing for the same float time.

END OF SECTION 01310

## SECTION 01370

### SCHEDULE OF VALUES AND SCHEDULE OF ASSETS

#### PART 1 – GENERAL

##### 1.01 REQUIREMENTS INCLUDED

- A. Submit to the ENGINEER a schedule of values and schedule of assets allocated to the various portions of the Work, within 14 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. The schedule of values, unless objected to by the ENGINEER, shall be used only as the basis for the CONTRACTOR's applications for payment.

##### 1.02 RELATED REQUIREMENTS

- A. Standard General Conditions of the Construction Contract are included in the Front End Documents.

##### 1.03 FORM AND CONTENT OF SCHEDULE OF VALUES

- A. Type schedule on an 8-1/2-inch x 11-inch or 8-1/2-inch x 14-inch white paper furnished by the OWNER; CONTRACTOR's standard forms and automated printout will be considered for approval by the ENGINEER upon CONTRACTOR's request. Identify schedule with:
  - 1. Title of Project and location.
  - 2. ENGINEER and Project number.
  - 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, also list sub-values of major products or operations.
- 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. The sum of all values listed in the schedule shall equal the total Contract Sum.



SECTION 01370

SCHEDULE OF VALUES AND SCHEDULE OF ASSETS

- G. Any items on the bid form denoted as allowances shall be accompanied with actual receipts showing the actual costs. The OWNER will only reimburse the CONTRACTOR for actual costs incurred and shall not include any additional markups. All remaining unused allowance amounts will be returned to the OWNER at the end of construction.
- H. Any items on the bid form denoted as unit price items shall be field verified by the ENGINEER and/or RPR for each payment application. All remaining unused portions of each unit price item will be returned to the OWNER at the end of construction.

1.04 SUBSCHEDULE OF UNIT MATERIAL VALUES

- A. Submit a sub-schedule of unit costs and quantities for:
  - 1. Products on which progress payments will be requested for stored products.
- B. The form of submittal shall parallel that of the Schedule of Values, with each item identified the same as the line item in the Schedule of Values.
- C. The unit quantity for bulk materials shall include an allowance for normal waste.
- D. The unit values for the materials shall be broken down into:
  - 1. Cost of the material, delivered and unloaded at the site, with taxes paid.
  - 2. Copies of invoices for component material shall be included with the payment request in which the material first appears.
- E. The installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values.

1.05 FORM AND CONTENT OF SCHEDULE OF ASSET VALUES

- A. For each asset listed, provide a constructed cost which will include an allocation of construction activities including but not limited to, demolition, sitework, specialties, materials, labor, general conditions, and overhead and profit associated with the construction of the asset.
- B. The combined value of the assets will equal the bid price for the project and will require adjustments as necessary due to change orders. The schedule of asset values will be updated on a monthly basis and will be included in the monthly pay request application for approval.
- C. The OWNER reserves the right to edit this list prior to the first pay application and may add up to 10 percent more items than have been identified in the list.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01370

## SECTION 01390

### CONSTRUCTION PHOTOGRAPHS AND VIDEOTAPING

#### PART 1 – GENERAL

##### 1.01 REQUIREMENTS INCLUDED

- A. CONTRACTOR and TANK CONTRACTOR shall provide competent photographer to take preconstruction video and photographs throughout the project.

##### 1.02 PHOTOGRAPHY REQUIRED

- A. A preconstruction video is required to be taken within four weeks prior to the start of construction. The preconstruction video is required to document the existing site conditions including CR 208 and Agricultural Center Drive to establish a baseline for the existing conditions. The preconstruction video shall be on DVD format and will provide the date and time of the video on the recording during playback. They should be submitted to the OWNER and ENGINEER for review.
- B. Views and quantities for photography shall include:
  - 1. All photography shall be digitally produced and electronically maintained. Provide the electronic copies of photos to the ENGINEER and OWNER.
  - 2. Photographer shall agree to furnish additional prints to CONTRACTOR and OWNER at commercial rates applicable at time of purchase. Photographer shall also agree to participate as required in any litigation requiring the photographer as an expert witness.
  - 3. The photographer shall provide the electronic records of the digital photographs to CONTRACTOR and OWNER with copyrights assigned to the OWNER.

##### 1.03 COSTS OF PHOTOGRAPHY

- A. The CONTRACTOR shall pay costs for specified photography and prints. Additional prints beyond those specified here shall be charged to interested party.

##### 1.04 OWNERSHIP OF PROPERTY

- A. Upon receipt of the photographs, the OWNER will be deemed owner of the photographs.

#### PART 2 – PRODUCTS

##### 2.01 PHOTOGRAPHS AND VIDEOS

- A. Color
  - 1. Paper: Single weight, color print paper.
  - 2. Finish: Smooth surface glossy.
  - 3. Photograph Size: 8½-inch x 11-inch

## SECTION 01390

### CONSTRUCTION PHOTOGRAPHS AND VIDEOTAPING

- B. Provide properly labeled CDs with electronic records of all photographs with identification for exposure number, orientation of view, and date of exposure.

#### PART 3 – EXECUTION

##### 3.01 TECHNIQUE

- A. Factual presentation
- B. Correct exposure and focus
  1. High resolution and sharpness
  2. Maximum depth-of-field
  3. Minimum distortion

##### 3.02 AUDIOVISUAL RECORDING

- A. The recordings shall contain coverage of all surface features within the construction zone of influence. These features shall include, but not be limited to, all features of existing utilities and structures within the SJC right-of-way and County property, landscaping and landscape buffer area, trees, and fences. Of particular concern shall be the existence or non-existence of any faults, fractures or defects.
- B. Video coverage shall include all surface conditions located within the zone of influence supported by appropriate audio description. Panning, zoom-in and zoom-out rates shall be sufficiently controlled to maintain a clear view of the object.
- C. Accompanying the video recording of each video tape shall be a corresponding and simultaneously recorded audio recording. This audio recording, exclusively containing the commentary of the camera operator, shall assist in viewer orientation and in any needed identification, differentiation, clarification, or objective description of the features being shown in the video portion of the recording. The audio recording shall also be free from any conversation between the camera operator and any other production technicians.
- D. Visibility: All recording shall be performed during times of good visibility; no recording shall be done during periods of significant precipitation, mist or fog. The recording shall only be done when sufficient sunlight is present to properly illuminate the subject and to produce sharp, bright video recordings of those subjects.
- E. In order to ensure the continuity of coverage, the coverage shall consist of a single continuous unedited recording which begins at one end of the construction area.
- F. The average rate of travel during a particular segment of coverage shall be directly proportional to the number, size, and value of the surface features within that construction area's zone of influence.

SECTION 01390

CONSTRUCTION PHOTOGRAPHS AND VIDEOTAPING

G. Camera Operation

1. Camera Height and Stability: When conventional wheeled vehicles are used as conveyances for the recording system, the vertical distance between the camera lens and the ground shall not exceed 10 feet. The camera shall be firmly mounted such that transport of the camera during the recording process will not cause an unsteady picture.
2. Camera Control: Camera pan, tilt, zoom-in and zoom-out rates shall be sufficiently controlled such that recorded objects shall be clearly viewed during video tape playback. In addition, all other camera and recording system controls, such as lens focus and aperture, video level, pedestal, white balance and electrical focus shall be properly controlled or adjusted to maximize picture quality.
3. Viewer Orientation Techniques: The audio and video portions of the recording shall maintain viewer orientation. To this end, overall establishing views of all visible house and business addresses shall be utilized. In areas where the proposed construction location will not be readily apparent to the video tape viewer, highly visible yellow flags shall be placed, by the CONTRACTOR, in such a fashion as to clearly indicate the proposed center line of construction.

END OF SECTION 01390

## SECTION 01410

### TESTING AND TESTING LABORATORY SERVICES

#### PART 1 – GENERAL

##### 1.01 REQUIREMENTS INCLUDED

- A. The CONTRACTOR and tank CONTRACTOR will employ and pay for the services of an independent testing laboratory to perform testing specifically indicated in the Contract Documents. This testing includes all required testing to determine soil/density, concrete compressive strength, asphalt testing, and reinforcement testing.
  - 1. CONTRACTOR(S) shall cooperate with the laboratory to facilitate the execution of its required services.
- B. The OWNER will reimburse the CONTRACTOR(S) for the costs of all passing laboratory tests from the laboratory based on actual invoices. Failed tests will be back-charged to the CONTRACTOR(S) at the time of final payment. All required testing shall be coordinated with and scheduled by the CONTRACTOR(S).
- C. Payment shall be made from the testing allowance shown in the Bid Form. Any costs for coordination of these efforts, markups, or incidentals by the CONTRACTOR(S) shall be included in the CONTRACTOR'S bid and will not be allowed as part of the allowance.
- D. SJCUD will be responsible for any required water quality testing and bacteriological clearance of water mains and or other potable water components.

##### 1.02 RELATED REQUIREMENTS

- A. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities.
- B. Respective sections of specifications: Certification of products.
- C. Each specification section listed: Laboratory tests required, and standards for testing.
- D. Testing Laboratory inspection, sampling and testing is required for but not limited to the following:
  - 1. Section 02100: Site Preparation
  - 2. Section 02220: Excavating, Backfilling, and Grading for Structures
  - 3. Section 02221: Trenching, Bedding, and Backfill for Pipes, and Site Earthwork
  - 4. Section 02400: Graded Aggregate Base
  - 5. Section 02610: Site Drainage
  - 6. Section 03300: Cast-in-Place Concrete
  - 7. Section 13216: Wire Wrapped Prestressed Concrete Tank

##### 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.

## SECTION 01410

### TESTING AND TESTING LABORATORY SERVICES

2. Approve or accept any portion of the Work.
3. Perform any duties of the CONTRACTOR(S).

#### 1.04 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel and 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 material mixes which require control by the testing laboratory.
- D. Materials and equipment used in the performance of work under this Contract are 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(S) 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(S), 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 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.
  2. All testing shall be coordinated by the CONTRACTORS and all testing shall be witnessed by the RPR or OWNER's Representative.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01410

## SECTION 01465

### EQUIPMENT TESTING AND STARTUP

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

- A. The CONTRACTOR and ELECTRICAL CONTRACTOR shall provide a competent field services technician of the manufacturers of all equipment furnished under Divisions 11, 15, and 16 to supervise installation, adjustment, initial operating and testing, performance testing, final acceptance testing and startup of the equipment.

##### 1.02 RELATED WORK

- A. Submittals are included in Section 01300.
- B. Operation and maintenance data is included in Section 01730.
- C. Performance and acceptance testing and startup requirements are included in the respective sections of Division 11, 15 and 16.

##### 1.03 SUBMITTALS

- A. The CONTRACTOR and ELECTRICAL CONTRACTOR shall provide the name, address, and resume of proposed field services technicians at least 30 days in advance of the need of such services.
- B. Submit, in accordance with Section 01300, detailed testing procedures for shop tests, field performance tests, and final acceptance tests as specified in various equipment specifications.
- C. Submittals shall include at a minimum the following:
  - 1. Testing schedule including proposed dates and times of testing.
  - 2. Summary of power, lighting, chemicals, water, sludge, gas, etc. needs and identification of who will provide them.
  - 3. Outline specific assignments of the responsibilities of the CONTRACTOR and ELECTRICAL CONTRACTOR and manufacturer's factory representative or field personnel.
  - 4. Detailed description of step-by-step testing requirements with reference to appropriate standardized testing procedures and laboratory analyses by established technical organizations (e.g. ASTM, Standard Methods, etc.)
  - 5. Sample of forms that will be used to collect and record test data and to present tabulated test results.
- D. Provide copies of all final testing reports including field, shop, performance, and acceptance testing.

##### 1.04 QUALITY ASSURANCE

- A. Field service technicians shall be competent and experienced in the proper installation, adjustment, operation, testing, and startup of the equipment and systems being installed.

## SECTION 01465

### EQUIPMENT TESTING AND STARTUP

- B. Manufacturer's sales and marketing personnel will not be accepted as field service technicians.

#### PART 2- GENERAL (NOT USED)

#### PART 3- EXECUTION

##### 3.01 PRELIMINARY REQUIREMENTS

- A. After installation of the equipment has been completed and the equipment is presumably ready for operation, before it is operated by others, the manufacturer's field service technician shall inspect, operate, test and adjust the equipment. The inspection shall include at least the following points where applicable:
  1. Soundness (without crack or otherwise damaged parts).
  2. Completeness in all details and as specified and required.
  3. Correctness of setting, alignment, and relative arrangement of various parts.
  4. Adequacy and correctness of packing, sealing, and lubricants.
- B. Upon completion of this work, the manufacturer's field service technician shall submit a signed report of his/her inspection, operation, adjustments, and tests.

##### 3.02 WITNESS REQUIREMENTS

- A. Shop tests or factory tests may be witnessed by the OWNER and/or ENGINEER, as required by the various equipment specifications. Factory test reports must be provided and approved prior to shipment of any equipment to the site.
- B. Field performance and acceptance tests shall be performed in the presence of the OWNER and/or ENGINEER.

##### 3.03 STARTUP AND ACCEPTANCE OF THE WORK

- A. General requirements
  1. Successfully execute the step-by-step procedure of startup and performance demonstration specified herein.
  2. The startup and performance demonstration shall be successfully executed prior to Substantial Completion and acceptance by the OWNER of the booster station and GST installation and related systems.
  3. All performance tests and inspections shall be scheduled at least 5 working days in advance or as otherwise specified by the OWNER and the ENGINEER. All performance tests and inspections shall be conducted during the work week of Monday through Thursday, unless otherwise specifically authorized.
  4. CONTRACTOR shall coordinate and schedule with ELECTRICAL CONTRACTOR on all startup activities, testing, and acceptance of work.
- B. Preparation for Startup
  1. Upon completion of the installation of the Work, all related systems shall be flushed with potable water and hydraulically water tightness tested for 24 hours and checked for leaks, cracks, and defects. Refer to Section 03300



## SECTION 01465

### EQUIPMENT TESTING AND STARTUP

2. Paragraph 3.15 H for additional requirements related to watertightness testing of structures.
  3. All mechanical and electrical equipment shall be checked to ensure that it is in good working order and properly connected. Preliminary run-ins of the pumps, fans, and other remaining equipment shall be made. Each equipment manufacturer shall certify the system is ready for operation. All systems shall be cleaned and purged as required. All sumps, tanks, basins, chambers, pump wells, and pipelines which are hydraulically checked shall be drained and returned to their original condition once the testing is completed.
  4. All instruments and controls shall be calibrated through their full range. All other adjustments required for proper operation of all instrumentation and control equipment shall be made.
  5. No testing or equipment operation shall take place until it has been verified by the ENGINEER that all specified safety equipment has been installed and is in good working order.
- C. Facilities Startup
1. Startup period shall not begin until all new equipment have been tested as specified and are ready for operation. The OWNER shall receive spare parts, safety equipment, tools, and maintenance equipment, lubricants, and approved O&M manuals prior to startup. All valve tagging shall also be completed prior to startup.
  2. **All instrumentation and SCADA shall be tested and able to operate completely in automatic mode.** Perform field operational tests including all SCADA and automatic functions prior to startup. This shall be implemented and demonstrated to confirm that the station is ready to begin the 5-day operational test required for substantial completion. Operation is "hand" without all instruments, SCADA, and controls in place is not an acceptable means to dictate startup. All programming and controls shall be performed by an OWNER approved Instrumentation System Supplier (ISS).
  3. In the event of failure to demonstrate satisfactory performance of the facility on the first or any subsequent attempt, all necessary alterations, repairs, and replacements shall be made. When the facility is again ready for operation, it shall be brought on line, and a new test shall be started. This procedure shall be repeated until the facility has operated continuously to the satisfaction of the OWNER and ENGINEER for the specified duration.
  4. The OWNER will furnish all operating personnel (other than vendor's or subcontractor's) needed to operate equipment during the testing period; however, said personnel will perform their duties under the CONTRACTOR'S direct supervision. Until the performance testing is completed, and units and systems are accepted by the OWNER as substantially complete, the CONTRACTOR shall be fully responsible for the operation and maintenance of the facilities.
  5. The OWNER will provide all water and electricity required for the testing. However, the CONTRACTOR shall provide all necessary personnel (field, vendor, subcontractors) on an 8 hour per day basis at the facilities on a 24 hour per day basis locally during the startup period. All chemicals for performance testing and startup shall be provided by the OWNER. Major equipment suppliers shall include, but not be limited, to the following:
    - a. Vertical turbine can pumps
    - b. HVAC system

SECTION 01465

EQUIPMENT TESTING AND STARTUP

- c. Electrical equipment including generator and ATS
  - d. Instrumentation and control equipment
6. Do not, at any time during startup, allow for the facility to be operated in a manner which subjects equipment to conditions that are more severe than the maximum allowable operating conditions for which the equipment was designed.

END OF SECTION 01465

## SECTION 01500

### TEMPORARY FACILITIES

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

- A. This Section includes general requirements relating to CONTRACTOR's (including tank CONTRACTOR and electrical CONTRACTOR) responsibilities for temporary construction facilities.

##### 1.02 CONSTRUCTION FACILITIES

- A. General
  1. Temporary facilities and protective devices include, but are not necessarily limited to, temporary barricades, fences, bridges, guards, temporary utilities, steel plates over trenches, maintenance of traffic, project identification signs, and construction of haul roads.
  2. Use materials of size, shape, and strength suitable for intended use, in construction of the above.
  3. Conduct construction operations to cause least inconvenience possible to the County staff and ENGINEER.
  4. Where required, erect and maintain signs, fences, barricades, and pedestrian bridges, and supply guards and flagmen for protection of public.
  5. Obtain ENGINEER's approval before transporting or locating temporary facilities within construction site.
  6. All facilities must comply and be installed as per the Florida Building Code latest edition.
- B. Temporary Fencing
  1. Furnish and construct, as required, to fence off excavation, storage, and operating areas.
  2. Erect suitably constructed temporary fences, neat in appearance, and meeting ENGINEER's approval.
  3. Unless otherwise indicated, fences shall be 6-feet high.
- C. Barricades
  1. Barricade or close openings in roadways, floors, walls, or other parts of structures or walkways while openings are not in regular use.
  2. Use barricades that are structurally sound, suitable for intended use, neat in appearance, and of size and arrangement, as approved by the ENGINEER.
- D. Field Office Facilities for the CONTRACTORS
  1. An office trailer is not required but will be allowed should the CONTRACTORS prefer. If preferred, the CONTRACTORS shall furnish adequate field office facilities for his own use during the execution of this Contract.
  2. Pay for installation, maintenance, and monthly electric service, internet, and telephone charges in this office.
  3. Pay for installation, maintenance, and monthly service charges for potable water and toilet facilities for this office.
  4. Provide portable UL-rated, Class A fire extinguishers for site offices and similar spaces. In other locations, provide portable UL-rated Class ABC dry chemical extinguishers or a combination of NFPA recommended classes for the

## SECTION 01500

### TEMPORARY FACILITIES

exposure. Comply with NFPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.

#### 1.03 TEMPORARY UTILITIES

- A. Water
  - 1. The OWNER shall furnish potable water required during entire construction period for the contract at no cost to the CONTRACTOR.
  - 2. CONTRACTOR shall make the necessary arrangements for connection, provide all piping, backflow devices, and appurtenances required.
  - 3. Assure the availability of drinking water for his work force.
  - 4. Provide temporary pumps, tanks and compressors as necessary to produce required pressures.
  
- B. Electricity: Each CONTRACTOR shall make necessary arrangements and pay for all temporary electric service and lighting required during construction period. The CONTRACTOR shall pay costs for temporary power and used during construction period through the date of Contract final completion.
  - 1. Ensure electric service of sufficient capacity and characteristics to supply proper current for various types of construction tools, motors, welding machines, light, heating plant, pumps, testing, and other work required.
  - 2. Install necessary temporary wiring, panelboards, outlets, switches, lamps, fuses, controls and accessories.
  
- C. Toilets: Maintain adequate number of temporary prefabricated chemical type toilets, unless otherwise indicated, with proper enclosures for use of workers during construction.
  - 1. Locate toilets where directed.
  - 2. Keep toilets clean and comply with local and State health requirements and sanitary regulations.
  - 3. Keep locked during non-working hours.
  
- D. Communications
  - 1. Provide DSL phone line or T1 cable line with internet access or wireless cable as an alternative for the duration of the project.
  - 2. Pay all costs for installation, maintenance, and removal of the telephone and internet service and instruments, including cellular phone service. The monthly cost of all calls made and received by the CONTRACTOR and Subcontractors, including long distance calls, shall be paid for by the CONTRACTOR for the duration of the project.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01500

## SECTION 01501

### CONTROL OF WORK

#### PART 1 – GENERAL

##### 1.01 PLANT

- A. The CONTRACTOR, electrical CONTRACTOR, and tank CONTRACTOR shall furnish personnel and equipment which will be efficient, appropriate and large enough to secure a satisfactory quality of work and a rate of progress which will ensure the completion of the work within the time stipulated in the Proposal. If any time such personnel appears 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 CONTRACTORS to increase the efficiency, change the character or increase the personnel and equipment, and the CONTRACTORS shall conform to such order. Failure of the ENGINEER to give such order shall in no way relieve the CONTRACTORS of his obligations to secure the quality of the work and rate of progress required.

##### 1.02 PRIVATE LAND

- A. The CONTRACTORS shall not enter or occupy private land outside of easements, except by permission of the OWNER.

##### 1.03 PIPE LOCATIONS

- A. Pipelines 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 CONTRACTORS shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access to private property during construction shall be removed when no longer required. The length of open trench will be controlled by the surrounding conditions but shall always be confined to the limits prescribed by the ENGINEER. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, the ENGINEER may require special construction procedures such as limiting the length of open trench, prohibiting stacking excavated material in the street, and requiring that the trench shall not remain open overnight.
- B. The CONTRACTORS 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.

## SECTION 01501

### CONTROL OF WORK

#### 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 CONTRACTORS as required to complete the work and/or at the direction of the ENGINEER. 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 MAINTENANCE OF TRAFFIC

- A. The CONTRACTORS shall always maintain roadways for emergency vehicles.
- B. The CONTRACTOR shall follow an established MOT plan for tie-in work along CR-208 and Agricultural Center Drive. All MOT plans shall be approved by the ENGINEER, OWNER, and through St. Johns County ROW.

#### 1.07 CARE AND PROTECTION OF PROPERTY

- A. The CONTRACTORS shall be responsible for the preservation of all public and private property and 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 CONTRACTORS, the CONTRACTORS shall restore such property to a condition similar or equal to that existing before the damage was done, or make good the damage in other manner acceptable to the ENGINEER.

#### 1.08 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES

- A. The CONTRACTORS shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including 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 CONTRACTORS shall carefully support and protect all such structures and utilities from injury of any kind. Immediately repair any damage resulting from the construction operations.
- B. Assistance will be given to the CONTRACTORS in determining the location of existing services. The CONTRACTORS, however, shall bear full responsibility for obtaining all locations of underground structures and utilities (including existing water services, drain, and sewers). The CONTRACTORS shall maintain services to buildings and pay costs or charges resulting from damage thereto.
- C. The CONTRACTORS shall notify all utility companies in writing at least 72 hours (excluding Saturdays, Sundays and Legal holidays) before excavating in any public way.
- D. If, in the opinion of the ENGINEER, permanent relocation of a utility owned by the OWNER is required, the ENGINEER may direct the CONTRACTORS, in writing, to perform the work. Work so ordered will be paid for at the Contract unit prices or through an agreed upon change order.

## SECTION 01501

### CONTROL OF WORK

- E. Along the proposed pipe lines as indicated on the plans, the CONTRACTORS shall remove the surface materials only to such widths as will permit a trench to be excavated which will afford sufficient room for proper efficiency and proper construction. All applicable regulations shall be followed. Where sidewalks, driveways, pavements, and curb and gutter are encountered, care shall be taken to protect against fracture or disturbance beyond reasonable working limits. All fractured, broken, or disturbed surfaces shall be restored to their original condition prior to completion of the work.
- F. Lawn areas shall be left in as good or better condition as before starting the work. Where sod is to be removed, it shall be carefully restored with new sod of the same type. Solid sodding shall be placed on all slopes greater than 4:1, within 10 feet of all proposed structures and where existing sod is removed or disturbed by the work. In addition, CONTRACTORS shall restore all storm drains, culverts, inlets, and storm manholes to equal or better condition.
- G. Any fence, or part thereof, that is damaged or removed during the course of the work shall be replaced or repaired by the CONTRACTORS and shall be left in as good a condition as before the starting of the work. The manner in which the fence is repaired and replaced and the materials used shall be subject to the approval of the ENGINEER.
- H. All trees and shrubs not shown to be removed on the plans shall be protected by the CONTRACTORS at his expense. No excavated materials shall be placed so as to injure such trees and shrubs. Trees or shrubs destroyed by negligence of the CONTRACTORS or his employees shall be replaced by him with new stock of similar size and age at the sole expense of the CONTRACTORS.

#### 1.09 POTABLE WATER FOR CONSTRUCTION PURPOSES

- A. The CONTRACTOR will be allowed to use potable water without charge for construction purposes.
- B. Potable water for use in water tightness testing shall be provided to the CONTRACTOR(S) free of charge but the necessary piping and or appurtenances to provide water to the tank shall be provided by the CONTRACTOR(S). The CONTRACTOR(S) will be required to coordinate with the SJCUD on the rate and times for filling tanks to avoid causing low pressure within the system.

#### 1.10 MAINTENANCE OF FLOW

- A. The CONTRACTORS shall provide for the flow of sewers, drains and water courses interrupted during the progress of the work, and immediately cart away and remove all offensive matter. Discuss the entire procedure of maintaining existing flow with the ENGINEER at least seven (7) days prior to the interruption of any flow.

#### 1.11 CLEANUP AND DISPOSAL OF EXCESS MATERIAL

- A. During the course of the work, the CONTRACTORS shall keep the site of operations as clean and neat as possible. The CONTRACTORS shall dispose of all residue resulting from the construction work and, after the work, remove and haul away any

## SECTION 01501

### CONTROL OF WORK

surplus excavation, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operations and leave the entire site of the work in a neat and orderly condition.

- B. To prevent environmental pollution arising from the construction activities related to the performance of this Contract, the CONTRACTORS shall comply with all applicable Federal, State and local laws and regulations concerning waste material disposal, as well as the specific requirements stated in this Section and in other related sections.
- C. Disposal of excess excavated material in wetlands, stream corridors and plains is strictly prohibited even if the permission of the property OWNER is obtained. Any violation of this restriction by the CONTRACTORS or any person employed by him will be brought to the immediate attention of the responsible regulatory agencies, with a request that appropriate action be taken against the offending parties. The CONTRACTORS will be required to remove the fill and restore the area impacted at no increase in the Contract Price.

#### 1.12 GRADES, SURVEY LINES, AND PROTECTION OF MONUMENTS

- A. All work shall be constructed in accordance with the lines and grades shown on the drawings. The full responsibility for keeping alignment and grade shall rest upon the CONTRACTORS.
- B. Bench marks and base line controlling points shall be established prior to beginning work. Reference marks for lines and grades as the work progresses will be located to cause as little inconvenience to the prosecution of the work as possible. The CONTRACTORS shall so place excavation and other materials as to cause no inconvenience in the use of the reference marks provided. CONTRACTORS shall remove any obstructions placed contrary to this provision.
- C. The CONTRACTORS shall furnish and maintain, at his own expense, stakes and other such materials and give such assistance, including qualified helpers, for setting reference marks to the satisfaction of the ENGINEER. The CONTRACTORS shall check reference marks by such means, as he may deem necessary. The CONTRACTORS shall, at his own expense, establish all working or construction lines and grades as required from the reference marks and shall be solely responsible for the accuracy thereof.
- D. Property corners and survey monuments shall be preserved using care not to disturb or destroy them. If a property corner or survey monument is disturbed or destroyed during construction, whether by accident, careless work, or required to be disturbed or destroyed by construction work, said property corner or survey monument shall be restored by a land surveyor registered in the state of Florida. All costs for this work shall be paid for by the CONTRACTORS.

#### PART 2 – PRODUCTS (NOT USED)



## SECTION 01501

### CONTROL OF WORK

#### PART 3 – EXECUTION

##### 3.01 COOPERATION WITHIN THIS CONTRACT

- A. All firms or persons authorized to perform any work under this Contract shall cooperate with the CONTRACTOR, tank CONTRACTOR, and electrical CONTRACTOR and their 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 directed by the ENGINEER.

##### 3.02 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 CONTRACTORS 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 CONTRACTORS shall cause the same to be repaired or removed and replaced by proper 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 CONTRACTORS 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.

END OF SECTION 01501

## SECTION 01580

### PROJECT IDENTIFICATION AND SIGNS

#### PART 1 – GENERAL

##### 1.01 REQUIREMENTS

- A. The CONTRACTOR shall furnish, install and maintain project identification sign at appropriate location to provide required information.
- B. Remove sign on completion of construction.
- C. Allow no other signs to be displayed.
- D. Finishes or painting shall be adequate to resist weathering and fading for scheduled construction period.

##### 1.02 RELATED WORK

- A. Rough Carpentry is included in Section 06100.

##### 1.03 SUBMITTALS

- A. Submit in accordance with the requirements of Section 01300.

##### 1.04 PROJECT IDENTIFICATION SIGN

- A. One painted sign, of not less than 32 square feet (3 square meters) and with painted graphic content to include:
  - 1. Title of project (4-inch letters): CR-208 Ground Storage Tank and Booster Pump Station
  - 2. Name of OWNER (4-inch letters): St. Johns County Utility Department
  - 3. Name of ENGINEER (3-inch letters): Design Engineer – Mott MacDonald
  - 4. Name of CONTRACTOR (3-inch letters)
  - 5. Name of major contractors (2-inch letters)
- B. The CONTRACTOR shall coordinate with ENGINEER to obtain the OWNER's and ENGINEER's logos.
- C. Graphic design, style of lettering and colors: as approved by the OWNER and ENGINEER and subject to the approval of the local community appearance board or its equivalent and applicable local regulations for signs.
- D. The CONTRACTOR shall erect on the site at a lighted location of high visibility and adjacent to the main entrance to site as approved by OWNER.

##### 1.05 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.

## SECTION 01580

### PROJECT IDENTIFICATION AND SIGNS

#### 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 Division 9.
  - 1. Use bulletin colors for graphics.
  - 2. Colors for structure, framing, sign surfaces and graphics: As selected by the ENGINEER.

#### PART 3 – EXECUTION

##### 3.01 PROJECT IDENTIFICATION SIGN

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

##### 3.02 MAINTAINENCE

- A. Maintain signs and supports in a neat, clean condition; repair damages to structure, framing or sign.

##### 3.03 REMOVAL

- A. Remove signs, framing, supports and foundations at completion of project.

END OF SECTION 01580

## SECTION 01600

### DELIVERY, STORAGE AND HANDLING

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

- A. This Section specifies the general requirements for the delivery handling, storage and protection for all items required in the construction of the work. Specific requirements, if any, are specified with the related item.

##### 1.02 TRANSPORTATION AND DELIVERY

- A. Transportation and handling shall be in accordance with MANUFACTURER's instructions.
- B. The CONTRACTOR, TANK CONTRACTOR, and ELECTRICAL CONTRACTOR shall schedule delivery to reduce long term on-site storage prior to installation and/or operation. Under no circumstances shall equipment be delivered to the site more than two months prior to installation without written authorization from the ENGINEER. Should equipment (anything with a motor, electrical, and instrumentation) need to be stored longer than two months, an approved climate controlled storage unit shall be provided by the CONTRACTOR(S) at no additional cost to the OWNER.
- C. CONTRACTOR, TANK CONTRACTOR, and ELECTRICAL CONTRACTOR shall coordinate with OWNER and ENGINEER on pre-purchased equipment and storage requirements. The CONTRACTOR, TANK CONTRACTOR, or ELECTRICAL CONTRACTOR will be responsible for unloading and storage of all equipment including that equipment pre-purchased by the OWNER.
- D. The CONTRACTORS shall coordinate delivery with installation to ensure minimum holding time for items that are hazardous, flammable, easily damaged or sensitive to deterioration.
- E. Products shall be delivered to the site in MANUFACTURER's original sealed containers or other packing systems, complete with instructions for handling, storing, unpacking, protecting, and installing.
- F. All items delivered to the site shall be unloaded and placed in a manner which will not hamper the CONTRACTOR's normal construction operation or those of subcontractors and other contractors and will not interfere with the flow of necessary traffic.
- G. The CONTRACTORS shall provide necessary equipment and personnel to unload all items delivered to the site.
- H. The CONTRACTORS shall promptly inspect shipment to assure that products comply with requirements, quantities are correct and items are undamaged. For items furnished by others (i.e. OWNER, other Contractors), perform inspection in the presence of the OWNER's Representative. Notify ENGINEER verbally, and in writing, of any problems.

## SECTION 01600

### DELIVERY, STORAGE AND HANDLING

- I. If any item has been damaged, such damage shall be repaired at no additional cost to the OWNER.

#### 1.03 STORAGE AND PROTECTION

- A. The CONTRACTORS shall store and protect products in accordance with the MANUFACTURER's instructions, with seals and labels intact and legible. Storage instruction shall be studied by the CONTRACTORS and reviewed with the OWNER's Representative by him/her. Instruction shall be carefully followed and a written record of this kept by the CONTRACTOR(S). Arrange storage to permit access for inspection.
  1. CONTRACTOR, TANK CONTRACTOR, and ELECTRICAL CONTRACTOR shall coordinate with OWNER and ENGINEER on pre-purchased equipment.
- B. The CONTRACTORS shall store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- C. Cement and lime shall be stored under a roof and off the ground and shall be kept completely dry at all times. All structural, miscellaneous, 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. Beams shall be stored with the webs vertical. Precast concrete 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, cracking and spalling to a minimum.
- D. All mechanical and electrical equipment and instruments shall be stored in a weather tight building to prevent injury. The building may be a temporary structure on the site or elsewhere, but it must be satisfactory to the OWNER's Representative. Building shall be provided with adequate ventilation to prevent condensation. Maintain temperature and humidity within range required by MANUFACTURER.
  1. CONTRACTOR to coordinate with TANK CONTRACTOR and ELECTRICAL CONTRACTOR on storing requirements for all pre-purchased equipment and maintenance methods.
  2. CONTRACTOR to coordinate with OWNER on maintenance methods for all pre-purchased equipment.
  3. All equipment shall be stored fully lubricated with oil, grease and other lubricants unless otherwise instructed by the MANUFACTURER.
  4. Moving parts shall be rotated a minimum of once weekly to ensure proper lubrication and to avoid metal-to-metal "welding". Upon installation of the equipment, the CONTRACTORS shall start the equipment, at least half load, once weekly for an adequate period of time to ensure that the equipment does not deteriorate from lack of use.
  5. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. New lubricants shall be put into the equipment at the time of acceptance.
  6. Prior to acceptance of the equipment, the CONTRACTOR shall have the MANUFACTURER inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by

## SECTION 01600

### DELIVERY, STORAGE AND HANDLING

the MANUFACTURER shall be deemed to mean that the equipment is judged by the MANUFACTURER to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the MANUFACTURER will guarantee the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the CONTRACTOR's expense.

- E. All paint and other coating products shall be stored in areas protected from the weather. Follow all storage requirements set forth by the paint and coating MANUFACTURER's.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01600

## SECTION 01700

### CONTRACT CLOSEOUT

#### PART 1 – GENERAL

##### 1.01 REQUIREMENTS INCLUDED

- A. Comply with requirements stated in Conditions of the Contract and in Specifications for administrative procedures in closing out the Work.
- B. The CONTRACTOR, tank CONTRACTOR, and electrical CONTRACTOR shall be required to complete all close out documentation requirements to the satisfaction of the OWNER and ENGINEER.

##### 1.02 RELATED REQUIREMENTS

- A. Conditions of the Contract. Fiscal provisions, legal submittals and additional administrative requirements.
- B. Section 01050: Project Controls (Surveying)
- C. Section 01390: Construction Photographs and Videotaping
- D. Section 01710: Cleaning
- E. Section 01720: Project Record Documents
- F. Section 01730: Operating and Maintenance Data
- G. Section 01740: Warranties
- H. The respective sections of Specifications: Closeout Submittals Required of Trades.

##### 1.03 CONTRACTOR'S CLOSEOUT SUBMITTALS TO ENGINEER

- A. Evidence of compliance with requirements of governing authorities.
- B. Hard copies of a photographs and CDs: Refer to Section 01390.
- C. Project Record Documents: Refer to requirements of Section 01720.
- D. Operating and Maintenance Data, Instructions to Owner's Personnel: Refer to requirements of Section 01730.
- E. Warranties: Refer to requirements of Section 01740.
- F. Spare parts and maintenance materials: Refer to requirements of Section 01730.
- G. Evidence of Payment and Release of Liens: Refer to requirements of General and Supplementary Conditions.
- H. Certificate of insurance for products and completed operations.

SECTION 01700

CONTRACT CLOSEOUT

1.04 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. Allowances
    - c. Unit Prices
    - d. Deductions for uncorrected Work
    - e. Penalties and Bonuses
    - f. Deductions for liquidated damages
    - g. Deductions for reinspection payments
    - h. Other adjustments
  3. Total Contract Sum, as adjusted.
  4. Previous payments.
  5. Sum remaining due.
- C. ENGINEER will prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.

1.05 FINAL APPLICATION FOR PAYMENT

- A. CONTRACTOR shall submit the final Application for Payment in accordance with procedures and requirements stated in the Conditions of the Contract.

1.06 FINAL CLEANING

- A. Refer to Section 01710 for final cleaning requirements.

1.07 FINAL SURVEY

- A. In addition to monthly surveys completed for the project, a final as-built survey shall be completed by a land surveyor registered in the state of Florida. This survey shall be provided to the OWNER and ENGINEER for review and comment prior to final acceptance. Refer to Section 01050 for additional requirements.

1.08 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01700



## SECTION 01710

### CLEANING

#### PART 1 – GENERAL

##### 1.01 REQUIREMENTS

- A. Execute cleaning, during progress of the Work, and at completion of the Work, as required by the General Conditions and Contract Documents.
- B. CONTRACTOR shall coordinate with the tank CONTRACTOR on all cleaning requirements prior to completing construction on site.

##### 1.02 RELATED WORK

- A. Conditions of the Contract
- B. Each Specification Section: Cleaning for specific products or work.

##### 1.03 DISPOSAL REQUIREMENTS

- A. Conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

#### PART 2 – PRODUCTS

##### 2.01 MATERIALS

- A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
- B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.
- C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

#### PART 3 – EXECUTION

##### 3.01 DURING CONSTRUCTION

- A. Execute periodic 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 on-site containers for the collection of waste materials, debris and rubbish.
- C. Remove waste materials, debris and rubbish from the site periodically and dispose of at legal disposal areas away from the site.

## SECTION 01710

### CLEANING

#### 3.02 DUST CONTROL

- A. Clean interior spaces, piping, and equipment prior to the start of finish painting and continue cleaning on an as needed basis until painting is finished.
- B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fail on wet or newly coated surfaces.

#### 3.03 FINAL CLEANING

- A. Employ skilled 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. Wash and shine glazing and mirrors.
- D. Polish glossy surfaces to a clear shine.
- E. Ventilating Systems:
  - 1. Clean permanent filters and replace disposable filters if units were operated during construction.
  - 2. Clean ducts, blowers and coils if units were operated without filters during construction.
- F. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.
- G. 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 01710

## SECTION 01720

### PROJECT RECORD DOCUMENTS

#### PART 1 – GENERAL

##### 1.01 REQUIREMENTS INCLUDED

- A. Maintain at the site for the OWNER and ENGINEER one record copy of:
  - 1. Drawings
  - 2. Specifications
  - 3. Change Orders and other Modifications to the Contract
  - 4. Engineer's Field Orders or written instructions
  - 5. Approved Shop Drawings, Working Drawings, and Samples
  - 6. Field Test records
  - 7. Construction photographs
  - 8. All applicable permits

##### 1.02 RELATED REQUIREMENTS

- A. Section 01050: Project Controls (Surveying)
- B. Section 01300: Submittals
- C. Section 01370: Operation and Maintenance Data

##### 1.03 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Store documents and samples in CONTRACTOR's field office apart from documents used for construction.
  - 1. Provide files and racks for storage of documents.
  - 2. Provide locked cabinet or secure storage space for storage of samples.
- B. File documents and samples in accordance with Construction Specifications Institute (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 the OWNER.
- F. CONTRACTOR shall maintain documents and samples from tank CONTRACTOR and electrical SUBCONTRACTOR.

##### 1.04 RECORDING

- A. Use felt tip marking pens for recording information in "Red."
- B. Label each document "PROJECT RECORD" in neat large printed letters.

## SECTION 01720

### PROJECT RECORD DOCUMENTS

- C. Record information concurrently with construction progress.
  - 1. Do not conceal any work until required information is recorded.
- D. Drawings: Legibly mark to record actual consideration:
  - 1. Depths of various elements of foundation in relation to finish first floor datum.
  - 2. All underground piping with elevations and dimensions. 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 (this includes electrical conduits).
  - 4. Field changes of dimension and detail.
  - 5. Changes made by RFIs, field orders, or by change orders.
  - 6. Details not on original contract drawings.
  - 7. Equipment and piping relocations.
  - 8. Major architectural and structural changes including relocation of doors, windows, etc.
  - 9. Architectural schedule changes according to CONTRACTOR's records and shop drawings.
  - 10. Locations, elevations, sizes, types and materials of all manholes (including pipe invert, manhole rim, and bottom elevations), valves, water and sewer services, fire hydrants and all associated structures, hose bibbs, and fittings.
  - 11. With reference to electrical work the exact routing of conduit runs shall be shown on these drawings.
  - 12. In addition to the monthly as-builts that are required, a comprehensive final as-built survey shall be signed and sealed by a land surveyor registered in the state of Florida. A hard copy of this survey shall be provided to the OWNER and ENGINEER for review and comment prior to final acceptance.

#### 1.05 SUBMITTAL

- A. At contract close-out, deliver record documents to the ENGINEER for the OWNER. The information submitted by the tank CONTRACTOR, CONTRACTOR, and electrical CONTRACTOR into the Record Drawings and Record Documents will be assumed to be correct, and each individual CONTRACTOR shall be responsible for the accuracy of such information and shall bear the costs resulting from the correction of incorrect data.
- 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 Contractors or his authorized representative
- C. Delivery of record drawings and record documents to the ENGINEER will be a prerequisite to final payment.

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01720

## SECTION 01730

### OPERATING AND MAINTENANCE DATA

#### PART 1 – GENERAL

##### 1.01 GENERAL

- A. Compile product data and related information appropriate for OWNER's maintenance and operation of products furnished under this Contract.
  - 1. Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent sections of Specifications.
  - 2. Provide a minimum of three hard copies and an electronic copy of the manuals at both the draft and final submittals.
- B. Instruct OWNER's personnel in maintenance of products and in operation of equipment and systems.
- C. CONTRACTOR shall coordinate with electrical CONTRACTOR and TANK CONTRACTOR on all associated submittals.

##### 1.02 RELATED REQUIREMENTS

- A. Section 01300: Submittals

##### 1.03 QUALITY ASSURANCE

- A. Preparation of data shall be done by personnel:
  - 1. Trained and experienced in maintenance and operation of described products.
  - 2. Familiar with requirements of this Section.
  - 3. Skilled as technical writer to the extent required to communicate essential data.
  - 4. Skilled as draftsman competent to prepare required drawings.

##### 1.04 OPERATING MANUALS

- A. The VENDOR shall provide operation and maintenance instructions for all electrical, mechanical, and instrumentation and controls equipment furnished under various technical specifications Sections.
- B. Complete sets of operations and maintenance manuals approved by the ENGINEER covering all equipment furnished under Divisions 11 and 16 shall be delivered at least 30 days prior to scheduled start-up directly to the OWNER.
- C. An electronic copy of the manual shall be provided as well as hard copy submittal.
- D. Separate manuals shall be provided for each type of equipment, or each Section number. Each manual shall contain the following specific requirements. Manuals that do not meet the requirements shall be rejected and Equipment Supplier/Manufacturer will bear all expenses to resubmit the manual to meet the following requirements.

## SECTION 01730

### OPERATING AND MAINTENANCE DATA

- E. Manual Format
  - 1. Size: 8 1/2 inches x 11 inches.
  - 2. Paper: 20 pound minimum, white, for typed pages.
  - 3. Text: Manufacturer's printed data, or neatly typewritten.
  - 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 inches x 17 inches.
  - 5. Provide fly-leaf for each separate product, or each piece of operating equipment.
    - a. Provide typed description of product, and major component parts of equipment.
    - b. Provide indexed tabs.
  - 6. Cover: Identify each volume with typed or printed, title "OPERATING AND MAINTENANCE INSTRUCTIONS" List:
    - a. Title of Project.
    - b. Identity of separate structure as applicable.
    - c. Identity of general subject matter covered in the manual.
- F. Binders
  - 1. Commercial quality three-post binders with durable and cleanable plastic covers.
  - 2. Maximum post width: 2 inches or as applicable.
  - 3. When multiple binders are used, correlate the data into related consistent groupings.

#### 1.05 CONTENT OF MANUAL

- A. Neatly typewritten table of contents for each volume, arranged in systematic order.
  - 1. Contractor, name of responsible principal, address, and telephone number.
  - 2. A list of each product required to be included, indexed to content of the volume.
  - 3. List, with each product, name, address, email, and telephone number of:
    - a. Subcontractor, manufacturer, or installer.
    - b. Local manufacturer's representative
    - c. Maintenance contractor, as appropriate.
    - d. Identify area of responsibility of each.
    - e. Local source of supply for parts replacement.
  - 4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.
- B. Product Data
  - 1. Include only those sheets which are pertinent to the specific product.
  - 2. Annotate each sheet to:
    - a. Clearly identify specific product or part installed
    - b. Clearly identify data applicable to installation
    - c. Delete references to inapplicable information

## SECTION 01730

### OPERATING AND MAINTENANCE DATA

- C. Drawings
  - 1. Supplement product data with drawings as necessary to clearly illustrate:
    - a. Relations of component parts of equipment and systems.
    - b. Control and flow diagrams.
  - 2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
  - 3. Do not use Project 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 logical sequence of instructions of each procedure.
  - 3. Copy of each warranty, bond and service contract issued.
  - 4. Provide information sheet for OWNER's personnel, give:
    - a. Proper procedures in event of failure.
    - b. Instances which might affect validity of warranties or bonds.
- E. Electronic Transmission of O&M Manuals
  - 1. Electronic O&M manuals shall meet the following conditions:
    - a. All other requirements specified above have been met, including, but not limited to, coordination by the CONTRACTOR, review and approval by the CONTRACTOR.
    - b. With the exception of the transmittal sheet, the entire submittal is included in a single file.
    - c. Files are Portable Document Format (PDF) – with the printing function enabled.
    - d. The Vendor provided equipment, sub-system, or system manuals shall be in PDF format, compliant with the Adobe PDF specification (latest version). The manual shall be searchable image. The optical character recognition of the image shall be a 95% confidence level. The manuals shall be linked and bookmarked as follows:
      - 1) Provide links from all Table of Contents, List of Tables, List of Figures, etc., entries to the actual occurrence in the body of the manual.
      - 2) Create bookmarks for all linked Table of Contents entries.
    - e. All drawings shall be in PDF format, compliant with the Adobe PDF Specification (latest version). The manual shall be PDF Searchable Image. The Optical Character Recognition of the image shall be at a 95% confidence level. The drawings shall be linked as follows:
      - 1) External links from the Drawing Index (if it exists) to each drawing.
      - 2) External links from references within drawings to other drawings.
  - 2. When electronic copies are provided, transmit three hard-copy (paper) originals to the Engineer.
  - 3. The electronic copy of the O&M manual must be identical in organization, format, and content to the hard copies of the manual.



## SECTION 01730

### OPERATING AND MAINTENANCE DATA

#### 1.06 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to startup of equipment and facilities, fully instruct OWNER's designated operating and maintenance personnel in operation, adjustment and maintenance of products, equipment, and systems. Refer to individual specifications for training requirements.
- B. Operating and maintenance manual shall constitute the basis of instruction.
  - 1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.
- C. Unless specified otherwise under the respective equipment specification section, vendor training/instruction shall consist of eight hours of training for each type of equipment. Such training/instruction shall be scheduled and held at times to accommodate the work schedules of OWNER'S personnel, including splitting the required training/instruction time into separate sessions and/or presented at reasonable times other than the CONTRACTOR's "normal working hours" or the OWNER's normal day shift.
- D. At least two weeks prior to the schedule for vendor training, a detailed lesson plan, representative of the material to be covered during instruction, shall be submitted to the ENGINEER for approval. Lesson plans shall consist of in-depth outlines of the training material, including a table of contents, resume of the instructor, materials to be covered, start-up procedures, maintenance requirements, safety considerations, and shut-down procedures.
- E. Vendor's training/instruction will be considered acceptable based on the completed *Owner's Acknowledgement of Manufacturer's Instruction* as indicated on the Equipment Manufacturer's Certification of Installation, Testing, and Instruction appended to this Section.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01730 - FORM TO FOLLOW

SECTION 01730

OPERATING AND MAINTENANCE DATA

**EQUIPMENT MANUFACTURER'S CERTIFICATE OF INSTALLATION, TESTING, AND INSTRUCTION**

Owner: SJCUD

Project: CR-208 Ground Storage Tank and Booster Pump Station

Contract No. \_\_\_\_\_

Mott MacDonald Project No. 502100379-007

EQUIPMENT SPECIFICATION SECTION \_\_\_\_\_

I \_\_\_\_\_, Authorized representative of  
(Print Name)

\_\_\_\_\_, hereby certify that  
(Print Manufacturer's Name)

\_\_\_\_\_  
(Print equipment name and model with serial No.)

installed for the subject project [has] [have] been installed in a satisfactory manner, [has] [have] been satisfactorily tested, [is] [are] ready for operation, and that Owner assigned operating personnel have been suitably instructed in the operation, lubrication, and care of the unit[s] on

Date: \_\_\_\_\_

CERTIFIED BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
(Signature of Manufacturer's Representative)

**OWNER'S ACKNOWLEDGMENT OF MANUFACTURER'S INSTRUCTION**

[I] [We] the undersigned, authorized representatives of the \_\_\_\_\_ and/or Plant Operating Personnel have received classroom and hands on instruction on the operation and maintenance of the subject equipment and [am] [are] prepared to assume normal operational responsibility for the equipment:

\_\_\_\_\_ DATE: \_\_\_\_\_

\_\_\_\_\_ DATE: \_\_\_\_\_

\_\_\_\_\_ DATE: \_\_\_\_\_

## SECTION 01740

### WARRANTIES

#### PART 1 – GENERAL

##### 1.01 REQUIREMENTS INCLUDED

- A. Compile specified warranties as per general conditions and per the technical specification requirements.
- 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 RELATED REQUIREMENTS

- A. SJCUD General and Supplemental Conditions
- B. Section 01700: Contract Closeout.

##### 1.03 SUBMITTAL REQUIREMENTS

- A. Assemble warranties and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and SUBCONTRACTORS.
- B. Number of original signed copies required: Two each.
- C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.
  - 1. Product or work item
  - 2. Vendor or manufacturer, with name of principal, address, and telephone number
  - 3. Scope
  - 4. Date of beginning of 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
  - 7. CONTRACTOR, name of responsible principal, address and telephone number

##### 1.04 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. Cover: Identify each packet with typed or printed title "WARRANTIES":
    - a. Title of Project
    - b. Name of CONTRACTOR

## SECTION 01740

### WARRANTIES

- C. Binders: Commercial quality, three-post binder, with durable and cleanable plastic covers and maximum post width of 2 inches. Include divider tabs for each warranty item and correlate to the table of contents.

#### 1.05 WARRANTY SUBMITTAL REQUIREMENTS

- A. For all major pieces of equipment, submit a warranty from the equipment manufacturer. The manufacturer's warranty period shall be concurrent with the CONTRACTOR's for one (1) year commencing at the time of acceptance by the OWNER or as specified in the equipment or material specifications.
- B. The CONTRACTOR shall be responsible for obtaining certificates for equipment warranty for all major equipment specified under Division 11, 15, and 16 and which has a 1 HP motor or which lists for more than \$1,000. The ENGINEER reserves the right to request warranties for equipment not classified as major. The CONTRACTOR shall still warrant equipment not considered to be "major" in the CONTRACTOR's one-year warranty period even though certificates of warranty may not be required.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 01740

## SECTION 02100

### SITE PREPARATION

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

- A. This Section covers clearing, grubbing and stripping along and within the construction sites, complete as specified herein.
- B. The TANK CONTRACTOR shall clear and grub all of the area within the limits of construction.
- C. The CONTRACTOR shall clear and grub all the area within the existing SJCUD easement for the pipeline work. The width of the area to be cleared shall be established by the ENGINEER prior to the beginning of any clearing or as shown on the Drawings.
- D. The TANK CONTRACTOR shall be responsible for excavating the entire wet detention pond from existing grade to pond bottom for GST construction and import of any additional structural fill required for tank construction.
- E. The CONTRACTOR shall be responsible for providing fill for the entirety of the site excluding the area below the GST. The CONTRACTOR shall coordinate with the GST contractor on non-structural fill excavated from the wet detention pond to be used onsite.

##### 1.02 RELATED WORK

- A. SJCUD Standards for grassing and restoration

#### 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, 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 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, and so as to provide for the safety of employees and others. Clearing for structures shall consist of topsoil and vegetation removal.

##### 3.02 GRUBBING

- A. Grubbing shall consist of the complete removal of all stumps, roots larger than 1-1/2 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

## SECTION 02100

### SITE PREPARATION

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, top soil 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 DEMUCKING, BACKFILLING AND SPECIAL COMPACTION REQUIREMENTS

- A. All organic surface soils and muck shall be removed under all structures, tanks, pipes, slabs, roads, and walls, plus a five foot margin all around.
- B. Refer to the geotechnical report located in **Appendix A** for additional details.

#### 3.05 DISPOSAL OF CLEARED, GRUBBED, AND DEMUCKED MATERIAL

- A. The TANK 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 or burial will not be permitted. The cost of disposal (including hauling) of cleared and grubbed material and debris shall be included in the contract.
- B. If the land owner desires the timber or small trees, the TANK CONTRACTOR shall cut and neatly pile it in 4 foot lengths for removal by the land owner; otherwise the TANK CONTRACTOR shall dispose of it by hauling away from the project site.

#### 3.06 PRESERVATION OF TREES

- A. Those trees which are designated on the drawings for preservation or protection shall be carefully protected from damage as detailed on the Drawings. The TANK CONTRACTOR and CONTRACTOR shall coordinate to erect such barricades, guards, and enclosures for the protection of the trees during all construction operations.

#### 3.07 PRESERVATION OF DEVELOPED PRIVATE PROPERTY

- A. The TANK CONTRACTOR and CONTRACTOR shall exercise extreme care to avoid unnecessary disturbance of developed private property as applicable. Trees, shrubbery, gardens, lawn and other landscaping, which in the opinion of the ENGINEER must be removed, shall be replaced and replanted to restore the construction easement to the condition existing prior to construction.
- B. All soil preparation procedures and replanting operations shall be under the supervision of a nurseryman experienced in such operations.
- C. Improvements to the land such as fences, walls, outbuildings, etc., which of necessity must be removed shall be replaced with equal quality materials and workmanship.

SECTION 02100

SITE PREPARATION

- D. The CONTRACTOR shall clean up the construction site across developed private property directly after construction is completed upon approval of the ENGINEER.

END OF SECTION 02100

## SECTION 02140

### DEWATERING

#### PART 1 – GENERAL

##### 1.01 SUMMARY OF WORK

- A. Any dewatering required to perform and complete the work under this Contract is the sole responsibility of the CONTRACTOR(S) and no additional payment will be made. Any dewatering operation(s), overtime, equipment rental or any and all other expenses/costs related to dewatering shall be borne solely by the CONTRACTOR(S).
- B. Seasonal high groundwater is estimated to be within 6 inches of existing grade at the pump station site and 2 to 3 feet above the groundwater levels along the watermain and reclaimed watermain alignment. It is possible that seasonal high groundwater may exceed these elevations during periods of rainfall. Dewatering will be required for most structures and piping that extend below existing grade. More detailed information on expected groundwater levels to be taken into consideration for the dewatering plan are contained in the geotechnical report provided in **Appendix A**.

##### 1.02 RELATED WORK

- A. Section 02220 – Excavating, Backfilling, and Grading for Structures
- B. Section 02221 – Trenching, Bedding, and Backfilling for Pipes

##### 1.03 SUBMITTALS

- A. Provide a dewatering plan in accordance with Section 01300 which addresses the dewatering activities to be employed by the CONTRACTOR of each structure and yard piping.
  - 1. Dewatering plan shall include plan for dewatering prior to the construction of the stormwater pond.

#### PART 2 – PRODUCTS

##### 2.01 MATERIALS AND EQUIPMENT

- A. The CONTRACTOR shall furnish all materials and equipment necessary to carry out all dewatering required to perform and complete all work under this contract.

#### PART 3 – EXECUTION

##### 3.01 GENERAL

- A. At all times, the CONTRACTOR is to maintain and operate proper and adequate surface and subsurface dewatering in order to keep the construction site dry and in such condition that construction of structures and utilities and placement and compaction of fill and backfill may proceed unhindered by saturation of the area. The CONTRACTOR shall maintain existing drainage at all times to allow for unimpeded, continuous drainage. Any temporary drainage shall be done in such a manner as to NOT impact existing structures, surface waters, existing drainage or construction operations in an adverse manner as determined by the ENGINEER.



## SECTION 02140

### DEWATERING

- B. The CONTRACTOR is to prevent surface water and subsurface or groundwater from flooding or spilling into excavations, and from flooding the project site or surrounding area. CONTRACTOR is to remove all water in order to prevent softening of structure or pipe foundation bottoms, undercutting footings, and creating soil consistency changes detrimental to the stability of sub grades and foundations. The CONTRACTOR is further to provide and maintain pumps, well points, sumps, suction and discharge lines, or other dewatering system components necessary to convey all water away from excavations.
- C. The CONTRACTOR is to obtain, at his own cost, any permits required for construction dewatering.
- D. Any and all discharges shall be in compliance with local, state and federal laws, regulations and guidelines including FAC Chapter 62-621.300. All water collected from construction activities shall be contained on site and disposed of either in the sanitary or storm sewer systems. The CONTRACTOR shall obtain any required permits related to dewatering, and no separate payment for permit fees will be made.
- E. Construction is in a sensitive area with residences surrounding it. CONTRACTOR shall discuss any and all discharges with the OWNER and ENGINEER prior to proceeding with permits and actual discharge operations. No discharges shall be allowed without the required permits approved and on site. Furnish a copy of all permits to OWNER and ENGINEER for their records.
- F. Where dewatering will occur in the vicinity of structures, the CONTRACTOR shall monitor for adverse effects to structures or wells due to dewatering and shall be responsible to remedy same to the satisfaction of the State and/or authorities having jurisdiction. Discharges from dewatering activities which contain silt or hydrogen sulfide are subject to the following controls:
  - 1. All discharges from dewatering activities to surface waters, wetlands or storm sewers shall be free of sediments. Care shall be taken not to damage or kill vegetation by excessive watering or by damaging silt accumulation in the discharge area. If discharges are sediment laden, techniques shall be employed to remove sediment prior to discharge. A sedimentation basin shall be constructed and used where necessary, to protect vegetation and to achieve environmental objectives.
  - 2. Sewer inlets within construction areas shall be protected with perimeter hay bales or with other approved inlet protection as approved by the ENGINEER or OWNER.

END OF SECTION 02140

## SECTION 02220

### EXCAVATING, BACKFILLING, AND GRADING FOR STRUCTURES

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

- A. This Section includes excavation, filling, and grading to attain the subgrades and grades indicated on the Drawings.
- B. Supplemental foundation and site preparation notes are indicated on the Drawings. Extensive grubbing and site preparation will be required for this project.
- C. Furnish and install temporary excavation support systems, including sheeting, shoring, and bracing, to ensure the safety of personnel and protect adjacent structures, piping, etc., in accordance with Federal, State and local laws, regulations, and requirements.
- D. Furnish and install temporary dewatering and surface water control systems and operate to dewater and maintain in a dry condition. Control drainage into excavations and remove seepage water and rainwater.
- E. All excavation and backfill for structures, utilities, and pavements shall be in accordance with the geotechnical engineering report. The geotechnical report for this project is included as **Appendix A**. Where discrepancies exist between this specification and the referenced geotechnical report, the referenced geotechnical report shall take precedence if more restrictive.
- F. The CONTRACTOR shall be responsible for calculating the required cut and fill calculations for the entire site. All new fill or reuse of soils on the site for fill shall meet the requirements of Sections 02220 and 02221. All hauling costs and subsequent backfill and compaction shall be by the CONTRACTOR.
  1. The TANK CONTRACTOR shall be responsible for the excavation of pond from existing grade and use of the soil for backfill to construct the GST as well as import of additional structural fill for GST construction. The TANK CONTRACTOR shall calculate the volume of additional structural fill and will be reimbursed for costs as per the unit price provided in their bid. The costs for excavation, stockpiling, backfill and compaction of the soils from the stormwater pond shall be included in their lump sum bid.
  2. The CONTRACTOR shall be responsible for importing of structural and common fill for the site (outside of the tank area), final grading, seeding, and sodding. The calculations of the additional fill for the site shall be performed by the CONTRACTOR and included in their base bid.
- G. The soils beneath and up to 5 feet around the perimeter of all structures (proposed GST, booster pump station, GST fill valve assembly pad, generator/fuel tank pad, effluent flow meter assembly and bypass pad) shall be excavated 6 inches from existing grade. The excavated material shall be removed, dewatered, hauled, and disposed of in an approved landfill or State of Florida approved disposal facility. The cost for this excavation, stockpiling, dewatering, loading, hauling, and disposal shall be included in the CONTRACTOR's base bid. No additional payment for this work will be considered.

## SECTION 02220

### EXCAVATING, BACKFILLING, AND GRADING FOR STRUCTURES

#### 1.02 RELATED WORK

- A. Section 01410: Testing and Testing Laboratory Services
- B. Section 02100: Site Preparation
- C. Section 02140: Dewatering
- D. Section 02221: Trenching Bedding, Backfill for Pipes, and Site Earthwork

#### 1.03 QUALITY ASSURANCE

- A. Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Testing and Inspection Service:
  - 1. The CONTRACTOR and tank CONTRACTOR shall engage soil testing and inspection service for quality control testing during earthwork operations pertinent to their scopes of work. See Section 01410 for additional details.
- C. All excavation, trenching, sheeting, bracing shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926.650 Subpart P), State of Florida "Trench Safety Act" (Part IV, Chapter 553 of the Florida Statutes) and local requirements. Where conflict between OSHA, State and local requirements exists, the most stringent requirements shall apply.

#### 1.04 SUBMITTALS

- A. Submit, in accordance with Section 01300, an excavation work plan that includes the proposed methods of construction, including earthwork operations, excavation limits, slopes, ramp access, fill material moisture conditioning and handling, compaction equipment, and material sources for the various portions of the work.
- B. Coordinate this submittal with the requirements of dewatering and support of excavation submittals.

#### 1.05 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - 1. ASTM D698 – Test Method for Laboratory Compaction Characteristics of Soils Using Standard Efforts.
  - 2. ASTM D1557 - Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu ft (2,700kN-m/cu m)).
  - 3. ASTM D 2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

## SECTION 02220

### EXCAVATING, BACKFILLING, AND GRADING FOR STRUCTURES

#### 1.06 QUALITY ASSURANCE

- A. At all structures, prior to the placement of bedding material, concrete work mats, structural fill or structural concrete, coordinate with the soils testing laboratory to verify the suitability of the existing subgrade soil and to perform in-place soil density tests as required to verify that the compaction of the subgrade is sufficient.
- B. Prior to and during the placement of backfill and fill coordinate with the soils testing laboratory to perform in-place soil density tests to verify that the backfill/fill material has been compacted in accordance with the compaction requirements specified elsewhere. The ENGINEER may designate areas to be tested.

#### 1.07 DEFINITIONS

- A. Where the phrase "in-the-dry" is used in this Section, it shall be defined to mean a soil condition such that the in-place moisture content of the soil at that time is no more than two percentage points above the optimum moisture content of that soil as determined by the laboratory test of the moisture-density relation appropriate to the specified level of compaction.
- B. Where used in this Section "structures" refers to all buildings, wet wells, manholes and below grade vaults. Stormwater structures and duct banks are not considered structures in this context.

#### 1.08 JOB CONDITIONS

- A. The CONTRACTOR shall examine the site 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.
- 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 unidentified, or incorrectly identified, 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 to be removed.
- C. Protection of Persons and Property
  - 1. Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction.
  - 2. Protect structures, utilities, sidewalks, pavements, and other facilities from possible damage which may result from settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

## SECTION 02220

### EXCAVATING, BACKFILLING, AND GRADING FOR STRUCTURES

#### PART 2 – PRODUCTS

##### 2.01 SOIL MATERIALS

###### A. Definitions:

1. Backfill and Fill Materials: Satisfactory soil materials for this project are defined as a non-plastic, inorganic, granular soil having less than 12 percent material passing the No. 200 mesh sieve and containing less than 4 percent organic material.

#### PART 3 – EXECUTION

##### 3.01 INSPECTION

- A. Examine the areas and conditions under which excavating, filling, and grading are to be performed. Notify the ENGINEER of any unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected.
- B. Examine and accept existing grade of all structures prior to commencement of work and report to ENGINEER if elevations of existing subgrade varies from elevations shown on Drawings.

##### 3.02 EXCAVATION

- A. Excavation consists of the removal and disposal of material encountered when establishing required grade elevations.
- 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 direction of ENGINEER. Unauthorized excavation, as well as remedial work directed 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 (unreinforced) concrete fill may be used to bring bottom elevations to proper position, when acceptable to ENGINEER.

## SECTION 02220

### EXCAVATING, BACKFILLING, AND GRADING FOR STRUCTURES

- b. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by ENGINEER.
- C. Additional Excavation: When excavation has reached required subgrade elevations, notify the ENGINEER or RPR who will inspect conditions.
  - 1. If unsuitable bearing materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material as directed by the ENGINEER.
- D. Stability of Excavations: 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.
  - 1. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- E. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.
  - 1. Establish requirements for trench shoring and bracing to comply with local codes and authorities having jurisdiction. Provide design drawings of all shoring and bracing signed and sealed by a Registered Professional ENGINEER in the state of Florida.
  - 2. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Carry down shoring and bracing as excavation progresses.
- F. Dewatering: The CONTRACTOR is solely responsible for all dewatering methods and providing proper equipment to perform such actions. Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.
  - 1. 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. Maintain groundwater table level a minimum of two-foot below excavation level.
  - 2. 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.
  - 3. While dewatering for new construction near 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 as approved by the ENGINEER.

## SECTION 02220

### EXCAVATING, BACKFILLING, AND GRADING FOR STRUCTURES

- G. Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage.
  - 1. Locate and retain soil materials away from edge of excavations.
  - 2. Dispose of excess soil material and waste materials as herein specified.
  - 3. All stockpiled materials shall be properly segregated based on usage and tested prior to use by the testing firm onsite.
  
- H. Excavation for Structures: 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.
  - 1. 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.
  
- I. Cold Weather Protection: Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

### 3.03 COMPACTION

- A. Unless otherwise specified in the geotechnical report, the prepared subgrade must meet the following minimum compaction requirements. In the event a discrepancy exists between this paragraph and the geotechnical report, the ENGINEER shall be notified immediately, and the strictest recommendations shall govern.
  - 1. Mat Foundation Structures: Mat foundation bearing soils should be compacted to at least 95 percent of the soils modified Proctor maximum density, to a depth of at least 2 feet below the foundation bearing level.
  - 2. Lawn or Unpaved Areas: Compact top 6-inches subgrade and each layer of backfill or fill.
  - 3. Walkways: Compact top 12-inches of subgrade to 98 percent maximum dry density.
  - 4. Pavements and Steps: Compact top 12-inches of subgrade to 98 percent maximum dry density.

### 3.04 STRUCTURAL BACKFILL AND FILL SOILS

- A. General: Place material in layers to required subgrade elevations, for each area classification listed below.
  - 1. In excavations, use satisfactory excavated or borrow material.
  - 2. Under grassed areas, use satisfactory excavated or borrow material.
  - 3. Under walks and pavements, use subbase material.
  
- 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.

## SECTION 02220

### EXCAVATING, BACKFILLING, AND GRADING FOR STRUCTURES

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: 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 material will bond with existing surface.
1. 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. Placement and Compaction: Place structural backfill and fill materials in layers not more than 12-inches loose depth for material compacted by vibratory drum roller equipment as specified in the geotechnical report, and not more than 8-inches loose depth for material compacted if the roller is operated in the static mode. If hand-held compaction equipment is used, the lift thickness should be reduced further to 6-inches.
1. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content. Compact each layer to required percentage of the modified Proctor maximum dry density specified. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
  2. Place backfill and fill materials evenly adjacent to structures, to required elevations. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around structure to approximately same elevation in each lift.
  3. Large compaction equipment shall not be used within 5 feet of walls.

### 3.05 GRADING

- A. General: Uniformly grade areas within limits of grading under this Section, 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.
- B. Grading Outside Building Lines: 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:
1. Lawn or Unpaved Areas: Finish areas to within not more than 0.10 feet above or below the required elevation.
  2. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10 feet above or below the required subgrade.



## SECTION 02220

### EXCAVATING, BACKFILLING, AND GRADING FOR STRUCTURES

- C. Grading Surface of Fill Under Building Slabs: 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 10-foot straightedge.
- D. Compaction:
  - 1. After grading, compact subgrade surfaces to the depth and percentage of modified Proctor maximum dry density and/or the standard maximum dry density specified.

#### 3.06 FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction: Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed.
- B. If in opinion of ENGINEER, based on testing service reports and inspection, subgrade or fills which have been placed are below specified density, provide additional compaction and testing at no additional expense.

#### 3.07 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
  - 1. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

#### 3.08 DISPOSAL OF SURPLUS AND WASTE MATERIAL

- A. All surplus and/or unsuitable excavated material shall be disposed of in one of the following ways as directed by the ENGINEER.
  - 1. Transport to soil storage area on OWNER's property and stockpile or spread as directed by the ENGINEER.
  - 2. Transport from OWNER's property and legally dispose of at an approved disposal facility. Any permit required for the hauling and disposing of this material beyond OWNER's property shall be obtained prior to commencing hauling operations.

END OF SECTION 02220

## SECTION 02221

### TRENCHING, BEDDING, BACKFILL FOR PIPES, AND SITE EARTHWORK

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

- A. The CONTRACTOR shall furnish all labor, materials, equipment, and incidentals necessary to perform all excavation, 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, roadways and paving, and general site earthwork; all backfilling, fill and required borrow; grading; disposal or surplus and unsuitable materials; and all related work such as sheeting, bracing, and water handling.
- B. Furnish and install temporary excavation support systems, including sheeting, shoring and bracing, to ensure the safety of personnel and protect adjacent structures, piping, etc., in accordance with Federal, State and local laws, regulations, and requirements.
- C. Furnish and install temporary dewatering and surface water control systems and operate to dewater and maintain in-a-dry condition. Control drainage into excavations and remove seepage water and rainwater.
- D. All excavation and backfill for structures, utilities, and pavements shall be in accordance with the geotechnical engineering report. The geotechnical report for this project is included as **Appendix A**. Where discrepancies exist between this specification and the referenced geotechnical report, the referenced geotechnical report shall take precedence if more restrictive.
- E. The CONTRACTOR shall be responsible for calculating the required cut and fill calculations for the entire site. All new fill or reuse of soils on the site for fill shall meet the requirements of Sections 02220 this section and the geotechnical report.

##### 1.02 RELATED WORK

- A. Section 02100: Site Preparation
- B. Section 02140: Dewatering
- C. Section 02220: Excavating, Backfilling, and Grading for Structures

##### 1.03 TRENCH PROTECTION

- A. The CONTRACTOR shall construct and maintain 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 piping and/or foundation material from disturbance, under-mining, 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.

## SECTION 02221

### TRENCHING, BEDDING, BACKFILL FOR PIPES, AND SITE EARTHWORK

- B. For pipe trench sheeting, 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 directed by the ENGINEER. If during the progress of the work the ENGINEER decides that additional wood sheeting should be left in place, he may direct the CONTRACTOR in writing. If steel sheeting is used for trench sheeting, removal shall be as specified above, unless written approval is given by the ENGINEER for an alternate method of removal.
- C. 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. 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.
- D. 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.

#### 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 at the time the investigation was made.
- 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, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

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#### 1.05 SUBMITTALS

- A. If requested by the ENGINEER, the CONTRACTOR shall furnish a representative sample of fill material obtained from onsite or offsite sources weighing approximately 50 pounds for approval, at least ten calendar days prior to the date of anticipated use of such material. For each material obtained from other than onsite sources, the CONTRACTOR shall notify the ENGINEER of the source of the material.
- B. All temporary shoring and bracing shall be designed by a specialty ENGINEER and system design/details shall be submitted to the ENGINEER of record for review and approval; submittals shall be signed and sealed by a registered ENGINEER licensed in the state of Florida. Submit in accordance with Section 01300.

#### 1.06 REFERENCED STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - 1. ASTM D75 – Standard Practice for Sampling Aggregates
  - 2. ASTM D698 – Test Method for Laboratory Compaction Characteristics of Soils Using Standard Efforts.
  - 3. ASTM D1556 – Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
  - 4. ASTM D2167 – Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method
  - 5. ASTM D1557 - Test Method for Laboratory Compaction Characteristics of Soils Using Modified Effort (56,000 ft-lbf/cu ft (2,700kN-m/cu m)).
  - 6. ASTM D2487 – Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
  - 7. ASTM D2922 – Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods
- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

### PART 2 – GENERAL

#### 2.01 SOIL 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.

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### TRENCHING, BEDDING, BACKFILL FOR PIPES, AND SITE EARTHWORK

#### B. Structural Fill

1. Structural fill material shall be satisfactory soil material consisting of a minimum of 60 percent clean medium to fine grain sized quartz sand, free of organic, deleterious and/or compressible material, having less than 10% material passing the No. 200 mesh sieve and containing less than 4% organic material. Rock in excess of 2-1/2 inches in diameter shall not be used in the fill material. Structural fill shall not contain hardpan, stones, rocks, cobbles or other similar materials.

#### C. Common Fill

1. Common fill material shall be satisfactory soil material containing no more than 20 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. 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.

#### D. Rock Bedding

1. Rock bedding shall be 3/8-inch to 3/4-inch washed and graded limerock. This rock shall be graded so that 99 percent will pass a 3/4-inch screen and 80 percent will be retained on a No. 8 screen.

## 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 offsite 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 always by flagging, marking, lighting and barricading. It shall also be the CONTRACTOR's responsibility to preserve and protect all above and underground structures, pipe lines, conduits, cables, drains or utilities which are existing 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 because of construction shall be borne by the CONTRACTOR without additional cost to the OWNER.

### 3.02 TRENCH EXCAVATION

- A. All trenching shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926), State of Florida "Trench Safety Act" (Part IV,

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### TRENCHING, BEDDING, BACKFILL FOR PIPES, AND SITE EARTHWORK

Chapter 553 of the Florida Statutes) and local requirements. Where conflict between OSHA, State and local requirements exists, the most stringent requirements shall apply.

- B. 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 30-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.
- C. Rock shall be removed to a minimum 8-inches clearance around the bottom and sides of all the pipe or ducts being laid.
- D. Where pipe or ducts are to be laid in limerock 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. The bottom of the excavations shall be firm and dry and in all respects acceptable to the ENGINEER. Excavate any organic soil material from the bottom of the trench and replace with rock bedding, at least 6 inches thick.

#### 3.03 PIPE INTERFERENCES AND ENCASEMENT

- A. In no case shall there be less than 0.5 feet between any two pipe lines or between pipe lines and structures.
- B. Wherever there is more than 0.5 foot but less than 1.0-foot clearance between any two pipe lines, or between pipe lines and structures, then a concrete encasement shall be provided in accordance with the typical detail as shown on the Drawings.
- C. Provide concrete encasement of piping under structures as per the details on the Drawings.
- D. The ENGINEER shall have full authority to direct the placement of the various pipes and structures to facilitate construction, expedite completion and to avoid conflicts.

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#### 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 compacted material to the mid-diameter of the pipe.
- 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 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 (ASTM D1557) 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 common fill by rolling, ramming, or puddling, as the ENGINEER may direct. Compact common fill in 6-inch layers to 95 percent maximum density (ASTM D1557).
- G. The bedding rock in muck areas shall consist of at least 6 inches of washed and graded limerock 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 ground water. 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.
- H. 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 center line of the pipe in level layers not exceeding 6-inches in depth.
  - 2. Wet each layer to the extent directed and thoroughly compact each layer with a power tamper to the satisfaction of the ENGINEER.

#### 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 directed 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 directed. During the process

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of excavation, the grade shall be maintained in such condition that it will be well drained at all times. When directed, 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. Shape the surface of earthwork to conform to lines, grades and cross sections that existed prior to beginning work or as shown on the drawings, within 1/10 of a foot. Round tops of banks to circular curves to not less than a 6-foot radius. Neatly and smoothly trim rounded surfaces. Do not overexcavate and backfill to achieve the proper grade.
- C. Overall area grading for which no grades are indicated shall be addressed as follows: Within the limits of construction and outer limits of clearing and grubbing, all holes and other depressions shall be filled, all mounds and ridges cut down, and the area brought to sufficiently uniform control so that the OWNER'S subsequent mowing operation will not be hindered by irregular terrain. This work shall be done regardless of whether the irregularities were the result of the CONTRACTOR'S operations or originally existed.
- D. 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 approved areas for later use. No extras will be considered for the stockpiling or double handling of excavated material.
- E. The right is reserved to make minute adjustments or revisions in lines or grades if found necessary as the work progresses, due to discrepancies on the Drawings or to obtain satisfactory construction.
- F. Stones or rock fragments larger than 2-1/2-inches in their greatest dimensions will not be permitted in the top 6-inches of the subgrade line of all dikes, fills or embankments.
- G. All fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings, or as directed by the ENGINEER.
- H. 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 directed by the ENGINEER.
- I. No grading is to be done in areas where there are existing pipe lines that may be uncovered or damaged until such lines which must be maintained are relocated, or where lines are to be abandoned, all required valves are closed and drains plugged at manholes.
- J. The CONTRACTOR shall replace all pavement cut or otherwise damaged during the progress of the work as specified elsewhere herein.



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### TRENCHING, BEDDING, BACKFILL FOR PIPES, AND SITE EARTHWORK

#### 3.06 COMPACTION

- A. Unless otherwise specified or shown on the drawings, areas outside pipe trenches must meet the following compaction requirements. All relative densities specified shall be as compared to modified proctor values as determined in the laboratory.
  - 1. Subgrade Underfill or Backfill: 95% relative density to a depth of 12 inches.
  - 2. Backfill or Fill Under Pavement: 98% relative density in 12-inch maximum layers.
  - 3. All Other Areas: 95% relative density in 12-inch maximum layers.
- B. Compact by using methods acceptable to the ENGINEER (powered tampers, vibrators, etc.). Flooding or puddling with water to consolidate backfill is not acceptable, except where sand is encountered and the specified density can be obtained using this method.
- C. During the compacting operations, maintain material within  $\pm 2\%$  of optimum moisture. Aerate material containing excessive moisture by blading, discing, or harrowing to hasten the drying process.
- D. If any field density tests are below the specified relative density, recompact or re-excavate, rebackfill and recompact the area until the specific density is obtained. Make a minimum of two field density tests per recompact and/or re-excavated area.

#### 3.07 DISPOSAL OF UNSUITABLE AND SURPLUS MATERIAL

- A. All surplus and/or unsuitable excavated material shall be disposed of in one of the following ways as directed by the ENGINEER.
  - 1. Transport to soil storage area on OWNER's property and stockpile or spread as directed by the ENGINEER.
  - 2. Transport from OWNER's property and legally dispose of. Any permit required for the hauling and disposing of this material beyond OWNER's property shall be obtained prior to commencing hauling operations.
  - 3. Suitable excavated material may be used for fill if it meets the specifications for common fill 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 nor inconvenience traffic or adjoining property OWNERS.

END OF SECTION 02221

## SECTION 02610

### SITE DRAINAGE

#### PART 1 – GENERAL

##### 1.01 SCOPE

- A. The Work under this section includes the furnishing of all labor material and equipment required to provide proper drainage of the site.

##### 1.02 GENERAL REQUIREMENTS:

- A. Pipe sizes shown on the drawings are based on concrete pipe with a coefficient of roughness based on Florida Department of Transportation Standards.
- B. All workmanship, materials, equipment and installation shall be in accordance with the applicable portions of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition, and referred to hereinafter as Standard Specification. The specific sections of the above-mentioned specifications which are applicable are listed below.

##### 1.03 SUBMITTALS

- A. Provide in accordance with Section 01300 the following:
  - 1. Product and dimensional data for all structures
  - 2. Product data for all piping
  - 3. Storm drainage schedule showing all structures, piping into and out, and elevations

#### PART 2 – MATERIALS

##### 2.01 CONCRETE PIPE

- A. Pipe: Concrete pipe shall conform to Section 449 of the Standard Specifications. All pipe shall be Class III unless otherwise noted on the Drawings.
- B. Sealing Joints: The joints of new pipe shall be sealed by use of round rubber gaskets meeting the requirements of Section 942 and as provided in Paragraph 430-7 of the Standard Specifications. All joints to be wrapped with non-woven filter fabric extending a minimum of 1-foot to either side of joint.

##### 2.02 DRAINAGE STRUCTURES

- A. Structures, including mitered end sections, shall be used where shown on the drawings and constructed in accordance with the details shown.
- B. Concrete shall be in accordance with Section 346, of the FDOT Standard Specification for Road and Bridge Construction, Latest Edition.

##### 2.03 POLYETHYLENE CORRUGATED PIPE

- A. Drainage pipe may be high density polyethylene corrugated exterior/smooth interior pipe in sizes 12 inches through 36 inches and conforming with AASHTO M294, Type

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### SITE DRAINAGE

- S. Material shall meet ASTM D 1248 Type III Category 4, Grade P33, Class C; or ASTM D 3350 Cell Classification 324420C. Minimum conveyance factor shall be a Manning "n" value of 0.010. Acceptable manufacturer shall be Hi-Q, as manufactured by Hancor, Inc., N-12 polyethylene pipe, as manufactured by Advanced Drainage Systems, Inc., or ENGINEER approved equal.
- B. Couplings and Fittings: Coupling bands shall cover at least one full corrugation on each section of pipe. When gasketed coupling bands are required, the gasket shall be made of closed-cell synthetic expanded rubber meeting the requirements of ASTM D 1056, Type 2. Gaskets shall be installed on the coupling band by the pipe manufacturer. All coupling bands shall meet or exceed the soil-tightness requirement of the AASHTO Standard Specification for Highway Bridges, Section 23, Paragraph 23.3.1.5.4(e). Pipe fittings shall conform to AASHTO M294.

#### 2.04 MANHOLES

- A. Precast Concrete Manholes: ASTM C 478, precast reinforced concrete, of depth indicated with provision for rubber gasket joints.
- B. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and having a separate base slab or base section with integral floor.
1. Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.
  2. Top Section: Eccentric cone type, unless concentric cone or flat-slab-top type is indicated. Top of cone to match grade rings.
  3. Grade Rings: Provide 2 or 3 reinforced concrete rings, of 6 to 9 inches total thickness and match 24-inch diameter frame and cover.
  4. Gaskets: ASTM C 443, rubber.
  5. Steps: Cast into base, riser, and top sections sidewall at 12-to 16-inch intervals.
  6. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
  7. Channel and Bench: Concrete.
- C. Cast-in-Place Manholes: Reinforced concrete of dimensions and with appurtenances indicated.
1. Bottom, Walls, and Top: Reinforced concrete.
  2. Channel and Bench: Concrete.
  3. Steps: Cast into sidewall at 12- to 16-inch intervals.
- D. Manhole Steps: Wide enough for an adult to place both feet on one step and designed to prevent lateral slippage off the step.
1. Material: Steel-reinforced plastic.
- E. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, heavy-duty, ductile iron, 24-inch inside diameter by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch-diameter cover, indented top design, with lettering "STORM SEWER" cast into cover.

## SECTION 02610

### SITE DRAINAGE

#### 2.05 CATCH BASINS

- A. Precast Concrete Catch Basins: ASTM C 478 or ASTM C 858, precast reinforced concrete, of depth indicated. Sections shall have provision for rubber gasket joints. Base section slab shall have minimum thickness of 6 inches.
  - 1. Base Section: Base riser section and separate base slab, or base riser section with integral floor.
  - 2. Riser Sections: Sections shall be of lengths to provide depth indicated.
  - 3. Top Section: Type to match FDOT configuration detailed.
  - 4. Grade Rings: Provide 2 or 3 reinforced concrete rings, of 6 to 9 inches total thickness, as necessary.
  - 5. Gaskets: ASTM C 443, rubber.
  - 6. Steps: Cast into riser sidewall at 12- to 16-inch intervals.
  - 7. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
  - 8. Channel and Bench: Concrete.
- B. Cast-in-Place Catch Basins: Reinforced concrete of dimensions and with appurtenances indicated.
  - 1. Bottom, Walls, and Top: Reinforced concrete.
  - 2. Channel and Bench: Concrete.
- C. Catch Basin Steps: Wide enough for an adult to place both feet on one step and designed to prevent lateral slippage off the step.
  - 1. Material: Steel-reinforced plastic.
- D. Catch Basin Frames and Grates: Per FDOT Standard Frame and Grates.

#### 2.06 OUTFALLS

- A. General: Construct of reinforced concrete pipe, mitered end section, toewalls, and rip rap, as indicated.

#### 2.07 CONCRETE AND REINFORCEMENT

- A. Concrete: Portland cement mix, 3,000 psi
  - 1. Cement: ASTM C 150, Type II
  - 2. Fine Aggregate: ASTM C 33, sand
  - 3. Coarse Aggregate: ASTM C 33, crushed gravel
  - 4. Water: Potable
- B. Reinforcement: Steel conforming to the following:
  - 1. Fabric: ASTM A 185, welded wire fabric, plain
  - 2. Reinforcement Bars: ASTM A 615, Grade 60, deformed
- C. Forms:
  - 1. Form Materials: Plywood, metal, metal-framed plywood, or other acceptable panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces without distortion or defects. Material shall be of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal.

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### SITE DRAINAGE

2. Form Release Agent: Provide commercial formulation form-release agent with a maximum of 350 mg/l volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces. Release agent to be within allowable volatile limits according to applicable local, state and federal codes.

#### 2.08 MASONRY

- A. Bricks for accessories shall be hard common clay brick. Mortar shall be one part Portland cement and three parts masonry sand to which shall be added lime putty in the amount of 50 percent of the volume of cement. Special commercial mortar mixes may be used if approved by the ENGINEER. All masonry materials shall conform to the latest applicable ASTM specifications. Set all masonry units in full beds of mortar, with full joints and strike all joints flush. Masonry reinforcements shall be galvanized Dur-O-Wal, or approved equal, and shall be installed at every other bed joint.

#### 2.09 CURING MATERIALS

- A. Conform to TT-C-800, with 30-percent minimum solids content.
- B. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yard, complying with AASHTO M-182, Class 2.
- C. Moisture-Retaining Cover: One of the following, complying with ASTM C-171.
  1. Waterproof paper
  2. Polyethylene film
  3. White burlap-polyethylene sheet
- D. Clear Solvent-Borne Liquid Membrane-Forming Curing Compound: This is a solvent-borne membrane-forming curing compound. Revise to Type II and verify manufacturer's products when a white pigmented curing compound is required. Do not use if waterborne low-VOC emissions compounds are required. ASTM C-309, Type I, Class A or B, wax free.
- E. Clear Waterborne Membrane-Forming Curing Compound:
  1. This is a waterborne membrane-forming curing compound. Use when low VOC emissions are required. ASTM C-309, Type I, Class B.
  2. Provide material that has a maximum volatile organic compound (VOC) rating of 350 mg per liter.
- F. Evaporation Control: Monomolecular film-forming compound applied to exposed concrete surfaces for temporary protection from rapid moisture loss.

### PART 3 – EXECUTION

#### 3.01 PREPARATION OF FOUNDATION FOR BURIED STORMWATER SYSTEMS

- A. Grade trench bottom to provide a smooth, firm, stable, and rock-free foundation, throughout the length of the pipe.

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### SITE DRAINAGE

- B. Remove unstable, soft, and unsuitable materials at the surface upon which pipes are to be laid, and backfill with clean sand or pea gravel to indicated level.
- C. Shape bottom of trench to fit bottom of pipe. Fill unevenness with tamped sand backfill. Dig bell holes at each pipe joint to relieve the bells of all loads and to ensure continuous bearing of the pipe barrel on the foundation.

#### 3.02 INSTALLATION, GENERAL

- A. General Locations and Arrangements: Drawings (plans and details) indicate the general location and arrangement of the underground stormwater system piping. Location and arrangement of piping layout take into account many design considerations. Install the piping as indicated, to the extent practical.
- B. Install piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert, unless approved otherwise by the ENGINEER. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings in accordance with manufacturer's recommendations for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed. The pipe shall be carefully examined for defects and the inside cleaned. After placing pipe in the ditch, the ends shall be wiped free from all dirt, sand and foreign material. All pipe and joints shall be made, handled, and installed in strict accordance with the manufacturer's recommendations and instructions. A copy of the installation manual shall be furnished to the ENGINEER prior to placing pipe on the job site.
  - 1. Install concrete pipe in accordance with applicable provisions of American Concrete Pipe Association "Concrete Pipe Field Manual", unless otherwise indicated.
  - 2. Place concrete pipe with elliptical reinforcing so that the reference lines indicating top of pipe are not more than 5 degrees from vertical plane through longitudinal axis of pipe.
- C. Use manholes or catch basins for changes in direction, except where a fitting is indicated. Use fittings for branch connections, except where direct tap into existing storm sewer is indicated. The ENGINEER shall be notified at least 24 hours before the pouring of any concrete is to be started, and such pouring shall not be started until the reinforcement has been approved as placed.
- D. Use proper size increasers, reducers, and couplings, where different size or material of pipes and fittings are connected. Reduction of the size of piping in the direction of flow is prohibited.
- E. Install piping pitched down in direction of flow, at minimum slope per plans.
- F. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed, by tunneling, jacking, or a combination of both.

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### SITE DRAINAGE

#### 3.03 MANHOLES

- A. General: Install manholes complete with accessories as indicated. Form continuous concrete or split pipe section channel and benches between inlets and outlet. Set tops of frames and covers flush with finish surface where manholes occur in pavements. Elsewhere, set tops 3 inches above finished grade, unless otherwise indicated.
- B. Place precast concrete manhole sections as indicated, and install in accordance with ASTM C 891.
- C. Construct cast-in-place manholes as indicated.
- D. Provide rubber joint gasket complying with ASTM C 443 at joints of sections.
- E. Apply bituminous mastic coating at joints of sections.

#### 3.04 CATCH BASINS

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

#### 3.05 OUTFALLS

- A. Construct outfalls of reinforced concrete which will attain 28-day compressive strength of not less than 3000 psi.

#### 3.06 TAP CONNECTIONS

- A. Make connections to existing piping and underground structures so that finished work will conform as nearly as practicable to the requirements specified for new work.
- B. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye fitting plus 6-inch overlap, with not less than 6 inches of 3,000-psi, 28-day compressive-strength concrete.
- C. Make branch connections from side into existing 15 to 18-inch piping by removing section of existing pipe and installing wye fitting into existing piping. Encase entire wye with not less than 6 inches of 3,000-psi, 28-day compressive-strength concrete.
- D. Make branch connections from side into existing 24-inch or larger piping or to underground structures by cutting opening into existing unit sufficiently large to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall, unless otherwise indicated. On outside of pipe or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.

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### SITE DRAINAGE

1. Provide concrete that will attain minimum 28-day compressive strength of 3,000 psi, unless otherwise indicated.
  2. Use epoxy bonding compound as interface between new and existing concrete and piping materials.
- E. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris, concrete, or other extraneous material that may accumulate.

#### 3.07 CLOSING ABANDONED STORMWATER SYSTEMS

- A. Abandoned Piping: Close open ends of abandoned underground piping that is indicated to remain in place. Provide sufficiently strong closures to withstand hydrostatic or earth pressure that may result after ends of abandoned utilities have been closed.
1. Close open ends of concrete pipe or structures with not less than 8-inch-thick brick masonry bulkheads.
  2. Close open ends of other piping with plastic plugs, or other acceptable methods suitable for size and type of material being closed. Wood plugs are not acceptable.
- B. Abandoned Structures: Remove structure and close open ends of the remaining piping or remove top of structure down to not less than 3 feet below final grade; fill structure with stone, rubble, gravel, or compacted dirt, to within 1 foot of top of structure remaining, and fill with concrete.

#### 3.08 FIELD QUALITY CONTROL

- A. Testing: Perform testing of completed piping in accordance with local authorities having jurisdiction. All sampling and testing shall be conducted by a testing laboratory under the direction of a Professional Engineer, licensed in the State of Florida, at the CONTRACTOR's expense. Submit test results directly to the ENGINEER. The following tests shall be taken:
1. 28-day compressive test of concrete, minimum of three test cylinders per 50 cubic yards of concrete poured.
  2. Air content, minimum one test for each day's pour.
  3. Slump test, minimum one test for each day's pour.
  4. CONTRACTOR shall replace materials removed for testing purposes.
  5. Should any work or materials fail to meet the requirements set forth in the plans and specifications, CONTRACTOR shall pay for retesting of same.
- B. Cleaning: Clear interior of piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.
1. In large, accessible piping, brushes and brooms may be used for cleaning.
  2. Place plugs in ends of uncompleted pipe at end of day or whenever work stops.
  3. Flush piping between manholes, to remove collected debris.
- C. Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred.



## SECTION 02610

### SITE DRAINAGE

- D. Make inspections after pipe between manholes has been installed, cleaned and approximately 2 feet of backfill is in place, and again at completion of project. Each section of pipe between structures is to show from either end on examination, a full circle of light. Each appurtenance to the system shall be of the specified size and form, to neatly and substantially constructed, with the top set permanently to exact position and grade.

If inspection indicates poor alignment, debris, displaced pipe, infiltration, or other defects, correct such defects and reinspect. All repairs shown necessary by the inspections are to be made, broken or cracked pipe replaced, all deposits removed and the pipe left true to line and grade as herein specified, or shown on the plans, entirely clean and free from abnormalities and ready for use.

- E. Limits of Infiltration and Methods of Testing: The allowable limit of groundwater infiltration for the entire system of new stormwater systems or any one trunk, or interceptor shall be in complete accordance with ASTM C425-71T and shall not exceed a limit of infiltration equal to 0.2 gal/inch diameter/hour/100 linear feet of pipe.
1. The test will be made by measuring the infiltrated flow of water over a measuring weir set up in the invert of the sewer, or by an alternate method approved by the ENGINEER, a known distance from a temporary bulkhead or other limiting point of infiltration. After the sewer have been pumped out, and normal conditions prevail, tests shall be started.
  2. Tests shall be run continuously for a period of not less than three(3) hours, with weir readings taken at 20 minute intervals. The tests shall be made by the CONTRACTOR. The ENGINEER shall be notified 24 hours in advance. Where infiltration occurs in excess of the specified amount, the defective pipe or joints shall be located and repaired at the expense of the CONTRACTOR. If the defective portions cannot be located, the CONTRACTOR, at his own expense, shall remove and reconstruct as much of the original work as necessary to obtain a sewer within allowable infiltration limits upon such retesting as necessary.
- F. Clean-up: Before final inspection and acceptance, the CONTRACTOR shall clean ditches, shape shoulders and restore all disturbed areas, including street crossings, grass plots, to as good as condition as existed before work started. All trenches shall be leveled and loose material removed from pavement gutters, sidewalks, pipe lines, and inlet sediment traps, employing hand labor, if necessary.

END OF SECTION 02610

## SECTION 03300

### CAST-IN-PLACE CONCRETE

#### PART 1- GENERAL

##### 1.01 SCOPE OF WORK

- A. Description of scope and intent
1. CONTRACTOR shall provide all material, labor, and tools required to complete the installation of specified system.
  2. Any omission of reference to items required to complete the full operational and functional system specified in the section does not relieve the CONTRACTOR of the obligation to provide same.
  3. To provide installation of all items, including delivery, dispersing to the proper locations within the building, and affixing in place.
  4. Installation shall be accomplished by workers skilled in their craft that will perform their work in a professional manner and will leave the premises safe, orderly and clean.
  5. Drawings and general provisions of Contract, including General and Supplemental Conditions and Division 1 Specification Sections, apply to this Section.
  6. CONTRACTOR is responsible for coordination of work included in this specification with all other specification sections related to furnishing of all materials, labor, permits, fees and services necessary for completion of work in this section.
- B. Section Includes:
1. Formwork for cast in place concrete, with shoring, bracing, and anchorage.
  2. Formwork accessories.
  3. Form stripping.
  4. Reinforcing steel for cast in place concrete.
  5. Grout.
  6. Cast in place concrete, including concrete for the following:
    - a. Foundations, footings.
    - b. Slabs on grade.
    - c. Supported slabs.
    - d. Foundation and structural walls.
    - e. Equipment pads and bases.
  7. Concrete curing.
  8. Shoring and reshoring.

##### 1.02 REFERENCES

All referenced standards refer to the edition in force at the time these plans and Specifications are issued for bidding.

- A. AASHTO M 182 Standard Specification for Burlap Cloth Made from Jute or Kenaf; American Association of State Highway and Transportation Officials.
- B. ACI 117 Standard Tolerances for Concrete Construction and Materials; American Concrete Institute.
- C. ACI 201.2R Guide to Durable Concrete; American Concrete Institute.

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### CAST-IN-PLACE CONCRETE

- D. ACI 211.1 Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute.
- E. ACI 214 Recommended Practice for Evaluation of Compression Test Results of Field Concrete.
- F. ACI 301 Specifications for Structural Concrete for Buildings; American Concrete Institute.
- G. ACI 302.1R Guide for Concrete Floor and Slab Construction; American Concrete Institute.
- H. ACI 304R Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute.
- I. ACI 305R Hot Weather Concreting; American Concrete Institute.
- J. ACI 306R Cold Weather Concreting; American Concrete Institute.
- K. ACI 318 Building Code Requirements for Reinforced Concrete; American Concrete Institute.
- L. ACI 347R Guide to Formwork for Concrete; American Concrete Institute.
- M. ACI 350 Code Requirements for Environmental Engineering Concrete Structures.
- N. ACI 350.1 Specification for Tightness Testing of Environmental Engineering Concrete Containment Structures & Commentary
- O. ACI 372 Guide to Design and Construction of Circular Wire-and-Strand-Wrapped Prestressed Concrete Structures
- P. ACI SP 66 ACI Detailing Manual; American Concrete Institute.
- Q. ASTM A 185 Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
- R. ASTM A 615 Standard Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
- S. ASTM C 31 Standard Practice for Making and Curing Concrete Test Specimens in the Field.
- T. ASTM C 33 Standard Specification for Concrete Aggregates.
- U. ASTM C 39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

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### CAST-IN-PLACE CONCRETE

- V. ASTM C 42 Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
- W. ASTM C 94 Standard Specification for Ready Mixed Concrete.
- X. ASTM C 143 Standard Test Method for Slump of Hydraulic Cement Concrete.
- Y. ASTM C 150 Standard Specification for Portland Cement.
- Z. ASTM C 171 Standard Specifications for Sheet Materials for Curing Concrete.
- AA. ASTM C 172 Standard Practice for Sampling Freshly Mixed Concrete.
- BB. ASTM C 173 Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
- CC. ASTM C 231 Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- DD. ASTM C 260 Standard Specifications for Air Entraining Admixtures for Concrete.
- EE. ASTM C 494 Standard Specifications for Chemical Admixtures for Concrete.
- FF. ASTM C 618 Standard Specifications for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
- GG. ASTM C 685 Standard Specifications for Concrete Made by Volumetric Batching and Continuous Mixing.
- HH. ASTM C 881 Standard Specification for Epoxy Resin Base Bonding Systems for Concrete.
- II. ASTM C 1059 Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.
- JJ. ASTM C 1107 Standard Specification for Packaged Dry, Hydraulic Cement Grout (Nonshrink).
- KK. ASTM D 1751 Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
- LL. ASTM D 1752 Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- MM. ASTM E 154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth under Concrete Slabs, on Walls, or as Ground Cover.

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### CAST-IN-PLACE CONCRETE

NN. ASTM E 329 Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.

OO. CRSI Manual of Standard Practice; Concrete Reinforcing Steel Institute.

PP. Florida Building Code – FBC

#### 1.03 DEFINITIONS

A. Unexposed Finish: A general use finish, with no appearance criteria, applicable to all formed concrete concealed from view after completion of construction.

B. Exposed Finish: A general use finish applicable to all formed concrete exposed to view except those indicated to receive textured finish and including surfaces which may receive a paint coating (if any).

#### 1.04 SUBMITTALS

A. All submittals shall be submitted in accordance with Section 01300.

B. Product Data: Submit manufacturer's product data for the following:

1. Formwork accessories.
2. Form liners.
3. Concrete admixtures.
4. Grout.
5. Bonding compound.
6. Epoxy bonding system

C. Aggregates: Submit test reports showing compliance with specified quality and gradation.

D. Shop Drawings: Submit shop drawings for fabrication and placement of the following:

1. Reinforcement: Comply with ACI SP 66. Include bar schedules, diagrams of bent bars, arrangement of concrete reinforcement, and splices.
  - a. Show construction joints.
  - b. Include details of reinforcement at openings through concrete structures.
  - c. Include elevations of reinforcement in walls.
  - d. Show stirrup spacing.
  - e. Concrete embedment's.
2. Shoring and reshoring for elevated concrete placement shall include:
  - a. Location, size, and type of all shoring members.
  - b. Location, size, and type of all reshoring members.
  - c. Location, size, and type of all mud sills, blocking, temporary lateral bracing and other accessories necessary to safely support and brace the structure during construction.
  - d. Prepare shop drawings under seal of professional structural ENGINEER registered in the state of Florida.

## SECTION 03300

### CAST-IN-PLACE CONCRETE

- E. Quality Control Submittals
1. Submit the following information related to quality assurance requirements specified:
  2. Design data: Submit proposed mix designs and test data before concrete operations begin. Identify for each mix submitted the method by which proportions have been selected.
    - a. For mix designs based on trial mixtures, include trial mix proportions, test results, and graphical analysis and show required average compressive strength  $f'(cr)$ .
    - b. Indicate quantity of each ingredient per cubic yard of concrete.
    - c. Indicate type and quantity of admixtures proposed or required.
  3. Test reports: Submit laboratory test reports for all testing specified.
  4. Certifications: Submit affidavits from an independent testing agency certifying that all materials furnished under this section conform to specifications.
  5. Certifications: Provide certification from manufacturers of concrete admixtures that chloride content complies with specified requirements.
  6. Certifications: Submit mill test certificates for all reinforcing steel furnished under this section, showing physical and chemical analysis.
  7. Placement schedule: Submit concrete placement schedule prior to start of any concrete placement operations. Include location of all joints indicated on drawings, plus anticipated construction joints.
  8. Submit batch tickets complying with ASTM C 685 or delivery tickets complying with ASTM C 94, as applicable, for each load of concrete used in the work.
    - a. Include on the tickets the additional information specified in the ASTM document.
  9. Cold weather concreting: Submit description of planned protective measures.
  10. Hot weather concreting: Submit description of planned protective measures.
  11. Mass Concrete: Submit description of planned protective measures.

#### 1.05 QUALITY ASSURANCE

- A. Codes and Standards: Comply with the following documents, except where requirements of the contract documents or of governing codes and governing authorities are more stringent:
1. ACI 301
  2. ACI 318
  3. ACI 350
  4. CRSI Manual of Standard Practice.
- B. Testing Agency Services:
1. Employ, at CONTRACTOR's expense, an independent testing agency acceptable to the ENGINEER to perform specified tests and other services required for quality assurance.
    - a. Testing agency shall meet ASTM E 329 requirements.

## SECTION 03300

### CAST-IN-PLACE CONCRETE

- C. Source of Materials: Obtain materials of each type from same source for the entire project.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver reinforcement to project site bundled and tagged with metal tags indicating bar size, lengths, and other data corresponding to information shown on placement drawings.
  - 1. Concrete reinforcement materials stored on the site shall be kept on concrete blocks and supported off the ground to prevent damage and accumulation of water, dirt, or rust.
- B. Store cementitious materials in a dry, weather tight location. Maintain accurate records of shipment and use.
- C. Store aggregates to permit free drainage and to avoid contamination with deleterious matter or other aggregates. When stockpiled on ground, discard bottom 6 inches of pile.
- D. Handle aggregates to avoid segregation.

#### 1.07 PROJECT CONDITIONS

- A. Cold Weather Concreting: Comply fully with the recommendations of ACI 306.
  - 1. Well in advance of proposed concreting operations, advise the ENGINEER of planned protective measures including but not limited to heating of materials, heated enclosures, and insulating blankets.
- B. Hot Weather Concreting: Comply fully with the recommendations of ACI 05R.
  - 1. Well in advance of proposed concreting operations, advise the ENGINEER of planned protective measures including but not limited to cooling of materials before or during mixing, placement during evening to dawn hours, fogging during finishing and curing, shading, and windbreaks.
- C. Mass Concrete: Comply fully with the recommendations of ACI 207.1R.
  - 1. Well in advance of proposed concreting operations, advise the ENGINEER of planned protective measures including but not limited to cooling of materials before or during mixing, placement, curing, forms, height of lifts (max 8ft), and monitoring.

### PART 2- PRODUCTS

#### 2.01 FORMWORK

- A. Facing Materials:
  - 1. Unexposed finish concrete: Any standard form materials that produce structurally sound concrete.
  - 2. Exposed finish concrete: Materials selected to offer optimum smooth, stain free final appearance and minimum number of joints. Provide materials with sufficient strength to resist hydrostatic head without bow or deflection in excess of allowable tolerances.

## SECTION 03300

### CAST-IN-PLACE CONCRETE

3. Textured finish concrete: Materials or linings as indicated on the drawings, or as required to match ENGINEER's control sample.
- B. Formwork Accessories:
1. Form coating: Form release agent that will not adversely affect concrete surfaces or prevent subsequent application of concrete coatings.
  2. Metal ties: Commercially manufactured types; cone snap ties, taper removable bolt, or other type which will leave no metal closer than 1-1/2 inches from surface of concrete when forms are removed, leaving not more than a 1 inch diameter hole in concrete surface.
  3. Fillets: Wood or plastic fillets for chamfered corners, in maximum lengths possible.

#### 2.02 REINFORCING MATERIALS

- A. Reinforcing Bars: Provide deformed bars complying with the following, except where otherwise indicated:
1. ASTM A 615, Grade 60.
- B. Welded Wire Fabric: ASTM A 185, cold drawn steel, plain.
- C. Reinforcing Accessories:
1. Tie wire: Black annealed type, 16-1/2 gage or heavier.
  2. Supports: Bar supports conforming to specifications of CRSI "Manual of Standard Practice."
    - a. Class 1 (plastic protected) at all formed surfaces which will be exposed to weather.
    - b. Class 1 (plastic protected) or Class 2 (stainless steel protected) at all formed surfaces which will be exposed to view but not to weather.
    - c. Precast concrete blocks of strength equal to or greater than specified strength of concrete or Class 3 supports equipped with sand plates, where concrete will be cast against earth. Concrete masonry units will not be accepted.

#### 2.03 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, and as follows:
1. Type IL cement shall be the standard default cement for all structures.
- B. Fly Ash: ASTM C 618, Type C or F.
- C. Water: Potable.
- D. Aggregates:
1. Normal weight concrete: ASTM C 33.
    - a. Class 5M.
    - b. Gradation as specified below under mix design.
- E. Admixtures General: Admixtures which result in more than 0.1 percent of soluble chloride ions by weight of cement are prohibited.



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### CAST-IN-PLACE CONCRETE

- F. Air Entraining Admixture: ASTM C 260 and certified by manufacturer for compatibility with other mix components.
  - 1. Products: The following products, provided they comply with requirements of the contract documents, will be among those considered acceptable:
    - a. "Air Mix"; The Euclid Chemical Company.
    - b. "Sika Aer"; Sika Corporation.
    - c. "Micro Air"; Master Builders, Inc.
    - d. "Darex AEA"; W. R. Grace & Co.
  
- G. Water Reducing, Retarding Admixture: ASTM C 494, Type D.
  - 1. Products: The following products, provided they comply with requirements of the contract documents, will be among those considered acceptable:
    - a. "Pozzolith Retarder"; Master Builders, Inc.
    - b. "Eucon Retarder 75"; The Euclid Chemical Company.
    - c. "Daratard 17"; W. R. Grace & Co.
    - d. "PSI R Plus"; Cormix Construction Chemicals.
    - e. "Plastiment"; Sika Corporation.
    - f. "Protard"; Master Builders, Inc. (former Conchem product).
  
- H. Water Reducing and Accelerating Admixtures: ASTM C 494, Type E.
  - 1. Products: The following products, provided they comply with requirements of the contract documents, will be among those considered acceptable:
    - a. "Accelguard 80"; The Euclid Chemical Company.
    - b. "Pozzutec 20"; Master Builders, Inc.
    - c. "Gilco Accelerator"; Cormix Construction Chemicals.
  
- I. High Range Water Reducing Admixture (Superplasticizer): ASTM C 494, Type F or G.
  - 1. Products: The following products, provided they comply with requirements of the contract documents, will be among those considered acceptable:
    - a. "WRDA 19" or "Daracem 100"; W. R. Grace & Co.
    - b. "PSP Superplasticizer"; Master Builders, Inc. (former Conchem product).
    - c. "Sikament 300"; Sika Corporation.
    - d. "Eucon 37"; The Euclid Chemical Company.
    - e. "PSI Super"; Cormix Construction Chemicals.
    - f. "Rheobuild"; Master Builders, Inc.

#### 2.04 MISCELLANEOUS MATERIALS AND ACCESSORIES

- A. Vapor Retarder: Membrane for installation beneath building slabs on grade, resistant to decay when tested in accordance with ASTM E 154, and as follows:
  - 1. Polyethylene sheet, not less than 8 mils thick. Refer to 07265 for vapor barrier requirements
  
- B. Nonshrink Grout: ASTM C 1107.
  - 1. Minimum 4000 psi grout compressive strength
  - 2. Type: Provide nonmetallic type only.

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### CAST-IN-PLACE CONCRETE

3. Products: The following products, provided they comply with requirements of the contract documents, will be among those considered acceptable:
  - a. Nonmetallic type:
    - 1) "Masterflow 928"; Master Builders, Inc.
    - 2) "SonogROUT 14k"; Sonneborn Building Products Division ChemRex, Inc.
    - 3) "Euco N S Grout"; The Euclid Chemical Company.
    - 4) "Supreme"; Cormix Construction Chemicals.
    - 5) "Five Star Grout"; Five Star Products, Inc.
- C. Burlap: AASHTO M 182, Class 2 jute or kenaf cloth.
- D. Moisture Retaining Cover: ASTM C 171, and as follows:
  1. Curing paper.
  2. Polyethylene film.
  3. White burlap polyethylene sheeting.
- E. Bonding Compound: Non redispersable acrylic bonding admixture, ASTM C 1059, Type II.
  1. Products: The following products, provided they comply with requirements of the contract documents, will be among those considered acceptable:
    - a. "Everbond"; L & M Construction Chemicals, Inc.
    - b. "Flex Con"; The Euclid Chemical Company.
- F. Epoxy Bonding Systems: Epoxy adhesive for bonding fresh concrete to hardened concrete and for grouting wall pipes, bolts and reinforcing dowels. ASTM C 881; type, grade, and class as required for project conditions.
  1. Products: The following products, provided they comply with requirements of the contract documents, will be among those considered acceptable:
    - a. "Concresive LPL"; Master Builders, Inc.
    - b. "Sikadur 32 Hi Mod"; Sika Corporation.
    - c. "Euco #452 Epoxy System"; The Euclid Chemical Company.
    - d. "Sikastix 390".
    - e. "EucoEpoxy 461".
    - f. "Five Star Epoxy Grout".
    - g. "Sikstix 370".
    - h. "EucoEpoxy 463".
- G. Expansion Joint Filler
  1. Expansion Joint Filler shall be performed non-extruding and resilient type meeting the Specifications of ASTM D1751, or D1752, unless otherwise specified.
  2. All expansion joints in base slabs on grade other than hydraulic structures shall be fiber expansion joints of required slab depth meeting the requirement of ASTM D1751, Type I and AASHTO M213. Exposed joints shall be sealed as specified below.
  3. All expansion joints in hydraulic structures shall be ¾ inch sponge rubber expansion joints of required wall thickness meeting the requirements of ASTM D1752, Type I and AASHTO M153, Type I. Joints shall be sealed on both sides as specified below.

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### CAST-IN-PLACE CONCRETE

- a. Nonextruding bituminous type: ASTM D 1751.
  - b. Sponge rubber type: ASTM D 1752, Type I.
- H. Expansion Joint Sealer
1. Joint sealants for hydraulic structures shall be one of the following, or approved equal:
    - a. "CM-60" two-part gray tone, as manufactured by W. R. Meadows, Inc., applied over a backer rod sized for the joint. Underwater primer shall be used on all joints subject to immersion. Standard "CM-60" primer shall be applied to all other joints. Sealant depth shall be one-half the width of the joint.
    - b. The sealant shall be a two-part, polyurethane sealant "Eucolastic I" by the Euclid Chemical Company or "Sikaflex 1a" by Sika Chemical Company. Joint width should be 4 times the expected joint movement, but not less than ¼ inch. All joints shall be primed with "Eucolastic Primer" by the Euclid Chemical Company or "Sikaflex 429" by Sika Chemical Company.
- I. PVC Waterstops
- Waterstops: Made of Polyvinyl Chloride (PVC) and of subzero grade, Plastigrip, Type W-6 as manufactured by Progress Unlimited, Inc. or approved equivalent.
1. Minimum 4-inch x 3/16inch- or as specified on the drawings.
  2. Produced from a compound, the base resin of which shall be virgin PVC.
  3. Minimum Properties:
    - a. 2000 psi minimum tensile strength, ASTM D412-51T
    - b. 350% minimum elongation, ASTM D412-51T
    - c. -35 degrees F minimum low temperature brittleness, ASTM D746-57T
    - d. 65-75 shore 'A' durometer hardness, ASTM D676-59T
    - e. 0.15 maximum water absorption, ASTM D570-59T
  4. Field Splicing:
    - a. Butt splices shall be fused welded using a thermostatically controlled Teflon PVC Waterstop iron at the Manufacturer's recommended temperature
    - b. Lapping, gluing or use of adhesives shall not be permitted.
    - c. Provide factory made waterstop fabrications for all changes of directions, intersections, and transitions leaving only butt joint splicing for the field.
  5. Center waterstop in the joint and secure in correct position.
  6. Use ribbed center bulb for all moving joints. Use dumbbell for all non-movement joints.
  7. Always place the center bulb in the center of the expansion joint. Do not embed the center bulb in concrete.
  8. Vibrate concrete around waterstops thoroughly to prevent honeycombing and to ensure contact between concrete and waterstop.

## 2.05 CONCRETE MIX DESIGN

- A. Review: Do not begin concrete operations until proposed mix has been reviewed by the ENGINEER.

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- B. Proportioning of Normal Weight Concrete: Comply with recommendations of ACI 211.1.
- C. Required Average Strength: Establish the required average strength  $f'(cr)$  of the design mix on the basis of trial mixtures as specified in ACI 301, and proportion mixes accordingly. Employ an independent testing agency acceptable to the ENGINEER for preparing and reporting proposed mix design.
- D. Proportion normal-weight concrete mix to produce an average strength at 28 day as follows unless otherwise indicated on the drawings:
  - 1. Columns, beams, walls, footings and slabs: 4000 psi
  - 2. Masonry Filled Grout: 3000 psi
  - 3. Prestressed Elements: 5000 psi
- E. Fly Ash:
  - 1. The CONTRACTOR may elect to replace a portion of the Portland cement with fly ash up to a maximum of 25 percent by weight of cement plus fly ash.
- F. Admixtures:
  - 1. Air entraining admixture: Add at rate to achieve specified air content.
    - a. Do not use in slabs on grade scheduled to receive topping, unless manufacturer of topping recommends use over air entrained concrete.
  - 2. Water reducing and retarding admixture: Add as required in concrete mixes to be placed at ambient temperatures above 90 degrees F.
  - 3. Water reducing and accelerating admixture: Add as required in concrete mixes to be placed at ambient temperatures below 50 degrees F.
  - 4. High range water reducing admixture (superplasticizer): Add as required for placement and workability.
  - 5. Do not use admixtures not specified or approved.
- G. Design mix to meet or exceed each requirement specified. Where more than one criterion is specified, the most stringent shall apply. For example, a minimum cement content or maximum water cement ratio might result in strengths greater than the minimum specified; likewise, a greater cement content or lower water cement ratio may be required in order to achieve the required strength.
  - 1. Specified compressive strength  $f'(c)$  (ASTM C 39): As noted
  - 2. Maximum water cement ratio by weight:
    - a. 0.4 for concrete toppings subject to traffic
    - b. 0.45 for all other concrete
  - 3. Maximum slump: As recommended in ACI 211.1. and ACI 350 as applicable.
  - 4. Gradation of coarse aggregate: ASTM C 33 standard gradation with maximum nominal size of 3/4 inches.
  - 5. Total air content (ASTM C 173 or ASTM C 231): 5 percent.
- H. Mix Adjustments: Provided that no additional expense to OWNER is involved, CONTRACTOR may submit for ENGINEER's approval requests for adjustment to approved concrete mixes when circumstances such as changed project conditions, weather, or unfavorable test results occur. Include laboratory test data substantiating specified properties with mix adjustment requests.

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### CAST-IN-PLACE CONCRETE

#### 2.06 CONTROL OF MIX IN THE FIELD

- A. Slump: A tolerance of up to 1 inch above that specified will be permitted for 1 batch in 5 consecutive batches tested. Concrete of lower slump than that specified may be used, provided proper placing and consolidation is obtained.
  - 1. If slump upon arrival at the site is lower than 1 inch below the value specified, one addition of water in accordance with ASTM C 94 will be permitted to bring slump within tolerance, provided that:
    - a. A positive means is available to measure the amount of water added at the site.
    - b. The specified (or approved) maximum water cement ratio is not exceeded.
    - c. Not more than 45 minutes have elapsed since batching.
- B. Total Air Content: A tolerance of plus or minus 1 1/2 percent of that specified will be allowed for field measurements.
- C. Do not use batches that exceed tolerances.

#### 2.07 CONCRETE MIXING

- A. On Site Equipment: Mix concrete materials in appropriate drum type batch machine mixer, in compliance with ASTM C 685. Mix each batch minimum of 1 1/2 minutes and maximum of 5 minutes before discharging concrete. Clean thoroughly at end of day and before changing concrete type.
- B. Transit Mixers: Mix concrete materials in transit mixers, complying with requirements of ASTM C 94.
  - 1. At ambient temperatures of 85 to 90 degrees F, reduce mixing and delivery time to 75 minutes.
  - 2. At ambient temperatures above 90 degrees F, reduce mixing and delivery time to 60 minutes.

### PART 3- EXECUTION

#### 3.01 CONCRETE FORM PREPARATION

- A. General: Comply with requirements of ACI 301 and ACI 347 for formwork, and as herein specified. The CONTRACTOR is responsible for design, ENGINEER, and construction of formwork, and for its timely removal.
- B. Earth Forms: Hand trim bottoms and sides of earth forms to profiles indicated on the drawings. Remove loose dirt before placing concrete.
- C. Design: Design and fabricate forms for easy removal, without impact, shock, or damage to concrete surfaces or other portions of the work. Design to support all applied loads until concrete is adequately cured, within allowable tolerances and deflection limits.

## SECTION 03300

### CAST-IN-PLACE CONCRETE

- D. Construction: Construct and brace formwork to accurately achieve end results required by contract documents, with all elements properly located and free of distortion. Provide for necessary openings, inserts, anchorages, and other features shown or otherwise required.
  - 1. Joints: Minimize form joints and make watertight to prevent leakage of concrete.
    - a. Align joints symmetrically at exposed conditions.
  - 2. Chamfers: Provide chamfered edges and corners at exposed locations, unless specifically indicated otherwise on the drawings.
  - 3. Permanent openings: Provide openings to accommodate work of other trades, sized and located accurately. Securely support items built into forms; provide additional bracing at openings and discontinuities in formwork.
  - 4. Temporary openings: Provide temporary openings for cleaning and inspection in most inconspicuous locations at base of forms, closed with tight fitting panels designed to minimize appearance of joints in finished concrete work.
- E. Tolerances for Formed Surfaces: Comply with minimum tolerances established in ACI 117, unless more stringent requirements are indicated on the drawings.
- F. Release Agent: Provide either form materials with factory applied non-absorptive liner or field applied form coating. If field applied coating is employed, thoroughly clean and recondition formwork and reapply coating before each use. Rust on form surfaces is unacceptable.

#### 3.02 VAPOR RETARDER INSTALLATION

- A. General: Place vapor retarder sheet over prepared base material, aligning longer dimension parallel to direction of pour and lapped 6 inches. Seal joints with appropriate tape.

#### 3.03 PLACING REINFORCEMENT

- A. General: Comply with requirements of ACI 301 and as herein specified.
- B. Preparation: Clean reinforcement of loose rust and mill scale, soil, and other materials which adversely affect bond with concrete.
- C. Placement: Place reinforcement to achieve not less than minimum concrete coverages required for protection. Accurately position, support, and secure reinforcement against displacement. Provide Class C tension lap splices complying with ACI 318 unless otherwise indicated. Do not field bend partially embedded bars unless otherwise indicated or approved.
  - 1. Use approved bar supports and tie wire, as required. Set wire ties to avoid contact with or penetration of exposed concrete surfaces. Tack welding of reinforcing is not permitted.
  - 2. Wire fabric: Install in maximum lengths possible, lapping adjoining pieces not less than one full mesh. Offset end laps to prevent continuous laps in either direction, and splice laps with tie wire.
- D. Welding: Welding of reinforcement is not permitted.

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### CAST-IN-PLACE CONCRETE

#### 3.04 JOINT CONSTRUCTION

- A. Construction Joints: Locate and install construction joints as indicated on drawings. If construction joints are not indicated, locate in manner which will not impair strength and will have least impact on appearance, as acceptable to the ENGINEER. Construction joints in retaining walls and walls of concrete tanks or structures subject to hydrostatic pressure shall be intentionally roughened to a full amplitude of approximately  $\frac{1}{4}$  inch.
  - 1. Keyways: Provide keyways not less than 1 1/2 inches deep.
  - 2. Reinforcement: Continue reinforcement across and perpendicular to construction joints, unless details specifically indicate otherwise.
- B. Isolation Joints: Construct isolation joints in slabs poured on grade at points of contact with vertical components, such as foundation walls and column pedestals. Install expansion joint filler to full concrete depth. Recess top edge of filler 1/8 inch where joints are unsealed.
- C. Expansion Joints: Construct expansion joints where indicated. Install expansion joint filler to full depth of concrete. Recess edge of filler to depth indicated to receive joint sealant and backer rod as specified herein and detailed on drawings.
- D. Control Joints: Construct contraction joints in building slabs poured on grade to form panels of sizes indicated on drawings, but not more than 20 feet apart in either direction.
  - 1. Saw cuts: Form control joints by means of saw cuts one fourth the depth of the slab, performed as soon as possible after slab finishing without dislodging aggregate.

#### 3.05 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set anchorage devices and other items required for other work connected to or supported by cast in place concrete, using templates, setting drawings, and instructions from suppliers of items to be embedded.
  - 1. Edge Forms and Screeds: Set edge forms and intermediate screeds as necessary to achieve final elevations indicated for finished slab surfaces.

#### 3.06 WATERSTOPS

- A. Waterstops shall be provided at all joints to seal off leakage of liquid from or into concrete tanks or structures subject to hydrostatic pressures. The type of waterstops used shall be as shown on the Drawings and as specified herein. The CONTRACTOR shall submit to the ENGINEER for approval the proposed procedure and schedule of concrete placing operations along with a detailed layout of the waterstop materials required showing sizes, lengths and types of joints.
- B. Where required for proper location of waterstops, whether shown on the Drawings or not, starter walls of up to 1-1/2 inches in height and monolithic with slabs shall be provided at all wall construction joints. Reinforcing steel shall not be depressed at waterstops but shall have only the amount of concrete covering shown or specified. Starter walls as specified shall be required whether shown on the Drawings or not, unless specified concrete cover over reinforcing steel is 3 inches or greater.

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### CAST-IN-PLACE CONCRETE

#### 3.07 CONCRETE PLACEMENT

- A. Preparation: Provide materials necessary to ensure adequate protection of concrete during inclement weather before beginning installation of concrete.
- B. Inspection: Before beginning concrete placement, inspect formwork, reinforcing steel, and items to be embedded, verifying that all such work has been completed.
  - 1. Wood forms: Moisten immediately before placing concrete in locations where form coatings are not used.
- C. Placement General: Comply with requirements of ACI 304 and as follows:
  - 1. Concreting should be carried on at such a rate that the concrete is at all times plastic and flows readily into spaces between reinforcement.
  - 2. Schedule continuous placement of concrete to prevent the formation of cold joints.
  - 3. Provide construction joints if concrete for a particular element or component cannot be placed in a continuous operation.
  - 4. Deposit concrete as close as possible to its final location, to avoid segregation.
  - 5. Concrete shall be worked around reinforcement and embedded fixtures and into corners of forms.
  - 6. The following shall be prohibited from use:
    - a. Partially hardened concrete.
    - b. Contaminated concrete.
    - c. Re-tempered concrete.
    - d. Re-mixed concrete after initial set has occurred.
- D. Placement in Forms: Limit horizontal layers to depths which can be properly consolidated, but in no event greater than 24 inches.
  - 1. Consolidate concrete by means of mechanical vibrators, inserted vertically in freshly placed concrete in a systematic pattern at close intervals. Penetrate previously placed concrete to ensure that separate concrete layers are knitted together.
  - 2. Vibrate concrete sufficiently to achieve consistent consolidation without segregation of coarse aggregates.
  - 3. Do not use vibrators to move concrete laterally.
- E. Slab Placement: Schedule continuous placement and consolidation of concrete within planned construction joints.
  - 1. Thoroughly consolidate concrete without displacing reinforcement or embedded items, using internal vibrators, vibrating screeds, roller pipe screeds, or other means acceptable to ENGINEER.
  - 2. Strike off and level concrete slab surfaces, using highway straightedges, darbies, or bull floats before bleed water can collect on surface. Do not work concrete further until finishing operations are commenced.
- F. Cold Weather Placement: Comply with recommendations of ACI 306 when air temperatures are expected to drop below 40 degrees F either during concrete placement operations or before concrete has cured.
  - 1. Do not use frozen or ice laden materials.
  - 2. Do not place concrete on frozen substrates.



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### CAST-IN-PLACE CONCRETE

- G. Hot Weather Placement: Comply with recommendations of ACI 305R when ambient temperature before, during, or after concrete placement is expected to exceed 90 degrees F or when combinations of high air temperature, low relative humidity, and wind speed are such that the rate of evaporation from freshly poured concrete would otherwise exceed 0.2 pounds per square foot per hour.
1. Do not add water to approved concrete mixes under hot weather conditions.
  2. Provide mixing water at lowest feasible temperature and provide adequate protection of poured concrete to reduce rate of evaporation.
  3. Use fog nozzle to cool formwork and reinforcing steel immediately prior to placing concrete.
- H. Mass Concrete Placement: Comply with recommendations of ACI 207.1R when any volume of concrete with dimensions large enough to require that measures be taken to cope with generation of heat from hydration of the cement and attendant volume change to minimize cracking.
1. When the minimum dimension of the concrete exceeds 36 inches and the ratio of volume of concrete to the surface area is greater than 12 inches, provide for mass concrete.
  2. Lifts shall not exceed 8ft.

#### 3.08 FINISHING FORMED SURFACES

- A. Repairs, General: Repair surface defects, including tie holes, immediately after removing formwork.
1. Remove honeycombed areas and other defective concrete down to sound concrete, cutting perpendicular to surface or slightly undercutting. Dampen patch location and area immediately surrounding it prior to applying bonding compound or patching mortar.
  2. Before bonding compound has dried, apply patching mixture matching original concrete in materials and mix except for omission of coarse aggregate, and using a blend of white and normal Portland cement as necessary to achieve color match. Consolidate thoroughly and strike off slightly higher than surrounding surface.
- B. Textured Form Finish: Repair tie holes and patch defective areas to match pattern created by form construction or form liners.
- C. Unexposed Form Finish: Repair tie holes and patch defective areas. Rub down or chip off fins or other raised areas exceeding ¼-inch height.
- D. Exposed Form Finish: Repair and patch defective areas, with fins or other projections completely removed and smoothed.
1. Smooth rubbed finish: Apply to surfaces indicated no later than 24 hours after form removal.
    - a. Wet concrete surfaces to be finished and rub with Carborundum brick or other abrasive until uniform color and texture are achieved.
    - b. Do not apply separate grout mixture.
  2. Contiguous unformed surfaces: Strike smooth and float to a similar texture tops of walls, horizontal offsets, and other unformed surfaces adjacent to or contiguous with formed surfaces. Continue final finish of formed surfaces across unformed surfaces, unless otherwise specifically indicated.

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### CAST-IN-PLACE CONCRETE

#### 3.09 FINISHING SLABS

- A. Finishing Operations
  - 1. Do not directly apply water to slab surface or dust with cement.
  - 2. Use hand or powered equipment only as recommended in ACI 302.1R.
  - 3. Screeding: Strike off to required grade and within surface tolerances indicated. Verify conformance to surface tolerances. Correct deficiencies while concrete is still plastic.
  - 4. Bull Floating: Immediately following screeding, bull float or darby before bleed water appears to eliminate ridges, fill in voids, and embed coarse aggregate. Recheck and correct surface tolerances.
  - 5. Do not perform subsequent finishing until excess moisture or bleed water has disappeared and concrete will support either foot pressure with less than ¼-inch indentation or weight of power floats without damaging flatness.
  - 6. Final floating: Float to embed coarse aggregate, to eliminate ridges, to compact concrete, to consolidate mortar at surface, and to achieve uniform, sandy texture. Recheck and correct surface tolerances.
- B. Coordinate appearance and texture of required final finishes with the ENGINEER before application.
  - 1. Apply final finishes in the locations indicated on the drawings.
- C. Float Finish: As specified above.
- D. Broomed Float Finish: After floating and when water sheen has practically disappeared, apply uniform transverse corrugations approximately 1/16-inch deep, without tearing surface.
- E. Slab Surface Tolerances:
  - 1. Achieve flat, level planes except where grades are indicated. Slope uniformly to drains.
  - 2. Floated finishes: Depressions between high spots shall not exceed 5/16 inch under a 10-foot straightedge.
- F. Repair of Slab Surfaces: Test slab surfaces for smoothness and to verify surface plane to tolerance specified. Repair defects as follows:
  - 1. High areas: Correct by grinding after concrete has cured for not less than 14 days.
  - 2. Low areas: Immediately after completion of surface finishing operations, cut out low areas and replace with fresh concrete. Finish repaired areas to blend with adjacent concrete. Proprietary patching compounds may be used when approved by the ENGINEER.
  - 3. Crazed or cracked areas: Cut out defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts. Dampen exposed concrete and apply bonding compound. Mix, place, compact, and finish patching concrete to match adjacent concrete.

## SECTION 03300

### CAST-IN-PLACE CONCRETE

4. Isolated cracks and holes: Groove top of cracks and cut out holes not over 1 inch in diameter. Dampen cleaned concrete surfaces and apply bonding compound; place dry pack or proprietary repair compound acceptable to ENGINEER while bonding compound is still active:
  - a. Dry pack mix: One part Portland cement to 2-1/2 parts fine aggregate and enough water as required for handling and placing.
  - b. Install patching mixture and consolidate thoroughly, striking off level with and matching surrounding surface. Do not allow patched areas to dry out prematurely.

#### 3.10 CONCRETE CURING AND PROTECTION

##### A. General

1. Prevent premature drying of freshly placed concrete and protect from excessively cold or hot temperatures until concrete has cured.
2. Provide curing of concrete by one of the methods listed and as appropriate to service conditions and type of applied finish in each case.

##### B. Curing Period

1. Not less than 7 days for standard cements and mixes.
2. Not less than 4 days for high early strength concrete using Type III cement.

##### C. Curing Temperature

1. Concrete shall be maintained above 50 degrees F and in moist condition during the entire curing period.

##### D. Formed Surfaces: Cure formed concrete surfaces by moist curing with forms in place for full curing period.

1. Keep wooden or metal forms moist when exposed to heat of the sun.
2. If forms are removed prior to completion of curing process, continue curing by one of the applicable methods specified.

##### E. Surfaces Not in Contact with Forms

1. Start initial curing as soon as free water has disappeared, but before surface is dry.
2. Keep continuously moist for not less than 3 days by uninterrupted use of any of the following:
  - a. Water ponding.
  - b. Water saturated sand.
  - c. Water fog spray.
  - d. Saturated burlap: Provide 4-inch minimum overlap at joints.
3. Begin final curing procedures immediately following initial curing and before concrete has dried.
  - a. Moisture retaining cover: Lap not less than 3-inches at edges and ends, and seal with waterproof tape or adhesive. Repair holes or tears during curing period with same tape or adhesive. Maintain covering in intimate contact with concrete surface. Secure to avoid displacement.
    - 1) Extend covering past slab edges at least twice the thickness of slab.
    - 2) Do not use plastic sheeting on surfaces which will be exposed to view when in service.
    - 3) Continue final curing to end of curing period.

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### CAST-IN-PLACE CONCRETE

- F. Avoid rapid drying at end of curing period.
- G. During and following curing period, protect concrete from temperature changes of adjacent air in excess of 5 degrees F per hour and 50 degrees F per 24 hours. Progressively adjust protective measures to provide uniform temperature changes over entire concrete surface.

#### 3.11 SHORES AND SUPPORTS

- A. General: Comply with recommendations of ACI 347 for shoring and reshoring in multistory construction.
- B. Low Rise Construction: Extend shoring from ground to roof for structures 4 stories or less in height.
- C. Reshoring: Remove shores and reshore in a planned sequence, to avoid damage to partly cured concrete. Locate and provide adequate reshoring to safely support work without excessive stress or deflection.
- D. Provide as a package, shoring and reshoring drawings prepared by or under the direct supervision of a specialty ENGINEER registered in the State of Florida.

#### 3.12 REMOVAL OF FORMS AND SUPPORTS

- A. Non Load Bearing Formwork: Provided that concrete has hardened sufficiently that it will not be damaged, forms not actually supporting weight of concrete or weight of soffit forms may be removed after concrete has cured at not less than 50 degrees F for 24 hours. Maintain curing and protection operations after form removal.
- B. Load Bearing Formwork: Do not remove shoring and forms supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements, until concrete has attained at least the specified compressive strength  $f'(c)$  and until the CONTRACTOR has determined that the actual compressive strength attained is adequate to support the weight of the concrete and superimposed loads.
- C. Keep reshores in place a minimum of 15 days after placing upper tier, and longer if required, until concrete has attained at least the specified compressive strength  $f'(c)$  and until the CONTRACTOR has determined that the actual compressive strength attained is adequate to support the weight of the concrete and superimposed loads.
- D. Keep supports in place until heavy loads due to construction operations have been removed.
- E. Test field cured specimens to determine potential compressive strength of concrete for specific locations.

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### CAST-IN-PLACE CONCRETE

#### 3.13 MISCELLANEOUS CONCRETE ITEMS

- A. Fill in: Fill in holes and openings left in concrete structures for passage of work by other trades after such work is in place. Place such fill in concrete to blend with existing construction, using same mix and curing methods.
- B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as indicated on Drawings. Set anchor bolts at correct elevations, complying with diagrams or templates of equipment manufacturer.
  - 1. Grout base plates and foundations as indicated with non-shrink grout.
  - 2. Use nonmetallic grout for exposed conditions, unless otherwise indicated.
  - 3. Equipment bases shall be sized to provide a minimum of 1.5" between the edge of the equipment bases and the edge of the equipment being served.
  - 4. Provide conduit windows through equipment bases of electrical equipment sized no larger than the conduit windows of the equipment being served.
  - 5. Equipment bases for electrical equipment shall be a minimum of 4" thick with chamfered edges.
- C. Reinforced Masonry: Provide concrete grout for reinforced masonry where indicated on Drawings and as scheduled.

#### 3.14 CONCRETE REPAIRS

- A. General: Repairs due to poor workmanship shall be made by the CONTRACTOR at the CONTRACTOR's expense and shall be approved by the ENGINEER prior to repair procedure being implicated.
- B. Perform cosmetic repairs of concrete surfaces as specified under concrete application.
- C. Perform structural repairs with prior approval of the ENGINEER for method and procedure, using epoxy bonding systems. The ENGINEER's approval is required for repair methods using materials other than those specified.

#### 3.15 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. Refer to Section 01410 for additional concrete testing requirements for the project.
- B. Composite Sampling and Making and Curing of Specimens: ASTM C 172 and ASTM C 31.
  - 1. Take samples at point of discharge.
  - 2. For pumped concrete, perform sampling and testing at the frequencies specified herein at point of delivery to pump, and perform additional sampling and testing at the same frequency at discharge from line.
  - 3. Results obtained at discharge from line shall be used for acceptance of concrete.
- C. Slump: ASTM C 143. One test per strength test and additional tests if concrete consistency changes.
  - 1. Modify sampling to comply with ASTM C 94.

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### CAST-IN-PLACE CONCRETE

- D. Air Content of Normal Weight Concrete: ASTM C 173 or ASTM C 231. One test per strength test performed on air entrained concrete.
- E. Concrete Temperature:
  - 1. Test hourly when air temperature is 40 degrees F or below.
  - 2. Test hourly when air temperature is 90 degrees F or above.
  - 3. Test each time a set of strength test specimens is made.
- F. Compressive Strength Tests: ASTM C 39.
  - 1. Compression test specimens: Mold and cure one set of 4 standard cylinders for each compressive strength test required.
  - 2. Testing for acceptance of potential strength of as delivered concrete:
    - a. Obtain samples on a statistically sound, random basis.
    - b. Minimum frequency:
      - 1) One set per 100 cubic yards or fraction thereof for each day's pour of each concrete class.
      - 2) One set per 3500 square feet of slab or wall area or fraction thereof for each day's pour of each concrete class.
      - 3) When the above testing frequency would provide fewer than 5 strength tests for a given class of concrete during the project, conduct testing from not less than 5 randomly selected batches, or from each batch if fewer than 5.
    - c. Test one specimen per set at 7 days for information unless an earlier age is required.
    - d. Test 2 specimens per set for acceptance of strength potential; test at 28 days unless other age is specified. The test result shall be the average of the two specimens. If one specimen shows evidence of improper sampling, molding, or testing, the test result shall be the result of the remaining specimen; if both show such evidence, discard the test result and inform the ENGINEER.
    - e. Retain one specimen from each set for later testing, if required.
    - f. Strength potential of as delivered concrete will be considered acceptable if all of the following criteria are met:
      - 1) No individual test result falls below specified compressive strength by more than 500 psi.
      - 2) Average of any 3 consecutive strength test results equals or exceeds specified compressive strength f'c.
      - 3) Testing for evaluation of field curing:
        - a) Frequency: 1 field set of specimens per strength acceptance test.
        - b) Mold specimens from same sample used for strength acceptance tests. Field cure, and test at same age as for strength acceptance tests.
        - c) Evaluate construction and curing procedures and implement corrective action when strength results for field cured specimens are less than 85 percent of test values for companion laboratory cured specimens.
  - 3. Removal of forms or supports: Mold additional specimens and field cure with concrete represented; test to determine strength of concrete at proposed time of form or support removal.

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### CAST-IN-PLACE CONCRETE

- G. Test Results: Testing agency shall report test results in writing to ENGINEER and CONTRACTOR within 24 hours of test.
1. Test reports shall contain the following data:
    - a. Project name, number, and other identification.
    - b. Name of concrete testing agency.
    - c. Date and time of sampling.
    - d. Concrete type and class.
    - e. Location of concrete batch in the completed work.
    - f. All information required by respective ASTM test methods.
  2. Nondestructive testing devices such as impact hammer or sonoscope may be used at ENGINEER's option for assistance in determining probable concrete strength at various locations or for selecting areas to be cored, but such tests shall not be the sole basis for acceptance or rejection.
  3. The testing agency shall make additional tests of in place concrete as directed by the ENGINEER when test results indicate that specified strength and other concrete characteristics have not been attained.
    - a. Testing agency may conduct tests of cored cylinders complying with ASTM C 42, or tests as directed.
    - b. Cost of additional testing shall be borne by the CONTRACTOR when unacceptable concrete has been verified.
- H. Water Tightness of Water Containing Walls
1. All basins, tanks, manholes, storm drainage structures, and wet wells are hydraulic structures and shall be watertight. Water tightness testing shall be conducted prior to any application of coatings or painting systems to the tank, basin, manhole, or wet well as per Sections 09900 and 13216. Each structure shall be filled with water, full depth (above maximum water level), prior to backfilling (unless otherwise noted) and kept full of water for 48 hours prior to starting the tightness testing. After 48-hours the level in the tank shall be measured and the testing period shall begin and conducted over a 24-hour period. The CONTRACTOR shall exercise every precaution to secure water tightness by careful mixing and placing of the concrete to obtain a homogeneous mixture at maximum density, without air pockets or voids, using the minimum practical amount of water in the mix. Extreme care shall be used to secure continuity of water stops at expansion and construction joints, to seal off holes from wall ties, and when placing concrete about wall sleeves, wall pipes and other obstructions. The CONTRACTOR shall fix all leaks.
  2. The CONTRACTOR shall furnish, at his own expense, any pumps, piping, and appurtenances to provide the test water for the water tightness testing and any water post-loading operations of structures.
  3. All structures shall be watertight.

END OF SECTION 03300

SECTION 09900

PAINTING

PART 1 - GENERAL

1.01 SCOPE

- A. Perform all work necessary and required for completion of the project as indicated. Work includes furnishing all materials and equipment and the application and completion of all painting and painter's finish on all exposed exterior and interior surfaces as required to complete the finishing as shown and noted on the Drawings and specified herein.
- B. The grade and number of coats of paint to be applied at assigned locations and on different materials, and the kind of materials to be supplied shall conform to this section.
- C. Refer to Section 13216 for specific external and internal ground storage tank coating requirements.

1.02 SUBMITTALS

- A. Type of material to be applied at each location shall be submitted to the OWNER with the manufacturer's written recommendation of the type of paint for each item to be painted. The submittal shall include a "Paint Color Schedule" as specified herein.
- B. All colors will be selected by the OWNER from color chips to be submitted by the CONTRACTOR.
- C. The paint manufacturer's submittal shall include a "Paint Color Schedule" of the format shown below, listing all information indicated for each item to be painted:

PAINT COLOR SCHEDULE

Structure	Surface	Dwg. No.	Manufacturer's Product for Final Coat	Color Selection (By Owner)
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1.03 PRODUCT HANDLING

- A. All painting materials shall be delivered to the site in the manufacturer's original containers with labels intact and seals unbroken. They shall be kept in a locked, well-ventilated storage place assigned for this purpose. Receiving, opening, and mixing of all paint materials shall be done in this room. Storage space shall be kept clean and neat. Oily rags shall be removed and disposed of each day, and all other necessary precautions shall be taken to avoid danger of fires.

1.04 ENVIRONMENTAL CONDITIONS

- A. Surfaces shall be painted only when they are free from moisture. No painting on exterior surfaces shall be done within less than 72 hours of adequate drying weather after a rain, nor during periods of dew or fog. Receiving surfaces shall be properly dried out before proceeding with the work. No painting shall be done when temperature is below 50 degrees F., except when specifically authorized otherwise



## SECTION 09900

### PAINTING

in writing by the CONTRACTOR. Clear sealer shall not be applied when air temperature is less than 70 Degrees F. Moisture in walls shall be registered with a meter to determine if they are moisture free. When manufacturer's require minimum humidity limits for application of paint, CONTRACTOR shall provide and maintain records of conditions when applications are made.

#### 1.05 SCAFFOLDING AND PROTECTION

- A. Furnish, maintain and remove all scaffolding, ladders and planks required for this work, and all drop cloths for the protection of concrete walks, floors, prefinished materials, building fixtures, etc. Painted and finished surfaces subject to damage or defacement due to other work on the building shall be properly protected and covered. CONTRACTOR shall be responsible for any and all damage to painted work and to that of other work caused by operations under this Section. All surfaces not to be painted shall be kept entirely free of paint by adequate temporary coverage including areas a minimum of 1 inch from joints to subsequently be welded in material coated with zinc base coatings.

#### 1.06 WORK IN CONFINED SPACES

- A. The CONTRACTOR shall, when work is located in confined spaces, provide and maintain safe working conditions for all employees as required by OSHA. Fresh air ventilation shall be provided to continuously remove paint fumes from the confined space through the combined use of existing openings, forced-draft fans and temporary ducts to the outside. Paint fumes shall, if possible, be exhausted to the outside from the lowest level in the confined space. Electrical fan motors shall, if located in the confined space, be explosion proof. No smoking or open fires will be permitted in the confined space.

#### 1.07 COMPATIBILITY OF SHOP AND FIELD PAINTS

- A. To ensure a satisfactory painting job, it is essential that the paints applied in the shop and in the field be mutually compatible. The shop coats to be applied by others shall be suitable for the field coats to be applied under this Contract.

#### 1.08 GUARANTEE

- A. Paint on all piping systems and interior and exterior concrete masonry units shall be guaranteed for five (5) years.

#### 1.09 APPLICATOR QUALIFICATIONS

- A. The coating application contractor shall be trained in application techniques and procedures of coating materials and shall demonstrate a minimum of 5 years successful experience in such application. The CONTRACTOR shall provide the following references:
  - 1. Five (5) Water/Wastewater Treatment Facilities that have been in service for at least 5 years. The projects shall have had been of the same size and scope as the current project. The projects must have utilized the same surface preparation and application techniques required by these project specifications. All references shall include the following information:

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### PAINTING

- a. Name of Project.
  - b. Project Location
  - c. Owner Name
  - d. Owner Address
  - e. Owners Phone Number
  - f. Owner Contact
  - g. Engineering Firm
  - h. Engineering Firm Address and Phone Number
  - i. Engineering Firm Contact.
- B. The CONTRACTOR shall provide the following information regarding the personnel performing the work:
1. Project foreman name
  2. Project foreman experience in high performance coating application
  3. Projects completed by the foreman of like scope in the last 5 years.

## PART 2 - PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURERS

- A. The paints and paint products of the *Tnemec Company, Inc.*, mentioned in the following specifications are considered to be the design standard for this work. Other acceptable manufacturers are Corrocoat, Sherwin Williams, PPG, or Carboline. No request for substitution will be considered which decreases the film thickness and/or the number of coats to be applied, or which offers a change from the generic type of coating specified. Request for substitution shall contain the following:
1. FULL NAME OF EACH PRODUCT
  2. DESCRIPTIVE LITERATURE
  3. DIRECTIONS FOR USE
  4. GENERIC TYPE
  5. NON VOLATILE CONTENT BY VOLUME
  6. PERFORMANCE DATA LISTED IN SECTION 2.03.
- B. Submittals shall include a side by side comparison of the performance attributes of the proposed materials as compared to the specified coatings.
- C. Products of other manufacturers may be acceptable provided that they meet the generic type of material specified and the performance requirements outline in Section 2.03 of these specifications.

### 2.02 SUBSTITUTIONS

- A. Comply with the General Conditions, and the requirements of Section 2.01 and Section 2.03 when requesting substitutions.
- B. Obtain review and approval prior to purchase and delivery.

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### PAINTING

#### 2.03 COATING MATERIALS

- A. Tnemec Series 1 Omnithane
  - 1. Generic Type: NSF Approved Aromatic Moisture Cured Urethane Primer
  - 2. Special Qualifications: Certified in accordance with NSF/ANSI std 61 for potable water applications.
  - 3. Performance Criteria
    - a. Adhesion: ASTM D 4541.
    - b. Humidity: ASTM D 4585. 5,000 hours exposure.
    - c. Salt Spray (Fog): ASTM B 117. 10,250 hours exposure
    - d. Impact: ASTM D 2794.
  
- B. Tnemec Series 91 H2O Hydro-Zinc
  - 1. Generic Type: Moisture Cured Zinc Rich Urethane
  - 2. Special Qualifications: Certified in accordance with NSF/ANSI std 61 for potable water applications.
  - 3. Zinc Dust: ASTM D520 Type III
  - 4. Performance Criteria:
    - a. Adhesion: ASTM D4541 (Elcometer):
    - b. Immersion: ASTM D 870. 7 years
    - c. Humidity: ASTM D 4585. 4,000 hours exposure.
    - d. Salt Spray (Fog): ASTM B 117: 50,000 hours exposure.
    - e. Prohesion: ASTM G 85. 15,000 hours.
  
- C. Tnemec Series N140 Pota-Pox Plus
  - 1. Generic Type: Polyamidoamine Epoxy.
  - 2. Special Qualifications: Certified in accordance with NSF/ANSI std 61 for potable water applications.
  - 3. Performance Criteria:
    - a. Abrasion; ASTM D4060, (CS-17 Wheel, 1,000 grams load, 1,000 cycles):
    - b. Adhesion: ASTM D4541 (Elcometer):
    - c. Immersion: ASTM D 870. 2 years
    - d. Exterior Exposure: 5 years
    - e. Humidity: ASTM D 4585. 10,000 hours exposure.
    - f. Salt Spray (Fog): ASTM B 117: 10,000 hours exposure.
    - g. Moisture Vapor Transmission: ASTM D 1653
    - h. Prohesion: ASTM G 85. 5,000 hours.
  
- D. Tnemec Series 66 Epoxoline
  - 1. Generic Type: Polyamide Epoxy.
  - 2. Performance Criteria:
    - a. Abrasion; ASTM D4060, (CS-17 Wheel, 1,000 grams load, 1,000 cycles):
    - b. Adhesion: ASTM D4541 (Elcometer):
    - c. Immersion: ASTM D 870. 7 years
    - d. Exterior Exposure (45 degrees facing south): 6 years
    - e. Humidity: ASTM D 4585. 4,500 hours exposure.
    - f. Salt Spray (Fog): ASTM B 117: 10,000 hours exposure.
    - g. Moisture Vapor Transmission: ASTM D 1653
    - h. Prohesion: ASTM G 85. 5,000 hours.

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- E. Tnemec Series 297 Enviro-Glaze
  - 1. Generic Type: Ceramic Modified Waterborne Aliphatic Urethane
  - 2. Performance Criteria:
    - a. Abrasion; ASTM D4060, (CS-17 Wheel, 1,000 grams load, 1,000 cycles):
    - b. Adhesion: ASTM D4541 (Elcometer):
    - c. Coefficient of Friction: ASTM D 2047
    - d. Flexibility: ASTM D 522 (Method A)
    - e. Impact: ASTM D 2794.
    - f. Scrubbability: ASTM D 4213 (1,000 cycles)
    - g. Moisture Vapor Transmission: ASTM D 1653
    - h. Steam Resistance: 250 F steam @ 15 – 17 psi. 4 hours.
  
- F. Tnemec Series 434 Perma-Shield H2S
  - 1. Generic Type: 100% Solids Modified Amine Epoxy
  - 2. Performance Criteria:
    - a. Abrasion; ASTM D4060, (CS-17 Wheel, 1,000 grams load, 1,000 cycles):
    - b. Adhesion: ASTM D4541 (Elcometer):
    - c. Immersion (140 F DI Water): ASTM D 870. 2,000 hours.
    - d. Severe Waste Water Analysis Test: H2S Autoclave (150F, 500 ppm H2S, 4,000 ppm NaCl, 10% H2SO4). 28 days exposure.
    - e. Salt Spray (Fog): ASTM B 117: 10,000 hours exposure.
    - f. Moisture Vapor Transmission: ASTM D 1653
    - g. Tensile Strength: ASTM D 2370
    - h. Water Absorption: ASTM C 413
    - i. Elongation: ASTM D 638
    - j. Chemical Immersion: NACE TM 0174 (5% Acetic Acid, 10% Sulfuric Acid, 20% Lactic Acid, 50% Citric Acid, 5% Nitric Acid, 5% Calcium Hydroxide)
  
- G. Tnemec Series G435 Perma-Glaze
  - 1. Generic Type: 100% Solids Modified Amine Epoxy
  - 2. Performance Criteria:
    - a. Abrasion; ASTM D4060, (CS-17 Wheel, 1,000 grams load, 1,000 cycles):
    - b. Adhesion: ASTM D4541 (Elcometer):
    - c. Immersion (140 F DI Water): ASTM D 870. 2,000 hours.
    - d. Severe Waste Water Analysis Test: H2S Autoclave (150F, 500 ppm H2S, 4,000 ppm NaCl, 10% H2SO4). 28 days exposure.
    - e. Salt Spray (Fog): ASTM B 117: 10,000 hours exposure.
    - f. Moisture Vapor Transmission: ASTM D 1653
    - g. Tensile Strength: ASTM D 2370
    - h. Water Absorption: ASTM C 413
    - i. Elongation: ASTM D 638
    - j. Chemical Immersion: NACE TM 0174 (5% Acetic Acid, 10% Sulfuric Acid, 20% Lactic Acid, 50% Citric Acid, 5% Nitric Acid, 5% Calcium Hydroxide)
  
- H. Tnemec Series 142 Epoxoline
  - 1. Generic Type: Modified Polyamine Epoxy
  - 2. Performance Criteria:
    - a. Abrasion; ASTM D4060, (CS-17 Wheel, 1,000 grams load, 1,000 cycles):
    - b. Adhesion: ASTM D4541 (Elcometer):

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- c. Cyclic Salt Fog/UV Exposure: ASTM D 5894, 5,000 hours
  - d. Edge Retention: MIL-PRF-23236, average of 3 tests
  - e. Flexibility & Elongation: ASTM D 522 (Method A, Conical Mandrel)
  - f. Hardness: ASTM D 2240: Shore D Hardness
  - g. Humidity: ASTM D 4585. 2,000 hours
  - h. Immersion (140 F DI Water): ASTM D 870. 1,000 hours.
  - i. Immersion (Tap Water): ASTM D 870, 2 years.
  - j. Salt Spray (Fog): ASTM B 117. 5,000 hours.
- I. Tnemec - Series 1074U Endura-Shield II
- 1. Generic Type: Aliphatic Acrylic Urethane
  - 2. Performance Criteria:
    - a. Abrasion; ASTM D4060, (CS-17 Wheel, 1,000 grams load):
    - b. Adhesion; ASTM D4541 (Elcometer):
    - c. Exterior Exposure; ASTM D 1014 (EMMAQUA): 500 MJ/m<sup>2</sup> UV exposure.
    - d. Humidity; ASTM D4585 1,500 hours exposure.
    - e. QUV Exposure; ASTM D 4587. 7,000 hours
    - f. Salt Spray (Fog); ASTM B117: 5,000 hours exposure.
    - g. Flexibility: ASTM D 522 (Method A)
- J. Tnemec - Series 1094 Endura-Shield
- 1. Generic Type: Aliphatic Acrylic Urethane
  - 2. Performance Criteria:
    - a. Abrasion; ASTM D4060, (CS-17 Wheel, 1,000 grams load):
    - b. Adhesion; ASTM D4541 (Elcometer):
    - c. Exterior Exposure; ASTM D 1014 (EMMAQUA): 500 MJ/m<sup>2</sup> UV exposure.
    - d. Humidity; ASTM D4585 1,500 hours exposure.
    - e. QUV Exposure; ASTM D 4587. 7,000 hours
    - f. Salt Spray (Fog); ASTM B117: 5,000 hours exposure.
    - g. Flexibility: ASTM D 522 (Method A)
- K. Tnemec Series 113 H.B. Tneme-TufCoat
- 1. Generic Type: Waterborne Acrylic Epoxy.
  - 2. Performance Criteria:
    - a. Abrasion; ASTM D4060, (CS-17 Wheel, 1,000 grams load):
    - b. Adhesion; ASTM D4541 (Elcometer):
    - c. Exterior Exposure (45 degrees facing south): 3 years
    - d. Humidity; ASTM D4585 1,000 hours exposure.
    - e. Scrubbability: ASTM D 4213, 1,000 cycles.
    - f. Stain Resistance: ASTM D 1308.
    - g. Flexibility: ASTM D 522 (Method A)
- L. Tnemec Series 37H-77 Chem-Prime
- 1. Generic Type: Modified Phenolic Rust Inhibitive Primer
  - 2. Performance Criteria:
    - a. Abrasion; ASTM D4060, (CS-17 Wheel, 500 grams load):
    - b. Adhesion; ASTM D4541 (Elcometer):
    - c. Salt Spray (Fog); ASTM B 117, 275 hours

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- d. Exterior Exposure (Exposed degrees facing south): 3 years exposure exposure.
  - e. Humidity; ASTM D4585 2,000 hours exposure.
- M. Tnemec Series 218 MortarClad
- 1. Generic Type: 100% Epoxy Mortar
  - 2. Performance Criteria:
    - a. Bond Strength: ASTM C 882
    - b. Compressive Strength; ASTM C 579
    - c. Freeze - Thaw: ASTM 666 Procedure A: 308 Cycles
    - d. Thermal Expansion; ASTM C 531
    - e. Tensile Strength, Elongation and Modulus of Elasticity: ASTM C 307 and ASTM D 638
- N. Tnemec Series 130 EnviroFill
- 1. Generic Type: Waterborne Cementitious Acrylic
  - 2. Performance Criteria:
    - a. Adhesion; ASTM D3359, (Method B, Crosshatch):
    - b. Freeze/Thaw; TTM 058, Method D: 30 cycles.
    - c. Humidity; ASTM D4585: 1,500 hours exposure.
    - d. Wind Driven Rain; TT-C-555B, 4.4.7.3; 24 hours
- O. Tnemec Series 135 Chembuild
- 1. Generic Type: Polyamidoamine.
  - 2. Performance Criteria:
    - a. Abrasion; ASTM D4060, (CS-17 Wheel, 1,000 grams load, 1,000 cycles):
    - b. Adhesion: ASTM D4541 (Elcometer): Rusty Steel, SSPC-SP2 Cleaned
    - c. Flexibility: ASTM D 522 (Method B)
    - d. Humidity: ASTM D 4585. 2,000 hours exposure.
    - e. Salt Spray (Fog): ASTM B 117: SSPC-SP 2 Cleaned Uniformly Rusty Steel, 4,000 hours exposure.
    - f. Moisture Vapor Transmission: ASTM D 1653
    - g. Prohesion: ASTM G 85. 10,000 hours.
- P. Tnemec Series 115 Uni-Bond
- 1. Generic Type: Waterborne Cementitious Acrylic
  - 2. Performance Criteria:
    - a. Adhesion; ASTM D4541
    - b. Abrasion: ASTM D 4060
    - c. Cyclic Salt Fog/UV Exposure: ASTM D 5894, 7,000 hours
    - d. Salt Spray (Fog): ASTM B117.
    - e. Humidity; ASTM D4585: 2,000 hours exposure.
- Q. Tnemec Series 1095 Endura-Shield
- 1. Generic Type: Aliphatic Acrylic Polyurethane
  - 2. Performance Criteria:
    - a. Adhesion: ASTM D 4541, (Method E, Type V Tester)
    - b. Cyclic Salt Fog/UV Exposure: ASTM D 5894, 5,376 hours
    - c. Hardness: ASTM D 3363
    - d. Humidity: ASTM D 4585
    - e. Impact: ASTM D 2794

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- f. Prohesion: ASTM G 85
- g. QUV Exposure: ASTM D 4587 (UVA-340 bulbs, 8 hours UV, 4 hours condensation)
- h. Salt Spray (Fog): ASTM B 117

#### 2.04 COATING SCHEDULE EXTERIOR ENVIRONMENTS

- A. Exterior Steel Surfaces, Non-submerged
  - 1. Surface Prep: SSPC-SP6
  - 2. Shop Primer – Series 91 H2O Hydro-Zinc (NSF approved zinc rich urethane primer), 2.5-3.5 mils.
  - 3. Field Primer – Series 91 H2O Hydro-Zinc (NSF approved zinc rich urethane primer), 2.5-3.5 mils.
  - 4. Intermediate Coat – 66 Epoxoline, 3.0-5.0 mils.
  - 5. Top Coat – Series 1094 Endura-Shield, 2.0-3.0 mils.
  - 6. Total Dry Film Thickness: 7.5 mils.
  - 7. Total Coats: Three (3)
- B. Exterior Steel Doors and Frames (Shop Primed), Interior and Exterior
  - 1. Surface Prep: SSPC-SP6
  - 2. Primer – Series 135 Chembuild, 2.5-3.5 mils.
  - 3. Finish – Series 1094 Endura-Shield , two coats, 2.0 – 5.0 mils DFT per coat.
  - 4. Total Dry Film Thickness: 6.5 to 13.5 mils
  - 5. Total Coats: Three (3)
- C. Ductile Iron Pipe, Non-Submerged
  - 1. SSPC-SP6
  - 2. Shop Primer – Series N140 Pota-Pox Plus (NSF approved polyamidoamine epoxy), 6.0 – 8.0 mils.
  - 3. Field Primer – Series N140 Pota-Pox Plus (NSF approved polyamidoamine epoxy), 6.0 – 8.0 mils.
  - 4. Intermediate – Series 66 Epoxoline, 3.0-5.0 mils.
  - 5. Finish – Series 1094 Endura-Shield, 2.0-3.0 mils
  - 6. Total Dry Film Thickness: 11.0 to 16.0 mils (Excluding Shop Primer).
  - 7. Total Coats: Three (3)
- D. Exterior Galvanized Substrates
  - 1. Surface Preparation: Abrasive blast referencing SSPC SP16 Abrasive Blasting Non-Ferrous Metals to provide uniform 1.0 mil angular anchor profile.
  - 2. First Coat: Tnemec Series 66 Epoxoline applied at 2.0 to 3.0 mils DFT.
  - 3. Second Coat: Tnemec Series 1074U or 1075U Endura-Shield II applied at 2.0 to 3.0 mils DFT.
  - 4. Finish: Tnemec Series 1074U or 1075U Endura-Shield II applied at 2.0 to 3.0 mils DFT.
  - 5. Total Dry Film Thickness: 6.0 to 9.0 mils DFT.
  - 6. Total Coats: Three (3)
- E. Exterior Aluminum (Non-Anodized or Otherwise Coated) Substrates:
  - 1. Stripe Coat: Tnemec Series 66 Hi-Build Epoxoline applied at 2.0 to 3.0 mils DFT.

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2. Second Coat: Tnemec Series 66 Hi-Build Epoxoline applied at 2.0 to 3.0 mils DFT.
  3. Finish: Tnemec Series 1074U or 1075U Endura-Shield II applied at 2.0 to 5.0 mils DFT.
  4. Total Dry Film Thickness: 4.0 to 6.0 mils DFT.
  5. Total Coats: Three (3)
- F. Exterior PVC Piping, Non-Submerged and Above Grade
1. Surface Preparation: SSPC-SP1 Solvent Cleaning followed by hand or power tool cleaning to scarify and de-gloss the surface
  2. Coat: Tnemec Series 1095 Endura-Shield applied at 2.4 to 3.5 mils DFT.
  3. Total Dry Film Thickness: 5.0 to 7.0 mils DFT.
  4. Total Coats: Two (2)

#### 2.05 COATING SCHEDULE – INTERIOR SYSTEMS ALL PLANT ENVIRONMENTS

- A. Interior Steel Doors and Frames (Shop Primed)
1. Surface Prep: SSPC-SP6
  2. Primer – Series 37H-77 Chem-Prime, 2.5 to 3.5 mils.
  3. Finish – Series 2H Tneme-Gloss, two coats, 2.0 to 3.0 mils DFT per coat.
  4. Total Dry Film Thickness: 6.5 to 9.5 mils
  5. Total Coats: Three (3)
- B. Interior Concrete Surfaces and Masonry Substrates:
1. Surface Prep: SSPC-SP13
  2. Block Filler – Series 130 EnviroFill, as required to create a pinhole free surface.
  3. Intermediate Coat – Tnemec Series 113 H.B. Tneme-TufCoat, 4.0 to 6.0 mils DFT.
  4. Finish – Tnemec Series 297 Enviro-Glaze, 2.0 to 3.0 mils DFT.
  5. Total Dry Film Thickness: 6.0 to 9.0 mils (not including block filler).
  6. Total Coats: Three (3)
- C. Interior Steel Substrates (Shop Primed):
1. Surface Preparation: SSPC-SP6.
  2. Prime Coat – Tnemec Series 135 ChemBuild applied at 4.0 to 6.0 mils DFT.
  3. Finish – Tnemec Series 1094 Endura Shield at 2.0 to 5.0 mils DFT.
  4. Total Dry Film Thickness: 6.0 to 11.0 mils (not including block filler).
  5. Total Coats: Two (2)
- D. Ductile Iron Pipe, Non-Submerged
1. SSPC-SP6
  2. Shop Primer – Series N140 Pota-Pox Plus (NSF approved polyamidoamine epoxy), 6.0 – 8.0 mils.
  3. Field Primer – Series N140 Pota-Pox Plus (NSF approved polyamidoamine epoxy), 6.0 – 8.0 mils.
  4. Intermediate – Series 66 Epoxoline, 3.0-5.0 mils.
  5. Finish – Series 1094 Endura-Shield, 2.0-3.0 mils
  6. Total Dry Film Thickness: 11.0 to 16.0 mils (Excluding Shop Primer).
  7. Total Coats: Three (3)



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- E. Interior Gypsum Board Substrates (Standard Exposure):
  - 1. Surface Prep: Clean and dry
  - 2. Prime Coat: Tnemec Series 151-1051 Elasto-Grip applied at 1.0 to 2.0 mils DFT.
  - 3. Intermediate Coat: Tnemec Series 113 H.B. Tneme TufCoat applied at 4.0 to 6.0 mils DFT.
  - 4. Finish: Tnemec Series 113 H.B. Tneme TufCoat applied at 4.0 to 6.0 mils DFT.
  - 5. Total Dry Film Thickness: 9.0 to 14.0 mils DFT.
  
- F. Interior Wood Substrates:
  - 1. Surface Prep: Clean and dry
  - 2. Prime Coat: Tnemec Series 10-99W Tnemec Primer applied at 1.0 to 2.0 mils DFT.
  - 3. Intermediate Coat: Tnemec Series 1028 or 1029 EnduraTone applied at 2.0 to 3.0 mils DFT.
  - 4. Finish: Tnemec Series 1028 or 1029 EnduraTone applied at 2.0 to 3.0 mils DFT.
  - 5. Total Dry Film Thickness: 5.0 to 8.0 mils DFT.
  
- G. Interior PVC Piping, Non-Submerged and Above Grade
  - 1. Surface Preparation: SSPC-SP1 Solvent Cleaning followed by hand or power tool cleaning to scarify and de-gloss the surface
  - 2. Coat: Tnemec Series 1095 Endura-Shield applied at 2.4 to 3.5 mils DFT.
  - 3. Total Dry Film Thickness: 5.0 to 7.0 mils DFT.
  - 4. Total Coats: Two (2)

#### 2.06 IMMERSION COATING SCHEDULE – POTABLE WATER TREATMENT PLANTS

- A. Steel Surfaces, Submerged in Potable Water
  - 1. Shop Primer – Series 91 H2O Hydro-Zinc (NSF 61 approved zinc rich urethane primer), 2.5-3.5 mils.
  - 2. Field Primer – Series 91 H2O Hydro-Zinc (NSF 61 approved zinc rich urethane primer), 2.5-3.5 mils.
  - 3. Stripe Coat – Series N140-39BL Pota-Pox Plus 4.0-6.0 mils DFT applied by brush to all weld seams, sharp edges and other difficult to coat areas.
  - 4. Intermediate Coat –N140-39BL Pota-Pox Plus 4.0-6.0 mils DFT.
  - 5. Finish –Series 21 10-12 mils DFT.
  - 6. Total Dry Film Thickness: 16.5 to 21.5 mils.
  - 7. Total Coats: Three (3) plus a stripe coat
  
- B. Ductile Iron pipe, Submerged (Potable Water)
  - 1. Shop Primer – Series N140-1211 Pota-Pox Plus (NSF 61 approved polyamidoamine epoxy), 6.0 – 8.0 mils.
  - 2. Field Primer – Series N140-1211 Pota-Pox Plus (NSF 61 approved polyamidoamine epoxy), 6.0 – 8.0 mils.
  - 3. Stripe Coat –N140-39BL Pota-Pox Plus 4.0-6.0 mils DFT applied by brush to all bolted connections, sharp edges and other difficult to coat areas.
  - 4. Intermediate Coat – Series 21-39BL Pota-Pox, 4.0 – 6.0 mils DFT.
  - 5. Finish –Series 21 10-12 mils DFT.
  - 6. Total Dry Film Thickness: 20.0 to 26.0 mils.
  - 7. Total Coats: Three (3) plus a stripe coat

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- C. Concrete Surface, Submerged (Potable Water)
  - 1 Primer / Surfacer – Apply one coat of Tnemec Series 217 – 1/4-inch to 4-inch as necessary and one coat of series 218 MortarClad to seal all surfaces and fill all bug holes, voids and other defects - 1/16-inch minimum.
  - 2 Intermediate: Series N140, 4.0 – 6.0 mils DFT.
  - 3 Finish: Series 22 Epoxoline, 100% solids 20.0 – 40.0 mils DFT
  - 4 Total Dry Film Thickness – 64.0 mils.
  - 5 Total Coats: Three (3)
  
- D. Concrete Masonry Units, Submerged or Intermittently Submerged (Potable Water)
  - 1. Primer / Surfacer – Apply one coat of Tnemec Series 217 – 1/4-inch to 4-inch as necessary and one coat of Series 218 MortarClad to seal all surfaces and fill all bug holes, voids and other defects - 1/16-inch minimum.
  - 2. Intermediate: Series N140, 4.0 – 6.0 mils DFT.
  - 3. Finish: Series 22 Epoxoline, 100% solids 20.0 – 40.0 mils DFT

#### 2.07 MIXING AND TINTING

- A. Deliver paints and enamels ready-mixed to job site except epoxies.
- B. Mix only in mixing pails placed in suitably sized non-ferrous or oxide resistant metal pans.
- C. Use tinting colors recommended by manufacturer for the specific type of finish.

### PART 3 - EXECUTION

#### 3.01 INSPECTION

- A. Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence or quality of work and which cannot be put into an acceptable condition through preparatory work as included in Paragraph 3.02, PREPARATION OF SURFACES.
- B. Do not proceed with surface preparation or coating application until conditions are suitable.

#### 3.02 PREPARATION OF SURFACES

- A. Wood
  - 1. Clean soiled surfaces (with alcohol wash).
  - 2. Sand to smooth and even surface then dust off.
  - 3. Apply shellac, not over two pounds cut to all knots, pitch and resinous sapwood before prime coat is applied.
  - 4. Fill nail holes, cracks, open joints and other defects with wood filler after priming coat has dried. Color to match finish color.
  
- B. Plaster and Gypsum Wallboard
  - 1. Fill narrow, shallow cracks and small holes with spackling compound.

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2. Rake deep, wide cracks and deep holes.
    - a Plaster: Fill with thin layers of patching plaster.
    - b Gypsum Wallboard: Fill with thin layers of drywall joint cement.
    - c Allow to dry.
    - d Sand smooth. Do not raise nap of paper on wallboards.
- C. Concrete
1. All concrete surfaces to be coated shall be clean and dry. All oil, grease, dirt, etc., shall be removed either by steam cleaning with detergent or by scrubbing with a strong commercial type detergent and flushing with water. All chemical contamination shall be neutralized and flushed.
  2. Old paint and unremoved tar stains shall be solvent cleaned with naphtha, trichloroethylene, or perchloroethylene. Proper safety precautions shall be observed if this step is necessary. The surface shall be flushed with fresh water and dried.
  3. Rough, chemically attacked and/or abraded floor and tank interior shall be rebuilt. If a newly poured concrete surface contains air, water pits, splatter, protrusions or other surface irregularities, it shall be rebuilt while the concrete is still "green". Rebuilding shall consist of the following:
    - a. Smooth the concrete surface, breaking down all rough protrusions.
    - b. The entire area shall be sandblasted to remove loose, powdery concrete and open sub-surface air holes (Reference SSCP-SP 13, ICRI CSP 5). Dust shall be removed from the blasted surface by vacuuming or blowing with dry, oil-free air.
    - c. Areas where the aggregate is exposed or deep pot holes exist shall be resurfaced utilizing Tnemec Series 217 MortarCrete applied in accordance with the manufacturer's instructions.
  4. Concrete surfaces which do not require rebuilding shall be properly prepared. This preparation shall be done in accordance with the coating manufacturer's latest written Application Instructions.
    - a. Proper preparation shall consist of either mechanically abrading or sandblasting for horizontal surfaces.
    - b. Non-Immersion Service: Proper preparation shall consist of sandblasting to open all bug holes and voids and to provide an adequate surface profile (Reference SSPC-SP 13, ICRI CSP 2 – 3).
    - c. Non-Immersion Service (Exterior Concrete Basins): Proper preparation shall consist of sandblasting to open all bug holes and voids and to provide an adequate surface profile (Reference SSPC-SP 13, ICRI CSP 3 – 5).
    - d. Immersion Service: For concrete in immersion, all surfaces shall be abrasive blasted to remove all form release agents, curing compounds, laitance, and to provide a surface profile (Reference SSPC-SP 13, ICRI CSP 5). Remove all loose materials.
  5. Concrete shall be fully cured prior to coating. Fully cured shall be defined as: 28 days at 75 Deg. F., or 40 days at 50 Deg. F., or equal. If concrete admixtures or concrete substitutes are used, increase the cure time by 1/3.
  6. The concrete surfaces shall be thoroughly dried and cured before application of the coating.

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#### D. Steel Surfaces

1. Remove any oil or grease from surfaces to be coated by solvent cleaning in accordance with Steel Structures Painting Council Specification SP 1-65. Any chemical contamination shall be eliminated by means of neutralization or flushing or both prior to additional surface preparation.
2. For immersion service, all sharp edges and welds shall be ground smooth to a rounded contour and all weld splatter shall be removed prior to sandblasting.
3. For non-immersion service, all sharp edges and welds shall be ground and all weld splatter shall be removed prior to sandblasting.
4. For immersion service, all surfaces to be coated shall be sandblasted to white metal in accordance with Steel Structures Painting Council Specification SP 5-63 or National Association of Corrosion Engineers Specification NACE No. 1 unless otherwise stated in the coating manufacturer's most recent printed Application Instructions or material shall be pickled in accordance with SP-8-63.
5. For non-immersion or intermittent service in a moist area or wherever specified in the coating manufacturer's most recent printed Application Instructions for other services, all surfaces to be coated shall be sandblasted to a finish near white in accordance with Steel Structures Painting Council Specifications SP 10-63 or National Association of Corrosion Engineers Specification NACE No. 2.
6. For non-immersion service, or wherever specified in the coating manufacturer's most recent printed Application Instructions, all surfaces to be coated shall be sandblasted to a commercial sandblast in accordance with Steel Structures Painting Council Specification SP 6-63 or National Association of Corrosion Engineers Specification NACE No. 3.
7. Steel surfaces previously exposed to sulfides shall be sandblasted, flame cleaned, and sandblasted again in accordance with the recommended surface preparation for the particular service in question.
8. After sandblasting, dust and spent sand shall be removed from the surfaces by brushing or vacuum cleaning. The prime coat shall be applied as soon as possible after the blasting preparation is finished and always before the surface starts to rust. No sandblasted surface shall stand overnight before coating.

#### E. Hot Steel Surfaces

1. Surface preparation shall be SSPC-SP-5-63, white metal abrasive blast.

### 3.03 APPLICATION

#### A. General Requirements

1. Do not apply initial coating until moisture content of surface is within limitations recommended by paint manufacturer.
  - a. Test with moisture meter
2. Apply paint, enamel, stain and varnish with suitable brushes, rollers, or spraying equipment.
  - a. Rate of application shall not exceed that as recommended by paint manufacturer for the surface involved less ten percent allowance.
  - b. Keep brushes, rollers and spraying equipment clean, dry, free from contaminants and suitable for the finish required.
  - c. Apply stain by brush.

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3. Comply with recommendations of product manufacturer for drying time between succeeding coats.
  4. Where possible, vary slightly the color of successive coats.
  5. Sand and dust between each coat to remove defects visible from a distance of 5 feet.
  6. Finish coats shall be smooth, free of brush marks, streaks, laps or pile up of paints, and skipped or missed areas.
    - a. Finished metal surface shall be free of skips, voids or pinholes in any coat when tested with a low voltage detector.
  7. Inspection
    - a. Do not apply additional coats until completed coat has been inspected by the ENGINEER.
    - b. Only inspected coats of paint will be considered in determining number of coats applied.
  8. Leave all parts of moldings and ornaments clean and true to details with no undue amount of paint in corners and depressions.
  9. Make edge of paint adjoining other materials or colors clean and sharp with no overlapping.
  10. Apply primer on all work before glazing.
  11. Change colors at doors where colors differ between adjoining spaces or rooms and where door frames match wall colors.
  12. Refinish whole wall where portion of finish has been damaged or is not acceptable.
  13. Hardware, trim and other items shall be removed as required for proper application of coatings.
  14. Field Touch-Up Painting:
    - a. Prior to applying finish coats of paint, areas where prime coat has been damaged shall be sanded smooth and touched up with the same primer applied at the shop.
    - b. Remove rust before above specified touch-up is applied.
    - c. Touch-up shall not be obvious.
- B. Painted Work
1. Back prime all exterior woodwork with oil base primer.
  2. Runs on face not permitted.

#### 3.04 CLEANING

- A. Remove spilled, splashed, or splattered paint from all surfaces.
- B. Do not mar surface finish of item being cleaned.
- C. Leave storage space clean and in condition required for equivalent spaces in project.
- D. Oily rags, waste, etc., shall be removed at end of each working day.

## SECTION 09900

### PAINTING

#### 3.05 PAINTING SCHEDULE

##### A. General

1. Painting of Piping and Equipment
  - a. The CONTRACTOR shall paint all piping, covering, pumps, motors, fans, duct work, including fiber glass duct work, foundations, hangers, supports and all miscellaneous equipment throughout the building and the covering of all concealed piping, or duct work, and all uncovered pipe and duct work in accessible pipe spaces, roof, etc., installed under Mechanical Piping, and Heating and Plumbing specifications. Ducts, pipe and pipe covering installed in completely furred - ceilings, and vertical shafts will not be painted.
  - b. All pumps, fans, motors and other mechanical apparatus furnished under the heating and plumbing specifications, shall be painted three coats, one prime coat and two finished coats of machinery enamel, or color as directed.
  - c. All pipe hangers and supports shall be painted to match the painting on the pipe covering or the pipe they support.
  - d. Identification lettering and directional flow arrows on heating and plumbing piping shall be by Heating and Plumbing Contractors. All other piping - see color code.
  - e. Painting or coatings shall not apply to stainless steel, aluminum, or galvanized steel.
2. Miscellaneous Painting
  - a. All metal doors other than aluminum shall be painted with two coats.
  - b. The painting of exposed panel board faces (aluminum excepted) shall be included.
  - c. The painting of all sheet metal work, radiators, convactor enclosures, all pipes and pipe covering in all exposed portions of the building, except as otherwise noted, shall be included within this contract.
  - d. The painting of all ducts, pipe and pipe covering occurring in accessible pipe spaces is included under this Contract. Ducts, pipe and pipe covering installed in completely furred-in ceiling and vertical shafts will not be painted. The equipment furnished under the Plumbing, Heating and Electrical Contracts will be painted under this section except as otherwise noted.
3. Painting of Electrical Conduit, Boxes and Equipment
  - a. The CONTRACTOR shall paint all conduit work, junction and pull boxes, bus duct, iron work hangers, supports, panel fronts, and all other miscellaneous equipment of the electrical system throughout the finished portions of the building.
  - b. All identification lettering of electrical equipment shall be by the Electrical Contractor.
4. Parking Lot Striping (as applicable)
  - a. Painting of striping within parking areas shall be to design indicated by ENGINEER.
  - b. Lines shall be four (4) inches wide applied in one coat.
  - c. Handicap area to be painted blue with a white handicap logo.

SECTION 09900

PAINTING

B. Standard Color Schedule

1. Architectural Painting: Color charts shall be submitted to the Architect for review with the OWNER for final color selections.
2. The following color scheme in pipe painting is recommended for purposes of standardization:

Pipe Description	Tnemec Color	Tnemec Code
Drains	Black	35GR
Fire Hydrant	Chrome Red	06SF
Potable Water	Fountainbleu	25BL
Pumps	Match Pipe Color	-
Sample	Light Gray	32GR

- a. In situations where two colors do not have sufficient contrast to easily differentiate between them, a six-inch band of contrasting color shall be placed on one of the pipes at approximately 30 inch intervals.
  - b. The name of the liquid or gas, with arrows indicating the direction of flow, shall also be indicated on the pipe.
3. Building and Architectural Components
    - a. All building colors shall be determined by the OWNER during construction. Other colors, if not identified in appropriate Specification Sections, shall be selected by the ENGINEER and approved by the OWNER.

C. Finishing Schedule

1. The following items (new) shall be painted in accordance with Painting Specifications.
  - a. Booster Pump Station
    - 1) All new exposed pumps, pipes, valves, and fittings
    - 2) Interior concrete floor surfaces - 100% Acrylic waterbased floor coating system. Basis of design is Armoseal Tread Plex Heavy Duty Coating by Sherwin Williams.
    - 3) All inside building walls of both the electrical room and pump room (full height)
  - b. All new exposed and piping internal and external (above grade) within the site

END OF SECTION 09900

## SECTION 13216

### WIRE WRAPPED PRESTRESSED CONCRETE TANK

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

- A. As noted in Section 01010, this project will be executed through three separate contracts. The tanks and all accessories described herein will be constructed under one contract and improvements will be performed by the TANK CONTRACTOR (also referred to herein as MANUFACTURER or tank MANUFACTURER). The electrical and I&C procurement and installation will be by the ELECTRICAL CONTRACTOR. The construction of the re-pump facility and all associated work will be by the general CONTRACTOR. It will be the responsibility of the TANK CONTRACTOR to coordinate construction of the tank with the general CONTRACTOR and other work associated with the tank. All costs associated with such shall be included in the bid price.
- B. The TANK CONTRACTOR shall be responsible for the excavation of the stormwater pond from existing grade to the pond bottom and the import of structural fill for GST construction. All costs associated with such shall be included in the bid price. The general CONTRACTOR will be responsible for all final grading and brining the site and pond to grades reflected on the drawings.
- C. Furnish all labor, materials, and incidentals required to design, construct, and test one (1) circular, 141-foot inside diameter, 3.0 MG (nominal volume; 2.8 MG useable) wire wrapped pre-stressed concrete potable water storage tank with a galvanized steel diaphragm including vent(s), hatch, manway, guardrails, aluminum exterior ladder, FRP interior ladder, gravity ventilator, precast overflow(s), and other accessories as shown on the Drawings and described herein.
- D. The TANK CONTRACTOR shall install all piping, fittings, and appurtenances within the perimeter of the tank and extending to the first pipe fitting or valve outside the tank perimeter as shown on the Drawings. The perimeter concrete curb and gravel and overflow structure will be provided and installed by the general CONTRACTOR. A portion of the tank's piping has been pre-purchased and provided by the OWNER so that construction can begin immediately. The piping pre-purchased by the OWNER is shown in **Appendix C**. The piping shall be coated as per these specifications by the TANK CONTRACTOR. Unloading, storage and handling of the piping shall be the responsibility of the TANK CONTRACTOR.
- E. The TANK CONTRACTOR shall include in their bid the excavation, removal, disposal and backfill for the top 6-inches of soil below the ground storage tank and extending to 5 feet around the perimeter.
- F. The potable water storage tank will require post-loading of the area with water for four weeks after construction and prior to making any piping connections as described in the geotechnical report. The geotechnical report is included in **Appendix A**.



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### WIRE WRAPPED PRESTRESSED CONCRETE TANK

#### 1.02 RELATED WORK

- A. Excavation, dewatering, and backfill are included in Division 2.
- B. Concrete is included in Division 3.
- C. Miscellaneous metals are included in Division 5.
- D. Pipes, valves, and fittings are included in Division 15.
- E. Level transmitters and appurtenances are included in Division 16.

#### 1.03 SUBMITTALS

- A. Submit shop drawings, design calculations, and product data, showing materials of construction and details of installation for construction of the new potable water storage tank in accordance with Section 01300:
  - 1. Product Data: Manufacturer's information, specifications, and installation instructions for the tank appurtenances. This submittal will be reviewed for operational requirements only. The locations of all appurtenances shall be identified and dimensioned. Appurtenances may include the following:
    - a. Inlet, outlet, overflow, level tap, and drain pipes
    - b. Ladders, dome probe curb, vent curbs, guardrails, and access hatch
    - c. Wall manway
    - d. Settlement monuments
    - e. Liquid level indicators
    - f. Perimeter concrete overflows
    - g. Roof ventilators and fan curbs with fiberglass cover
    - h. Gravity ventilator
    - i. All other appurtenances
    - j. Stainless steel vortex breaker
  - 2. Shop Drawings: Detailed erection shop drawings and construction procedures stamped by a professional ENGINEER licensed in the State of Florida. Provide complete details for the foundation, floor slab, walls, dome, piping, and all other details and accessories necessary to construct the tank. The submittal shall include thicknesses and dimensions of all structure components and the prestressing schedule showing number and placement of prestressing wires. The submittal shall include the size, location, and number of all reinforcing bars. The submittal will be reviewed for operational requirements only and will be used in the field by the OWNER's representative during construction.
  - 3. Submit concrete design mixes including ingredient proportions, minimum cementitious content, and water/cementitious ratio in accordance with this specification.
  - 4. Interior and exterior coating data:
    - a. Product data sheets for each coating product used to coat the interior concrete surfaces and interior metallic surfaces.
    - b. Coating profile including recommended surface preparation, prime coat MDFT and finish coat MDFT.
    - c. Qualifications and record of experience of the coatings applicator actually performing the work.
    - d. Documentation that the coatings are NSF 61 certified.

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### WIRE WRAPPED PRESTRESSED CONCRETE TANK

- e. Documentation that coatings for PVC piping are NSF 14 certified.
  - f. Documentation for cure time based on temperature.
  - g. Color chart
  5. Submit concrete strength reports for 7-day and 28-day breaks taken in accordance with the requirements of Paragraph 3.04 of this specification.
  6. Submit warranty document in Owner's name in accordance with Paragraph 1.08 of this specification.
  7. Submit a cleaning and disinfection plan which complies with Part 3 of this specification.
- B. Design Data
1. Submit design calculations of the tank stamped by a professional ENGINEER licensed in the State of Florida for the project records. These calculations shall be provided at the time of initial shop drawing review. If changes occur during construction, the tank MANUFACTURER will also provide the "as-built tank" design calculations for re-submittal upon completion of construction.
- C. Certification
1. The tank MANUFACTURER shall be responsible for the design and construction of the prestressed concrete tanks. The tank MANUFACTURER shall submit written certification prepared, sealed, and signed by a professional ENGINEER licensed State of Florida that the design, details, and construction conform to the requirements of AWWA D110, this Section, and applicable city and state building codes.
  2. Tank MANUFACTURER shall submit results of the concrete strength test following 28 days of curing.
- D. Statement of Qualification
1. Submit experience record in the design and construction of wire wrapped prestressed concrete tanks as specified herein.
  2. Submit ACI CP-60 certification for each nozzleman and foreman to be employed on the project as specified herein.
- E. Project Record Documents
1. Record actual location layout and final configuration of tank and accessories on shop drawings and submit to ENGINEER after construction of the tank is complete.

#### 1.04 DEFINITIONS

- A. Prestressed Tank System: Consists of an AWWA D110 wire-wound, circular prestressed concrete tank with Type II core wall, concrete dome roof storage tank with galvanized steel diaphragm, concrete base mat, reinforcing, concrete work, accessories, and testing directly related to the tank.
- B. Shotcrete: Mortar projected directly upon intended surface.

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### WIRE WRAPPED PRESTRESSED CONCRETE TANK

#### 1.05 REFERENCE STANDARDS AND DOCUMENTS

- A. American Society for Testing and Materials (ASTM)
1. ASTM A1008/A1008M - Standard Specification for Commercial Steel, Sheet, Carbon, Cold-Rolled with Improved Formability, Solution Hardened, and Bake Hardenable.
  2. ASTM A185 – Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
  3. ASTM A416/A416M - Standard Specification for Steel Strand, Uncoated Seven-Wire for Prestressed Concrete.
  4. ASTM A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
  5. ASTM A653, Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot Dip Process.
  6. ASTM A722 – Standard Specification for Uncoated High-Strength Steel Bars for Prestressing Concrete.
  7. ASTM A821/A821M – Standard Specification for Steel Wire, Hard Drawn for Prestressing Concrete Tanks.
  8. ASTM A884/A884M – Standard Specification for Epoxy Coated Steel Wire and Welded Wire Reinforcement.
  9. ASTM A1064/A1064M Standard Specification for Carbon Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
  10. ASTM C31/C31M – Test Methods for Making and Curing Concrete Test Specimens in the Field.
  11. ASTM C33/C33M – Specification for Concrete Aggregates.
  12. ASTM C39/C39M – Test Method for Compressive Strength of Cylindrical Concrete Specimens.
  13. ASTM C42, Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
  14. ASTM C143 – Standard Test Method for Slump of Hydraulic-Cement.
  15. ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete.
  16. ASTM C231 – Standard Test Method for Air Content of Freshly Mixed Concrete by Pressure Method.
  17. ASTM C881/C881M – Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
  18. ASTM C1140/C1140M – 11 – Standard Practice for Preparing and Testing Specimens from Shotcrete Test Panels.
  19. ASTM D1056 – Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
  20. ASTM D1557, Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
  21. ASTM D1752 – Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Filler for Concrete Paving and Structural Construction.
  22. ASTM D412 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension.
  23. ASTM E1745 – Standard Specifications for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
  24. ASTM F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

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- B. American Concrete Institute (ACI)
  - 1. ACI 117 – Specification for Tolerances for Concrete Construction and Materials.
  - 2. ACI 301 – Specifications for Structural Concrete for Buildings.
  - 3. ACI 305R – Hot Weather Concreting.
  - 4. ACI 306R – Cold Weather Concreting.
  - 5. ACI 318 – Building Code Requirements for Structural Concrete.
  - 6. ACI 347 – Guide to Formwork for Concrete.
  - 7. ACI 350/350R – Environmental Engineering Concrete Structures.
  - 8. ACI 350.1-10 – Specification for Tightness Testing of Environmental Engineering Concrete Containment Structures & Commentary.
  - 9. ACI 372R-13 – Design and Construction of Circular Wire and Strand Wrapped Prestressed Concrete Structures.
  - 10. ACI 506R.2 – Guide to Shotcrete.
  - 11. ACI CP-60 – Shotcrete Nozzlemen Certification Publication.
  - 12. ACI SP4 – Formwork for Concrete.
- C. American Society of Civil Engineers (ASCE): 7 – Minimum Design Loads for Buildings and Other Structures.
- D. American Water Works Association (AWWA)
  - 1. AWWA C652 – Disinfection of Water Storage Facilities
  - 2. Current AWWA D110– Wire- and Strand- Wound Circular-Prestressed Concrete Water Tanks
- E. U.S. Army Corps of ENGINEERS Spec. CRD-C572 - Specification for PVC Waterstop
- F. Florida Building Code, 2020, 7<sup>th</sup> edition
- G. Occupational Safety and Health Administration (OSHA)
- H. Concrete Reinforcing Steel Institute (CRSI) – Code of Standard Practice
- I. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

#### 1.06 QUALITY ASSURANCE

- A. The tank shall be wire wrapped prestressed concrete tank with a Type II core wall as manufactured by Crom Corp. Gainesville, Florida, Precon Corporation of Newberry, Florida or ENGINEER pre-approved equal that meet or exceed all quality assurance prequalification requirements. Approved equals will be added by addendum only.
- B. The tank design and construction shall be performed by an established manufacturer of recognized ability, having at least 7 years of experience in the design and construction of wire wrapped circular prestressed concrete tanks as specified herein. The design and construction of all aspects of the floor slab, walls, prestressing, shotcrete, and dome roof of the wire wound circular prestressed concrete tank shall

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be performed by the tank MANUFACTURER and shall not be subcontracted or otherwise assigned.

1. The MANUFACTURER shall have designed and constructed at least 10 wire wrapped prestressed concrete tanks conforming to ANSI/AWWA D110 with Type II core wall(s) that have been put into service within the last 10 years. The tanks shall equal or greater size than that required for this proposed tank. The tank shall have the diameter and capacity of not less than 75% nor more than 150% of the diameter and capacity of the proposed tank.
  2. The MANUFACTURER's staff shall include a full-time professional engineer registered in the state of Florida, having no less than five years of experience in the design and field construction of circular prestressed composite tanks. All working drawings and design calculations shall carry the seal of such registered professional engineer.
- C. All concrete work including the foundation, base slab/floor, walls, and roof shall be performed by the tank MANUFACTURER, including all tank coatings, using its own trained personnel and equipment.
- D. Foreman supervising the placing of the shotcrete shall have a minimum of five (5) years' experience as a nozzleman. Each shotcrete nozzleman shall have a minimum of five (5) years' experience on similar applications and shall be able to demonstrate by tests, if required, his/her ability to satisfactorily gun shotcrete of the required quality. All shotcrete nozzleman shall be certified by the American Concrete Institute (ACI) as outlined in the ACI certification publication CP-60.

#### 1.07 DESIGN CRITERIA

- A. Tank construction for the one (1) circular wire wrapped prestressed concrete with galvanized steel diaphragm, domed, AWWA D110 Type II, potable water tank.
1. Inside diameter: 141 feet
  2. Tank finished floor elevation: 45.83 feet at bottom of sidewall (NAVD 88)
  3. Finished grade around tank exterior perimeter: 47.50 feet
  4. Nominal Liquid Capacity – 3,000,000 gallons
    - a. Water overflow elevation: 71.20 feet (OVF)
    - b. High water surface elevation: 71.20 feet (HWSE)
    - c. Minimum water surface elevation: 47.00 feet (LLWSE)
    - d. Maintenance water elevation (empty): 45.83 feet
  5. Maximum height of structure (interior floor to top of gravity ventilator housing) 41.14 feet – to be verified and confirmed by the TANK CONTRACTOR.
  6. Maximum Influent Flow Rate – 2,022 gpm
  7. Maximum Effluent Flow Rate – 6,000 gpm
  8. Connections to the tank and piping requirements including tank penetrations, watertight appurtenances, and concrete encasement below tank for the following:
    - a. 16-inch diameter influent ductile iron pipe
    - b. 20-inch diameter effluent ductile iron pipe
      - 1) Provide stainless steel vortex breaker
    - c. 8-inch diameter ductile iron drain pipe
      - 1) Provide drain pipe inlet with 4-foot diameter by 3-inch deep sump
    - d. 12-inch diameter ductile iron overflow pipe with pipe supports on the dome

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- e. 4-inch diameter stainless steel level tap
- f. Flanged pipe sleeve for conduit/instrumentation and sampling penetrations installed in the dome of the tank.
9. Tank accessories furnished and installed to include:
  - a. Tank access hatch curb and cover
  - b. Tank gravity ventilator
  - c. Provide interior fiber reinforced polymer ladder. Provide exterior aluminum ladder. All ladders shall meet OSHA 1910.28(b)(9)(i)(B).
  - d. One wall manhole with sample tap
  - e. Stainless steel pipe brackets
  - f. Fiberglass liquid level indicator
  - g. Provisions for mounting conduit for float switches including conduit mounting brackets and dome probe opening/curb
  - h. Provide thickened bosses for the full height of the wall for mounting conduits, lightning protection, instrumentation and control conduits, and ladder. Ladder shall be centered on boss.
10. Precast concrete overflows in the dome of the roof.
11. Aluminum guardrail and aluminum kickplate around entire tank dome.
12. Dome ventilators.
13. A tank placard shall be installed on the exterior of the tank. Information shall include tank contractor, year of construction, job number, dates of warranty, depth, diameter, and type of interior coating.
14. The interior of the tank dome and walls shall be coated with an epoxy approved for contact with potable water as per Paragraph 2.02 L.
15. Subbase - A granular base material shall be used beneath the membrane and/or slab.
  - a. The base material should consist of a minimum 6-inch thick clean, well-compacted, and angular or sub-angular material that is non-plastic, inorganic, granular soil having less than 10 percent material passing the No. 200 mesh sieve and containing less than 4 percent organic material.
  - b. The gradation of the base material should be selected to permit free drainage without the loss of fines or intermixing with the subgrade material.
  - c. The maximum particle size of the base material should be limited to provide a relatively level working surface without potential intrusion of the base materials into the membrane floor slab concrete.
  - d. Base material should be compacted to 95 percent of the maximum laboratory density determined by ASTM D1557.
16. Floor – Non-prestressed cast-in-place reinforced concrete
  - a. A Class A polyethylene moisture barrier of at least 6 mils thick shall be installed under concrete floor slab.
  - b. The minimum thickness of the floor slab is 4-inch.
  - c. The floor system shall have a thickened edge for the exterior wall footing and where additional loadings are expected or reinforcement is needed. Slabs greater than 12-inch shall have top and bottom reinforcement in each direction.
  - d. The transition from the bottom of the footings and pipe encasements to the underside of the floor slab shall not be steeper than 2 horizontal to 1 vertical. The concrete for all pipe encasement(s) and sump(s) shall not be less than 8 inches thick. All pipe encasements shall be flared at tank wall. The clearance in all directions shall not be less than 12 inches.

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- e. A minimum percentage of 0.60 percent reinforcing steel shall be used in the membrane floor. The minimum percentage shall apply to all thickened sections and shall extend a minimum of 2 feet into the adjacent membrane floor.
- f. The floor shall be cast monolithically with no cold joints.
- 17. Hydrostatic Floor/Wall Joint – Fixed, non-hydrostatic, rotating, or translating and shall include plastic waterstop.
- 18. Horizontal prestressing shall be continuous. Discontinuous prestressing tendons or strands will not be allowed.
- 19. All vertical and horizontal joints shall be designed to minimize leakage. Joints with gaps shall not be allowed.
- 20. Equipment/Structural Dead and Dynamic Loads
  - a. Intake hoods and gravity ventilator being installed now, and potential future fans and tray aerator
  - b. Miscellaneous (piping, valves, etc.)
  - c. Guardrails, ladders, and monitoring equipment
- 21. Core Wall
  - a. Shotcrete core wall with continuous internal galvanized steel diaphragm, vertical joint seals, and shotcrete coverings. Walls placed on elastomeric bearing pads, free to move radially, and shall have plastic water stop connection between wall and footing.
  - b. The wire-wound, prestressed concrete tank core wall shall be designed as a thin shell cylindrical element using shotcrete and an embedded, mechanically bonded, galvanized steel shell diaphragm.
  - c. Bonded wire-prestressed wall consisting of Type II shotcrete core wall encasing a mechanically bonded, continuous, galvanized steel diaphragm.
  - d. The design of the core wall shall take into account appropriate edge restraint. To compensate for bending moments, shrinkage, differential drying, and temperature stresses, the top two feet of core wall and the bottom three feet of core wall shall have not less than one percent circumferential reinforcing.
    - 1) Inside Face:
      - a) The inside face of the core wall shall utilize the galvanized steel diaphragm as effective reinforcing.
      - b) Additional vertical and horizontal reinforcing steel bars shall be used as required by design computations.
    - 2) Outside Face:
      - a) Vertical reinforcing steel in the outside face of the core wall shall be: minimum of No. 4 bars at 12-inch center to center.
      - b) Additional vertical and horizontal reinforcing steel bars shall be used as required by design computations.
  - e. The minimum core wall thickness shall be 3½-inch.
  - f. Reinforcing steel used in the core wall shall be designed using a maximum allowable design tensile stress,  $f_s$ , of 18,000 psi.
  - g. Allowable compressive stress in the core wall due to initial prestressing force,  $f_{gi}$ , shall be:
    - 1) 1250 psi + 75t psi/in. with 0.5  $f_{gi}$  maximum (where  $f_{gi}$  is defined as compressive strength required for final prestressing force and t is the thickness of the core wall in inches).

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- 2) Maximum of 2000 psi.
  - h. Allowable compressive stress in the core wall due to final prestressing force,  $f_g$ , shall be:
    - 1) 1250 psi + 75t psi/in. with 0.45  $f_g$  maximum (where  $f_g$  is defined as compressive strength required for final prestressing force and t is the thickness of the core wall in inches).
    - 2) Maximum of 1800 psi.
  - i. Interior core wall surface shall be finished with a smooth steel trowel finish prior to application of specified surfacer or coating.
22. Roof - Concrete dome
- a. Roof shall be a circumferentially prestressed cast-in-place concrete dome with a minimum thickness of 3-inch except at the edge, where it shall be at least 7.5-inch.
  - b. Dome shell reinforcement shall consist of reinforcing bars or welded wire fabric meeting ASTM A185, not galvanized. Bolsters for wire fabric and reinforcing bars shall be plastic. Steel reinforcement shall meet the requirements of AWWA D110-04. Wire ties shall be galvanized.
  - c. The dome ring girder shall be prestressed with sufficient wire to withstand the dome dead load and design live loads. The ring girder shall have cross section suitable to accept the applied prestressing forces.
  - d. The high-water level in the tank shall be permitted to encroach on the dome shell no higher than the upper horizontal plane of the dome ring girder so that the tank may overflow out of the dedicated overflow pipe. Should the water level continue to rise, it shall flow out of the precast concrete overflows. The precast overflow outlets plus the dome ventilator shall provide an open area no less than three times the largest influent pipe area.
  - e. The dome shall be designed as a free-span, spherical thin shell with one-tenth rise.
  - f. The dome edge and upper wall shall be designed to resist the moments, thrusts, and shears that occur in this region due to dome and wall prestressing and loading conditions.

1) Dome Edge Thickness:

- a) A determination of the buckle diameter shall be made, as defined by:

$$d_b = 2.5 \cdot \sqrt{r_d \cdot t_d} \text{ rounded up to the next foot}$$

Where:  $d_b$  = buckle diameter in feet

$r_d$  = dome radius in feet

$t_d$  = typical dome thickness in feet

- b) Dome edge thickening shall begin at a radial location on the dome, defined as which is at least one buckle diameter away from the tank wall.
- c) A springline haunch shall be provided, which extends radially from the inside face of the tank wall to radial location which is defined as:

$$s_1 = 0.6 \cdot \sqrt{1.5 \cdot r_d \cdot t_d} \text{ rounded up to the next foot}$$



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Where:

$s_1$  = distance from inside face of wall to haunch in feet

$s_2$  = distance from inside face of wall to typical dome thickness in feet.

This springline haunch shall begin at the inside face of the tank wall with a springline thickness as required by paragraph (f) below and shall end at radial location with the following thickness:

$$t_{d1} = 1.33 \cdot t_d$$

Where:

$t_{d1}$  = minimum thickness at in feet

$t_d$  = typical dome thickness in feet at one buckle diameter from tank wall

- (d) Beginning at  $s_1$  and continuing to  $s_2$  the dome shell shall have a uniform straight line taper.
  - (e) Parameters (b), (c), and (d) above are not required for domes where the calculated typical dome thickness is less than 75% of the actual typical dome thickness.
  - (f) Sufficient concrete thickness at the springline of the dome shall be provided so that no more than 2 ft of the springline haunch is considered in calculating the effective dome edge ring cross sectional area. Compressive stress in this area shall not exceed 1000 psi when subjected to initial prestressing, offset by dead load only.
- 2) Dome Edge Steel Reinforcement:
- a) Throughout the dome edge, the percentage of steel reinforcement, both radially and circumferentially, shall be no less than 0.25% of the gross cross sectional area of concrete.
  - b) Along the dome edge, steel reinforcement shall be distributed between the upper and lower layers unless finite element analysis calculations indicate that tensile stress does not exist in the concrete along the bottom face of the dome edge. In that case, only top bars are required radially and circumferentially. In addition, radial and circumferential reinforcing bars will not be required along the bottom face of the dome edge where the calculated typical dome thickness is less than 75% of the actual typical dome thickness.
  - c) Where reinforcing bars are required in the bottom layer, they shall be placed near the tank wall to insure adequate development at the intersection between dome and wall.
  - d) In all cases, the percentage of circumferential steel reinforcement in the effective dome ring shall be no less than one percent of the gross cross sectional area of concrete. The effective dome ring is defined as  $\frac{1}{4}$  of the haunch length not to exceed 2 ft.

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- e) Where bottom dome edge steel reinforcement is required, vertical steel reinforcement along the inside face of the tank wall shall be no less than 0.5% of the cross sectional area of wall shotcrete.
  - g. The dome shall be designed to support all accessories that will be included such as probe curbs, access hatches, ventilators, fan curbs and four future fans, precast concrete overflows, gravity ventilator, and guardrail.
  - h. Anodized aluminum dome railing around the tank perimeter with kickplate shall be constructed of 6061-T6 aluminum to meet applicable OSHA standards. The guardrail height shall be 42-inch above the adjacent supporting concrete surface.
  - i. All joints of the plywood deck shall be taped to prevent concrete rundown.
23. Prestressing
- a. Circumferential prestressing of the tank shall be achieved by the application of cold-drawn, high-carbon steel wire placed under high tension.
  - b. A substantial allowance shall be made for prestressing losses due to shrinkage and plastic flow in the shotcrete and due to relaxation in the prestressing steel.
  - c. The prestressing design shall conform to the following minimum requirements:
    - 1) Working stress for the tank wall and dome ring shall be a maximum of 115,000 psi and 120,000 psi, respectively.
    - 2) The allowable design tensile stress in the prestressing wire before losses, fsi shall be 145,600 psi or no greater than 0.63 times the ultimate strength of the wire.
    - 3) Areas to be prestressed will contain no fewer than 10 wires per foot of wall for 8-gauge and 8 wires per foot of wall for 6-gauge.
    - 4) A maximum of 24 wires per layer per foot for 8-gauge and 20 wires per layer per foot for 6-gauge will be allowed.
24. Wall Openings
- a. When it is necessary for a pipe to pass through the tank wall, the invert of such pipe or sleeve shall be no less than 18 inches above the floor slab. The prestressing wires required at the pipe elevation shall be distributed into circumferential bands immediately above and below the opening to maintain the required prestressing force while leaving an unbanded strip around the entire tank.
  - b. Unbanded strips shall have a vertical dimension of no more than 36 inches unless an axi-symmetric shell analysis is performed to account for compressive forces plus shear and moments caused by displacement of the prestressing wires into adjacent bands.
  - c. All wall pipes, sleeves, and manholes passing through the wall shall be sealed to the diaphragm by epoxy injection
25. Fan curbs with fan covers for the openings.
- B. The tank MANUFACTURER shall use the following minimum information in the design of the tank and tank appurtenances:
- 1. Unit Weights:
    - a. Concrete and Shotcrete - 150 pcf
    - b. Soil - 120 pcf

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- c. Water – 62.4 pcf
- d. Steel – 490 pcf
- 2. Live Load:
  - a. Floor – 62.4 pcf times the height of water to overflow plus 6-inch
  - b. Assume ground water level at elevation 44.5 feet (top of existing grade).
  - c. Roof – 20 psf horizontal projection to tank roof but the roof live load is reducible as allowed by the current ASCE 7 and the latest Florida Building Code.
    - 1) Live load shall include the load of an operating gravity ventilator.
- 3. Wind Load:
  - a. Shall be calculated using ASCE 7-16 based on an ultimate wind load of 142 mph.
  - b. Building Risk Category III
  - c. Exposure C
- 4. Seismic Load:
  - a. Importance Factor: 1.25
  - b. Spectral Response Accelerations:(S<sub>s</sub>,S<sub>1</sub>):0.09, 0.047
  - c. Site Class: D
  - d. Spectral Response Coefficients:(S<sub>d</sub>,S<sub>d1</sub>):0.096, 0.075
  - e. Seismic Design Category: B
  - f. Seismic Force Resisting System: Flat Bottom Ground Supported Tanks Reinforced or Prestressed Concrete Reinforced Anchored Flexible Base
  - g. Seismic Response Modification Factor: 2
  - h. Seismic Response Coefficient: 0.06
- 5. Flood Criteria:
  - a. Flood Zone: Zone X, outside of the annual 0.2% chance floodplain
- 6. Allowable Bearing Pressure: 2,000 psf
- 7. Applied Bearing Pressure: Refer to geotechnical report for expected applied bearing pressures with correlating settlements.
- 8. Dead load of potential future tray aerator with a capacity of the fill rate of 2,022 gpm
- 9. Overflow capacity requirement at maximum infill capacity = 2,022 gpm
- 10. Consider loads listed herein to act in combinations, whichever produces the most unfavorable effects.
- 11. It is not necessary to combine wind and earthquake loads but the maximum stress produced by either condition with other applicable loads shall be considered.
- 12. Any ladders connecting to or on the tank shall be coordinated with the Manufacturer for support and connection details. Loads resulting from these appurtenances shall be taken into account in the tank's design.

#### 1.08 WARRANTY

- A. The tank MANUFACTURER shall warrant the tank structure against any defective materials or workmanship for a period of 5 years from the date of tank acceptance with 1 year bond and 4 year written company warranty. If any materials or workmanship proves to be defective within that period, they shall be replaced or repaired by the tank MANUFACTURER at no additional cost to the OWNER.
- B. If any leakage or other defects appear within the warranty period, the tank Manufacturer shall promptly repair the tank at its own expense upon written

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notification by the Owner that such defects have been found. This warranty shall not apply to any accessory, equipment or other product that is not a structural part of the tank or manufactured by a company other than the tank construction company. Leakage is defined as liquid appearing on the exterior of the tank, the source of which is from inside the tank.

- C. All interior coatings shall be included in the scope of the tank MANUFACTURER and shall not be subcontracted. Coatings shall be included under tank MANUFACTURER 5-year warranty that covers coating system failure.
  - 1. Coating system failure is defined as either (1) delamination of the coating (2) a breach of the coating exposing the substrate below or (3) chipping and peeling of the coating system not caused by physical damage or abrasion to the tank. Changes in color shall not be deemed a coating failure.

## PART 2 – PRODUCTS

### 2.01 GENERAL

- A. Materials shall be new and shall conform to the material specified in AWWA D110 and the following material standards.
- B. Products listed in this section shall be applicable to locations shown in drawings or otherwise specified in the design criteria of this specification. Substitutions to the materials in this specification shall be submitted in writing to the ENGINEER for approval.

### 2.02 MATERIALS

- A. Concrete and reinforcing steel for the tank core wall and roof dome shall conform to the requirements of AWWA D110. Concrete and reinforcing steel for all other structural elements shall conform to the requirements of Division 3. A 3/8-inch maximum size aggregate may be used for dome concrete if designed for strength and maximum density. Admixtures causing accelerated or retarded set of the concrete shall not be used unless approved in writing by the ENGINEER.
  - 1. Concrete Strength: Minimum concrete strength at 28 days.
    - a. Pipe encasement  $f'c = 4000$  psi
    - b. Footing and floors  $f'c = 4000$  psi
    - c. Shotcrete  $f'c = 4000$  psi
    - d. Dome roof  $f'c = 4000$  psi
- B. Shotcrete
  - 1. Shotcrete shall be in accordance with AWWA D110.
  - 2. Shotcrete shall conform to the requirements of ACI 506.2 except as modified herein.
  - 3. All shotcrete mixes shall utilize Type I/II cement. Type II cement may be substituted with a written request to the ENGINEER.
  - 4. A maximum of 25 percent cementitious material may be flyash.
  - 5. All shotcrete in contact with diaphragm or prestressing wire shall be proportioned to consist of not more than three parts sand to one part Portland cement by weight. All other shotcrete shall be proportioned to consist of not more than four parts sand to one part Portland cement by weight.

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6. Admixtures shall not contain more than trace amounts of chlorides, fluorides, sulfides, or nitrates.
7. Shotcrete mixes used in the tank construction shall conform to the following.
  - a.  $f'_c = 4000$  psi
  - b. Maximum w/c ratio = 0.42
  - c. Slump =  $4" \pm 1"$

C. Fine Aggregates (Sand)

1. Saturated, surface dry, hard, dense, uncoated rock fragments free from injurious amounts of foreign or deleterious substances
2. Fineness Modulus for Sand: Range from 2.70 to 3.00 with maximum particle size of 1/4-inch.
3. Maintain sand at 3 to 6 percent moisture content; dampen or dry with sand dryers if necessary.
4. Screen sand for finish coat to produce uniform dense surface in texture and appearance.
5. Gradation:

Sieve Size	Percent Passing by Weight
No. 4	97 - 100
No. 8	90 - 98
No. 16	70 - 85
No. 30	35 - 55
No. 50	12 - 25
No. 100	2 - 8

6. Mix proportions:
  - a. Adjacent to steel diaphragm and over prestressing wire shall be proportioned to consist of not more than three parts sand to one part Portland cement by weight.
  - b. All other areas shall be proportioned to consist of not more than four parts sand to one part Portland cement by weight.

D. Non-prestressed Reinforcement

1. Shall meet the requirements of ACI 318.
2. Shall have a maximum allowable tensile stress of 18,000 psi, exclusive of shrinkage and temperature effects.
3. Shall not be credited for resisting any portion of primary circumferential tension resulting from fluid pressure.
4. Non-prestressed mild reinforcing steel shall be new billet steel meeting the requirements of ASTM A615/A615M with a minimum yield strength,  $f_y$ , of 60,000 psi.
5. Welded wire reinforcing shall be plain wire conforming to the requirements of ASTM A1064/A1064M with a minimum yield strength,  $f_y$ , of 65,000 psi.

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- E. Prestressed Wire
1. Unless otherwise approved in writing by the ENGINEER, prestressed wire shall conform to ASTM A821, suitable for redrawing and having a minimum ultimate strength of 231,000 psi.
  2. The prestressing wire shall conform to the requirements of ASTM A821/A821M, Type B.
  3. The prestressing wire size shall be 0.162-inch (8 gauge), 0.192-inch (6 gauge) or larger, but no larger than 0.250-inch.
  4. The ultimate tensile strength shall be 231,000 psi or greater for 8 gauge wire, and 222,000 psi or greater for 6 gauge.
  5. Splices for horizontal prestressed reinforcement shall be ferrous material compatible with the prestressing reinforcement and shall develop the full strength of the wire.
- F. Galvanized Steel Diaphragm
1. Tank galvanized diaphragm in accordance with ASTM A653 for commercial quality cold-rolled steel sheet. Minimum of 26-gauge sheet and form corrugations of a pattern to form a continuous positive watertight seal and a strong mechanical key between shotcrete and steel. Furnish steel sheets in one continuous length to full height of wall. Vertical joints between sheets. Weight of zinc coating shall be not less than G90 or a minimum coating weight of 0.9 oz/ft<sup>2</sup> total for both sides with a minimum average coating weight per side of 0.32 oz/ft<sup>2</sup>. Testing of the galvanic coating shall be completed at three locations on the surfaces of the galvanized diaphragm as per the ASTM standard.
  2. The galvanized diaphragm shall be supported off the mat foundation and shall be continuous to within 3 inches of the top of the wall. Horizontal joints or splices will not be permitted.
  3. All vertical joints in the galvanized diaphragm shall be rolled seamed, crimped, and sealed watertight using epoxy injection.
  4. At the floor/wall joint, the steel shell galvanized diaphragm shall be epoxy bonded to the waterstop.
  5. In all tanks designed to use a waterstop at the floor/wall joint, the galvanized steel shell diaphragm shall be epoxy bonded to the waterstop.
- G. Elastomeric Materials
1. Waterstops
    - a. Waterstops shall be extruded from an elastomeric plastic compound with virgin polyvinyl chloride as the basic resins. The waterstop shall meet the performance criteria in the Corps of Engineers Specifications CRD-C572.
    - b. The profile and size of the waterstop shall be suitable for the hydrostatic pressure and movements to which it is exposed.
  2. Elastomeric Bearing Pad
    - a. Elastomeric Bearings Pads shall be a neoprene or natural rubber pad conforming to ASTM D2000, line call-outs 2BC415A14B14 and 4AA420AB respectively.
  3. Sponge filler at the floor/wall joint shall be closed-cell neoprene.

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- H. Moisture Barrier
  - 1. The moisture barrier shall be polyethylene Class A conforming to ASTM D4397. The thickness shall not be less than 6 mil.
  
- I. Epoxy
  - 1. Epoxy Sealants
    - a. Epoxy used for sealing the steel shell shall conform to the requirements of ASTM C881/C881M.
    - b. Epoxy used for sealing the steel shall be Type III, Grade 1, and shall be a 100 percent solids, moisture insensitive, low modulus epoxy system.
    - c. Epoxy used for placing the waterstop shall be Type II, Grade 2, and shall be 100 percent solids, moisture insensitive, low exotherm epoxy.
    - d. When pumped, maximum viscosity of the epoxy shall be 10 poises at 77-degree F.
    - e. The epoxy sealants used in the tank construction shall be suitable for bonding to concrete, shotcrete, PVC, and steel.
  - 2. Bonding Epoxy
    - a. Epoxy resins used for enhancing the bond between fresh concrete and hardened concrete shall conform to the requirements of ASTM C 881/C 881M.
    - b. Epoxy resins shall be a two-component, 100% solids, moisture-insensitive epoxy and shall be Type II, Grade 2.
  
- J. Seismic Resistant Cables
  - 1. Seismic restraint cables shall be seven-wire strand conforming to ASTM A416/A416M.
  - 2. The strand shall be protected with a fusion-bonded, grit-impregnated epoxy coating conforming to ASTM A882/A882M.
  - 3. The minimum yield strength of the seven-wire strand shall be 270,000 psi.
  
- K. Appurtenances
  - 1. Wall Manway
    - a. One rectangular opening access manway for access to the interior of the tank. Frame, cover, and anchor bolts shall be type 316 stainless steel. The removable watertight wall manhole shall be designed to resist hydraulic loading without excessive deflection. Centerline of wall manhole shall be as shown on the Drawings.
    - b. The manway shall also include hinges and a sample tap and valve as detailed on the Drawings.
    - c. The centerline of the manway shall be as shown on the Drawings. If the distance from the bottom of the opening of the manway to the floor is 2 feet or greater, FRP manhole rung(s) shall be provided and cast into the tank wall by the tank MANUFACTURER for each manway to provide safe access into the tank. Rungs shall be completely inert and rated for installation within a potable water tank.
  - 2. Roof hatch
    - a. Provide 7-foot by 7-foot square fiberglass roof hatch cover with Type 316 stainless steel fasteners. The hatch opening in the tank dome shall be a 6-foot by 6-foot opening with a fiberglass cover. The fiberglass cover shall have clear opening dimensions as shown on the Drawings with a lockable hinged access door. Hatch shall be furnished with stainless

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steel hardware throughout. A suitable stainless steel anchor system for attachment to concrete curb on roof shall be provided. Provide continuous 1/4-in thick, 60 durometer neoprene sheet gasket under hatch flange and fasten flange through gasket. Hatch shall be watertight.

3. Concrete Overflows
  - a. Provide eight (8) precast concrete emergency overflows on the dome at the locations shown in the Drawings. The total cross-sectional areas of emergency overflows shall be a minimum three times the area of the inlet pipe. Emergency overflows shall be provided with fiberglass insect screens (24-inch by 24-inch mesh). The screen shall meet the following requirements.
    - 1) Fiber: Polyester.
    - 2) Mesh Opening: 800 microns.
    - 3) Thread Count: 24 by 24 per inch.
    - 4) Thread Diameter: 254 microns.
    - 5) Open Area Percent: 58 percent.
    - 6) Overflow and screens shall be provided by tank manufacturer.
4. Fans and Ventilators
  - a. Provide four (4) fan curbs at the locations shown on the Drawings for future fans.
  - b. Provide four (4) roof ventilators at locations shown on the Drawings. Roof ventilator shall be provided by Markair Model RIH, 60 x 60 inch intake hoods with 28-inch throat and of aluminum construction. The ventilators shall be provided with a 24-mesh aluminum fail safe pop out insect screen in case of blocked up screens. Ventilators shall be designed for operational and rapid draw down events. A suitable stainless steel anchor system for attachment to concrete curb on roof shall be provided.
5. Guardrail
  - a. Guardrail and kickplate shall be of 6061-T6 anodized aluminum conforming to OSHA requirements. Railing shall be around the entire perimeter of the tank and as shown on the Drawings. The guardrail and kickplate shall be as detailed on the Drawings. Guardrails shall be rolled to the proper curvature and shall be of welded construction. Mechanical field splices between guardrails shall be provided to provide continuity between sections of shop assembled guardrails assemblies. Guardrails shall extend a minimum of 42-inches above the top edge of the concrete surface.
6. Ladders
  - a. Interior ladder shall be fiber reinforced polymer. Ladder shall be installed at location shown on the Drawings. Ladder, ladder accessories, and ladder clearances shall conform to the requirements of OSHA. Interior ladder does not require a cage.
  - b. Exterior mill finish ladder, cage, and lockable security gate shall be provided. Ladder shall be installed at the location shown on the Drawings.
  - c. All ladders shall meet OSHA 1910.28(b)(9)(i)(B).
  - d. Provide 316 stainless steel hardware and fasteners, accessories, and all other materials required for the complete installation.
  - e. All ladders shall be fitted with a fall prevention device and removable extension conforming to OSHA requirements. Two climbing belts shall be provided to the OWNER.



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7. Liquid Level Indicator and Transmitter
    - a. The liquid level indicator shall have a half travel gauge with an interior float. The glass shall be fiberglass with 4-inch black numbers on a white board. The level indicator shall be a red fiberglass target. The zero mark shall be set even with the top of the tank wall. The interior float shall be fiberglass or PVC and shall be guided vertically true.
    - b. One 10-inch dome probe curb to mount the level switch(es) shall be included.
    - c. One 4-inch 316 Sch 40 SS floor penetration for mounting the gate valve and pressure transmitter assembly.
  8. One 316 SS vortex baffle plate on the tank discharge with 316 SS mounting hardware.
  9. All wall pipe sleeves and pipe brackets shall be Type 316 stainless steel.
  10. Gravity Ventilator
    - a. A 6-foot 4-inch diameter gravity ventilator suitable for contact with potable water shall be provided at the peak of the dome. The outside surface color shall be white. The gravity ventilator shall be supplied with 24/24 stainless steel screens with ten (10) screened openings. Four (4) stainless steel safety hooks shall be supplied at 90 degrees around the ventilator with a maximum load rating in any direction of 3,100 lbs unfactored load. The bottom shall be covered with a 24/24 mesh polyester removable screen.
  11. Accessory hardware, unless otherwise noted, shall be Type 316 stainless steel conforming to ASTM F593.
  12. Settlement monuments shall be 2-inch by 2-inch by 4-inch aluminum angle, 4-inches wide.
- L. Coatings
1. The interior coatings of the tank, (tank dome, walls (full height), and all ductile iron pipe surfaces) shall be coated by the tank vendor and the tank vendor shall have system responsibility for all interior coatings.
  2. Internal and external tank colors shall be selected by OWNER during the shop drawing process.
  3. Interior Coatings - System A:
    - a. Underside of dome and interior walls (full height)
      - 1) Surface preparation: Sweep blast to CSP5.
      - 2) Surfacer across the interior dome surface and on walls to fill all pinholes and inconsistencies in texture of concrete: Sherwin Williams Dura-Plate 2300 (formerly Corobond 300) at 1/16-inch to 1/8-inch above the inconsistencies.
      - 3) Conduct a detailed inspection of the surfacer application paying attention to pin holes that have not been properly covered.
      - 4) Apply a second application of surfacer (Sherwin Williams Dura-Plate 2300) to areas where pin holes are discovered. Assume 1000 sf of surfacer is required.
      - 5) First Coat: Sherwin Williams Macropoxy 5500 PW at 6.0-8.0 mils DFT.
      - 6) Second Coat: Sherwin Williams Macropoxy 5500 PW at 6.0-8.0 mils DFT.
      - 7) "Holiday" test the entire surface

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- b. Interior floor
    - 1) No coatings.
  - c. All interior metal surfaces including pipes and pipe supports.
    - 1) Surface Preparation: Shop blasted and primed prior to being installed. Pressure wash at 4000 psi and abrade primer with sandpaper to develop a surface profile.
    - 2) Prime Coat: Sherwin Williams Macropoxy 5500 at 5.0-8.0 mils DFT.
    - 3) Stripe Coat: All edges and sharp points shall be coated with a brush or roller to within 3 inches of the edge with Sherwin Williams Macropoxy 5500 at 5.0-8.0 mils DFT.
    - 4) Spot Prime: Sherwin Williams Macropoxy 5500 at 5.0-8.0 mils DFT.
    - 5) Top Coat: Sherwin Williams Macropoxy 5500 at 5.0-8.0 mils DFT.
4. Interior Coatings – System B:
- a. Underside of dome and interior walls (full height)
    - 1) Surface Preparation: NACE No. 6/SSPC-SP13 Joint Surface Prep Standards to ICRI CSP5 surface profile.
    - 2) Apply surfacer across the interior dome surface and wall to fill all pin holes and coat all inconsistencies in texture of concrete: Tnemec Series 218 Mortarclad (1/16"-1/4" Per Lift Max 1/2").
    - 3) Conduct a detailed inspection of the surfacer application paying attention to pin holes that have not been properly covered.
    - 4) Apply a second application of surfacer (Tnemec Series 218) to areas where pin holes are discovered. Assume 1000 sf of surfacer is required.
    - 5) Stripe Coat: All concrete edges and sharp points shall be coated with a brush or roller to within 3 inches of the edge with Tnemec Series N140 Pota-Pox at 6-8 mils.
    - 6) First Coat: Tnemec Series N140 Pota-Pox at 6-8 mils
    - 7) Second Coat: Series 22 Epoxoline at 20 to 24 mils DFT.
    - 8) Total Thickness: 26 mils DFT min.
    - 9) "Holiday" test the entire surface.
  - b. Interior floor
    - 1) No coatings.
  - c. All interior metal surfaces including pipes and pipe supports.
    - 1) Surface Preparation: SSPC-SP-10/NACE2 to a minimum anchor profile of 1.5 mils
    - 2) Prime Coat: Tnemec Series N140 6-8 mils DFT.
    - 3) Stripe Coat: All edges and sharp points shall be coated with a brush or roller to within 3 inches of the edge with Tnemec Series N140 at 6-8 mils DFT.
    - 4) Spot Prime: Tnemec Series N140 at 6-8 mils DFT.
    - 5) Top Coat: Tnemec Series 22 at 20-24 mils DFT.
5. Exterior Coating
- a. Provide an elastomeric breathable coating for the exterior of the new prestressed concrete tank (walls and dome). Exterior coating shall be a modified waterborne acrylate applied to two coats. Colors shall be coordinated and selected by the OWNER.
    - 1) Surface preparation: remove all contaminants by powerwashing per SSPC-SP1.

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- 2) First Coat
  - a) Tnemec Series 156 Enviro-crete – 5 mils DFT
  - b) Sherwin-Williams Loxon XP at 6-8 mils DFT
- 3) Second Coat
  - a) Tnemec Series 156 Enviro-crete – 5 mils DFT
  - b) Sherwin-Williams Loxon XP at 6.0-8.0 mils DFT

#### 2.03 STRUCTURAL DESIGN

- A. Construct the tank from prestressed concrete.
- B. Design, fabricate, erect, inspect, and test the structures in accordance with Florida Building Code 2020 7th edition, ACI 318, ACI 350, ACI 350.1, and ACI 372.
- C. The tanks shall be free of abrupt changes in the meridional profile throughout the operating liquid depth.
- D. Include the effects of localized stresses in the design of the tank and structural attachments and connections.
- E. Design each prestressed concrete tank in accordance with ACI 372 and AWWA D-110 and follow the recommendations for environmental engineering concrete structures in ACI 350.
- F. Maximum initial prestress shall not exceed 0.55 of the concrete compressive strength at time of tensioning.
- G. Provide a minimum 200 psi compressive residual stress under operating conditions circumferentially at any point in the tank wall if the standard design approach is utilized in the tank wall design. (Design References ACI 372R-13 Sections 3.3.5.2 and 3.3.5.3) & (ANSI/AWWA D110-13 Section 3.5.2.1). The 25,000 psi prestressing loss in the standard design approach will require the additional 200 psi residual compressive stress to be accounted for in the wall design. If the Alternative Design is utilized as illustrated in (ANSI/AWWA D110-13 Sections 3.4.4 and 3.5.2.2), the 200 psi residual compressive stress is already taken into account due the long term prestressing loss of 30,600 psi and the 200 psi residual compressive stress will not be required. On the design plans and calculations, please indicate which design option was utilized in the design of the tank.
- H. Tank design shall include the following basic loads that act upon the structure:
  1. Full hydrostatic load.
  2. Partial hydrostatic load.
  3. No hydrostatic load.
  4. Loads from ladders.
  5. Wind load.
  6. Wind vortex shedding.
  7. Seismic load.
  8. Pressure loads.
  9. Unbalanced backfill loads.
  10. Vehicle load GVWR 12,000 on the backfill.
  11. Construction loads.

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12. Buoyancy loads, if required due to seasonal high groundwater conditions as specified herein and the geotechnical report.
  13. Minimum roof live load or snowload.
  14. Gravity ventilator load and winds/seismic loads induced by gravity ventilator.
- I. Consider loads listed herein to act in combinations, whichever produces the most unfavorable effects.
  - J. It is not necessary to combine wind and earthquake loads but the maximum stress produced by either condition with other applicable loads shall be considered.
  - K. In addition to these loads, the design shall provide for the effects on the structure from the following stresses:
    1. Losses from shrinkage, plastic flow, wire creep, anchorage loss, maximum friction loss, and allowance for residual compression in concrete.
    2. In no case shall the losses used for design (exclusive of residual compression requirements) be less than 25,000 psi, regardless of calculations.
    3. Support stresses at the junction with the vessel support structure.
    4. Prestressing during and after tensioning.
    5. Calculate differential drying stresses and the required reinforcement.
  - L. The stresses for concrete shall not exceed ACI 318 except as recommended in ACI 372 and unless otherwise specified herein.
  - M. Under no combination of conditions due to specified load conditions, prestressing, backfilling, and temperature or dryness differential shall maximum extreme fiber tensile stresses under severe load conditions in the wall exceed  $3f_c$  during construction or after the tanks are in service.
  - N. The maximum effective steel prestress, after deducting losses due to shrinkage, plastic flow, reinforcement creep, and an allowance for residual compression, shall not exceed 63 percent of the ultimate strength of the prestressed reinforcement.
  - O. The maximum initial prestress, in any single wire or strand, shall not exceed 75 percent of the minimum ultimate strength of the prestressed reinforcement.
  - P. Any stairs, ladders, or platforms connecting to or on the tank shall be coordinated with the Manufacturer for support and connection details. Loads resulting from these appurtenances shall be taken into account in the tank's design.
  - Q. Nonprestressed Reinforcement
    1. Shall meet the requirements of ACI 318.
    2. Shall have a maximum allowable tensile stress of 18,000 psi, exclusive of shrinkage and temperature effects.
    3. Shall not be credited for resisting any portion of primary circumferential tension resulting from fluid pressure.
    4. Non-prestressed mild reinforcing steel shall be new billet steel meeting the requirements of ASTM A615/A615M with a minimum yield strength,  $f_y$ , of 60,000 psi.
    5. Welded wire reinforcing shall be plain wire conforming to the requirements of ASTM A1064/A1064M with a minimum yield strength,  $f_y$ , of 65,000 psi.

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#### PART 3 – EXECUTION

##### 3.01 ENVIRONMENTAL INSTALLATION REQUIREMENTS

- A. Delay of work under the following conditions:
  - 1. During high winds causing sand to separate at the nozzle.
  - 2. When weather approaches freezing defined as below 40 degrees F when temperature is falling, or until temperature is 35 degrees F when temperature is rising.
  - 3. During rains of high intensity to wash cement out of fresh material.
- B. Cold Weather: Take precautions to avoid low temperatures detrimental to epoxy grout or the ability to pump. If grouting procedure cannot be postponed, keep wall temperatures within the required temperature range
- C. Hot Weather: When temperatures exceed 90 degrees F, obtain approval for method used to protect shotcrete from excessive heat and drying.
- D. Do not expose circumferential prestressing on walls to weather for more than 72 hours. Exercise precautions during adverse weather conditions.

##### 3.02 INSTALLATION

- A. All subgrade elevations shall be verified prior to starting tank construction.
- B. Reinforcing Steel
  - 1. Reinforcing steel shall be installed in accordance with the CRSI, Code of Standard Practice.
- C. Placing Concrete
  - 1. General Placement
    - a. Cast-in-place concrete floor and dome roof shall be installed in accordance with ACI 301, ACI 318, ACI 347, and ACI 350 except as specified herein.
    - b. No concrete shall be mixed or placed during freezing weather without explicit permission. When placing concrete when air temperature is below 40 degrees F, the water, sand and gravel shall be heated so that the temperature of the concrete will be at least 50 degrees F. This temperature shall be maintained for 72 hours after placing. No concrete shall be placed on frozen ground.
    - c. In hot weather, concrete, when deposited, shall have a placing temperature that will not cause difficulty from loss of slump, flash set, or formation of cold joints. In no case shall the temperature of concrete being placed exceed 95 degrees F.
    - d. All concrete shall be consolidated by means of a vibrator for proper encasement of reinforcing steel and welded wire fabric.
  - 2. Floor Slab
    - a. The subgrade shall be prepared by fine grading to ensure proper placement of reinforcing steel with proper bottom cover.
    - b. Prior to placement of the floor slab, a 6 mil vapor- barrier per ASTM D 4397, Below grade vapor retarders shall be placed over the subbase.

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- c. Form and screed boards shall be of proper thickness and sufficiently braced to ensure that the floor is constructed within proper thickness tolerances.
  - d. Plate bolsters shall be used to support reinforcing steel supported directly on the subgrade to ensure positive control of placement of reinforcing steel.
  - e. The floor shall be vibratory screeded to effect consolidation of concrete and proper encasement of floor reinforcing steel.
  - f. The floor slab including the thickened portion for the wall footing shall be placed in one continuous concrete placement. Construction joints between the floor slab and footings shall not be allowed. Where a construction joint is approved in writing by the ENGINEER, the joint shall have 6-inch wide, 3/8-inch thick PVC waterstop conforming to the same requirements as the wall - base slab waterstop.
  - g. The tank floor shall be wood/bull float finished first followed by a broom finish. No water shall be added to the slab during finishing. Curing of the tank floor shall be accomplished by ponding the entire area within the waterstops with 2-inch minimum of water within 24 hours after concrete placement. The floor shall be kept wet for a minimum of 7 days.
  - h. Provide four settlement monuments on the perimeter of the tank at 90-deg increments, four at 30 feet from the center of tank at the same 90-deg increments as those on the perimeter, and one at the center of the tank to survey and monitor total, differential, and angular settlement for compliance with ACI 372R and settlement estimates.
3. Concrete Dome
- a. The roof shall be wood/bull float finished and then receive a light broomed surface finish. No water shall be added during the finishing of the roof. Precast dome panels, if used, shall have a surface designed to receive a cementitious coating.
- D. Core Walls
- 1. Prestressed Core wall(s)
    - a. Exterior wall details including the galvanized steel diaphragm, PVC waterstops, elastomeric bearing pads, sponge rubber fillers, prestressing steel, prestressing earthquake cables, and shotcrete shall conform to the requirements of AWWA D110.
      - 1) Seismic Resistant Cables
        - a) Seismic restraint cables shall be seven-wire strand conforming to ASTM A416/A416M.
        - b) The strand shall be protected with a fusion-bonded, grit-impregnated epoxy coating conforming to ASTM A882/A882M.
        - c) The minimum yield strength of the seven-wire strand shall be 270,000 psi.
    - b. A PVC waterstop shall be installed in the wall to base joint. Field splices shall be in accordance with the MANUFACTURER's specifications. The waterstops shall be installed so as to form a continuous watertight dam. Adequate provisions shall be made to support and protect the waterstop during the progress of the work. Where the waterstop is placed in a

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- concrete cove attached to the inner face of the wall, the cove shall attain 60 percent of its 28-day strength prior to the start of prestressing the wall.
- c. Circumferential Prestressing
- 1) Stress readings on a calibrated stressometer, furnished by the tank MANUFACTURER, shall be made on each prestressing wire. The stress measuring equipment shall include: electronic direct reading stressometer accurate to within 2%, calibrated dynamometers and a test stand to verify the accuracy of the equipment. A running log shall be maintained by the tank manufacturer of the stress readings and used to determine the final number of wires required.
  - 2) The initial tension in each wire shall be read and recorded to verify that the total aggregate force is no less than that required by the design. Averaging or estimating the force of the wire on the wall shall not be considered satisfactory evidence of correct placement of prestressing wires.
  - 3) In computing the final tension in the wires, an allowance for prestress loss due to creep, shrinkage, elastic deformation, and residual compression shall be provided for. The tank manufacturer shall submit an "as-built" revision to the design diagram showing the location and number of wires actually used for the project records only.
  - 4) Placement of the prestressing steel wire shall be in a continuous and uniform helix of such pitch as to provide in each lineal foot of core wall height an initial force and unit compressive force equal to that shown on the design drawings. Splicing of the wire shall be permitted only when completing the application of a full coil of wire or when removing a defective section of wire.
  - 5) Shotcrete shall be used to completely encase each individual wire and to protect it from corrosion. To facilitate this encasement, the clear space between adjacent wires is to be no less than one wire diameter.
  - 6) Prestressing shall be accomplished by a machine capable of continuously inducing a uniform initial tension in the wire before it is positioned on the tank wall. Tension in the wire shall be generated by methods not dependent on cold working or re-drawing of the wire. In determining compliance with design requirements, the aggregate force of all tensioned wires per foot of wall shall be considered rather than the force per individual wire, and such aggregate force shall be no less than that required by the design and as shown on approved drawings.
  - 7) After circumferential prestressing wires have been placed, they shall be protected by encasement in shotcrete. This encasement shall completely encapsulate each wire and permanently bond the wire to the tank wall. A shotcrete cover having a thickness of no less than 1-inch shall be placed over the prestressing wires
- d. The galvanized steel diaphragm shall be protected against damage before, during, and after erection. Nail or other holes shall not be made in the galvanized steel diaphragm for erection except in the top 3 inches. Holes shall not be made in the galvanized steel diaphragm except for inserting wall pipes or sleeves, reinforcing steel, bolts, or other special

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appurtenances. Such penetrations shall be sealed with an epoxy sealant which complies with Paragraph 2.02.I. Epoxy.

e. Shotcreting

- 1) All shotcrete shall be applied by an experienced nozzleman certified by the American Concrete Institute (ACI) as outlined in ACI certification publication CP-60.
- 2) Each shotcrete layer shall be broomed prior to final set to effect satisfactory bonding of subsequent layers.
- 3) No shotcrete shall be applied to reinforcing steel or galvanized steel diaphragm which is encrusted with shotcrete overspray.
- 4) A minimum of 1/8-inch thick shotcrete shall separate reinforcing steel and prestressing wire.
- 5) No prestressing wire shall remain exposed during inclement weather over a holiday or weekend; it shall be covered with shotcrete and subsequently wet cure.
- 6) Vertical shooting wires shall be installed to establish uniform and correct thickness of shotcrete. Shooting wires shall be at 2-ft on center around the circumference of the tank. The final coat shall be applied true to shooting wires so as to form a cylindrical surface.
- 7) At the end of the day's work, or similar stoppage period, the shotcrete shall be sloped off at an angle of approximately 45 degrees. Before placing adjacent sections, the sloped portions shall be thoroughly cleaned and wetted by means of air and water blast. Shotcrete with a strength lower than specified due to cold weather shall be removed and replaced with sound material.
- 8) The shotcrete shall be cured by keeping the shotcrete continuously wet for 7 days. No natural curing allowed.
- 9) Shotcrete on the inside of the tank shall receive a light broom finish, and shotcrete on the exterior shall receive a sponge float finish.
- 10) Keep shotcrete between layers of wire and cover damp by hand watering or fine mist spray.
- 11) Remove laitance from wall prior to placing successive layers of shotcrete.
- 12) Do not use curing compounds.
- 13) Horizontal sections of the wall shall form true circles without flat areas, excessive bumps or hollows. The covercoat shall receive a sliced trowel or sponge float finish.
- 14) All rebound concrete shall be completely removed after construction.

E. Finishing of Shotcrete

1. Underlayers or Exposed Surfaces:

- a. On completing surfaces, bring shotcrete to an even plane and to well-formed corners by working up to ground wires or other thickness or alignment guides, using lower placing velocity than normal.
- b. Screed exposed surfaces or underlayers by working upward against gravity with thin-edged screed using a slicing motion to trim off high spots and expose low spots.
- c. Avoid pulling and breaking surface with subsequent checking.
- d. The interior core wall shall have a smooth steel trowel finish.



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2. Finish Coat:
  - a. Apply coat to remove rough areas after ground wires have been removed.
  - b. Carefully screen sand for finish coat to remove oversize particles which rebound and mar surfaces.
  - c. Surface of finish coat shall be of natural texture and coloration; free from spotting, cement or dust streaking, lap lines, uneven surfaces, and rebounded material.
  - d. Do not hand-patch.
  - e. Check coatings for bond by tapping lightly to test for hollow sounding spots.
  - f. Cut out areas where bond is not fully developed and repair.
  
- F. Curing
  1. Dome Concrete:
    - a. The dome shall be water cured for a minimum 7 days after casting or until dome band prestressing is complete.
    - b. Schedule wire wrapping and application of shotcrete so curing shall not be interrupted, and water from curing shall not wash or damage shotcrete wire coats.
    - c. Begin curing after initial concrete set has occurred.
  2. Shotcrete:
    - a. Keep shotcrete between layers of wire and cover damp by hand watering or fine mist spray.
    - b. Continuously water cure completed shotcrete surfaces for period of 7 days after application, or until subsequent shotcrete coats are applied prior to end of the 7-day curing period.
    - c. Remove laitance from wall by light abrasive blasting after curing period.
    - d. Do not use curing compounds.
  
- G. Epoxy Injection
  1. Epoxy injection shall be carried out from bottom to top of wall using a pressure pumping procedure.
  2. Epoxy injection shall proceed only after the diaphragm has been fully encased, inside and outside, with shotcrete.
  
- H. Dome
  1. All concrete shall be consolidated by means of a vibrator for proper encasement of reinforcing steel and welded wire fabric.
  2. All surfaces at the joint between the wall and the dome shall be coated with bonding epoxy which complies with PART 2 – Products: Epoxy.
  3. Plastic bolsters shall be used to support reinforcing steel and welded wire reinforcement to ensure positive control on placement of steel.
  4. The exterior surface of the dome shall receive a light broom finish.
  5. Plywood shall be used for dome scheduled to receive interior protective coatings. All plywood butt joints shall be taped.
  6. Dome wall interface shall be formed as such the minimum tolerance should be 1/4-inch.
  7. All form board gaps greater than 1/16-inch shall be caulked prior to dome pour.

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- I. Roof Hatch
  - 1. Roof hatch shall be installed at locations shown on the Drawings. The hatch shall be installed on a concrete curb with a minimum finished height of 4 inches above dome and a minimum of 3 inches wide. The hatch shall be installed with a watertight gasket and 316 stainless steel expansion bolts.
- J. Interior Tank Coating
  - 1. Provide interior coating on the tank as per section 2.02L. The interior core wall shall have a smooth trowel finish. The coatings shall be applied after hydrostatic watertightness test.
- K. Exterior Tank Coating
  - 1. Provide exterior coating on the tank as per section 2.02L. The coatings shall be applied after hydrostatic watertightness test.
- L. Ladders
  - 1. Ladders shall be installed at locations shown on the Drawings. Ladders, ladder accessories and ladder clearances shall be installed to conform to the requirements of OSHA. The ladder shall have a safety climbing device and extension manufactured from Type 316 stainless steel to meet applicable OSHA standards.
  - 2. Ladder supports shall be installed by stainless steel expansion bolts or stainless steel bolts with cast-in-place threaded inserts. Prior to installing expansion bolts, the reinforcing bars shall be located with a "rebar locator" supplied by the tank manufacturer. The location of the reinforcing bars shall be marked on the concrete surface indicating the spacing and direction of the bars.
  - 3. Where interference occurs, adjust anchor locations to clear reinforcing bars and alter supports at no additional cost to the Owner.
- M. Guardrail and Kickplate
  - 1. Anodized aluminum guardrail and kickplate shall be installed as described herein and shall conform to the requirements of OSHA.
  - 2. Ladder supports shall be either by stainless steel expansion bolts or cast-in-place threaded inserts. Prior to installing expansion bolts, the reinforcing bars shall be located with a "rebar locator". The location of the reinforcing bars shall be marked on the concrete surface indicating the spacing and direction of the bars.
  - 3. Where interference occurs, adjust anchor locations to clear reinforcing bars and alter supports at no additional cost to the OWNER.
- N. Liquid Level Indicators and Transmitters
  - 1. Liquid level indicators and transmitter shall be installed at locations shown on the Drawings. The ELECTRICAL CONTRACTOR shall procure and install the transmitter, but the TANK CONTRACTOR shall install the process piping required for the transmitter.
- O. Accessory hardware, unless otherwise noted, shall be Type 316 stainless steel conforming to ASTM F593.

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- P. The tank exterior ladder shall be centered on a 6-foot wide thickened boss the full height of the tank wall. This will provide enough space for routing conduit along the height of the tank.

3.03 TANK SETTLEMENT BY OPERATIONAL-LEVEL POST-LOADING

- A. The tank must be allowed to settle following satisfactory testing and prior to attaching pipes. The settlement will be achieved by loading the tank to operating level. The hydraulic watertightness test may be conducted concurrently with the operational-level tank settlement.
- B. CONTRACTOR and tank MANUFACTURER shall coordinate to provide a detailed plan for monitoring total and differential tank settlement, including the settlement monuments, means and frequency of monitoring both total and differential tank settlement, and log of settlement at each monument and cumulative settlement, as shown in total settlement and differential settlement. Submit a proposed monitoring plan for review and approval by the ENGINEER.
- C. The tank settlement must last at least four weeks and will continue until the majority of expected settlement has occurred, as determined by ENGINEER.
- D. During operational-level loading of the tank, the changes in elevation to the outside edge of the tank foundation and center of the tank must be surveyed weekly to monitor differential and total tank settlement. The tank MANUFACTURER shall hire a registered land surveyor certified in the State of Florida to implement the tank settlement monitoring plan. A survey of the interior midpoint settlement monuments shall be taken immediately prior to and after the post-loading has been completed and the tank has been drained.
- E. Results from monitoring tank settlement data shall be submitted every week to the ENGINEER.
- F. At the end of the minimum four-week tank settlement period, ENGINEER shall review final monitoring data to determine whether majority of expected settlement has occurred. More time shall be allowed for tank settlement if deemed necessary by ENGINEER.
- G. Review report of geotechnical exploration for the anticipated post loading settlement and settlement after post loading. Refer to geotechnical report for required post loading requirements. Refer to geotechnical report for required waiting time period before piping connections are completed after the post loading sequence of construction.

Estimated Settlement	
Post Loading Settlement	Differential Settlement between Center of Tank and Perimeter of Tank
≤2.5"	1.0" to 1.5"

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### WIRE WRAPPED PRESTRESSED CONCRETE TANK

- H. If operational settlement testing is successful and after the results are approved by the ENGINEER, CONTRACTOR can proceed with connecting the inlet and outlet piping.

#### 3.04 TESTING

- A. Payment for testing shall be made from the testing allowance. Any costs for coordination of these efforts, markups, or incidentals by the TANK CONTRACTOR shall be included in their bid price and will not be allowed as part of the allowance.
- B. Compression Tests
  1. Compression test specimens shall be taken during construction from the first placement of shotcrete. At least one set of test specimens shall be made for each 50 cubic yards of shotcrete placed. Additional tests shall be made if deemed necessary by the ENGINEER to ensure continued compliance with these Specifications. Each set of specimens shall be a minimum of 5 cylinders.
  2. Compression test specimens for shotcrete shall conform to ASTM C172/C172M for sampling and ASTM C31/C31M for making and curing test cylinders. Test specimens shall be 6-inch diameter by 12-inch high or 4-inch diameter by 8-inch high cylinders.
  3. Compression test shall be performed in accordance with ASTM C39/C39M. Two test cylinders will be tested at 7 days and two at 28 days. The remaining cylinder will be held to verify test results, if needed.
- C. Air Content Tests (concrete only)
  1. Air content tests shall conform to ASTM C231/C231M (Pressure Method for Air Content).
  2. Test for air content shall be made prior to concrete placement and whenever compression test specimens are made.
- D. Slump Test (concrete only)
  1. Slump tests shall be made in accordance with ASTM C143/C143M.
  2. Slump tests shall be made whenever compression test specimens are made.
- E. Shotcrete testing shall follow ASTM C1140/C1140M – 11 and shall be performed at no additional cost to the OWNER through the concrete testing allowance.
- F. Hydraulic Watertightness Testing
  1. After the tank has been completed, but prior to applying any coatings and before any backfill is placed, the tank shall be filled slowly in the presence of the ENGINEER. Careful observation for leaks shall be made and any leaks that occur shall be immediately repaired. The tanks shall not be filled any higher than 8 feet over a 24-hour period.
  2. The tank shall be kept full of water until the ENGINEER is satisfied that all defects have been discovered and repaired. There shall be no flowing water allowed through the walls or floor slab. Damp spots that glisten on the surface of the tank and spots where moisture can be picked up on a dry hand will not be allowed. Damp spots on the top of footing projections that are not from flowing water shall not be considered to be leakage.
  3. Allowable tank leakage shall be zero.

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### WIRE WRAPPED PRESTRESSED CONCRETE TANK

4. The water required for leakage tests shall be provided by the OWNER at no cost. However, the TANK CONTRACTOR shall be responsible for supplying the water to the tank at a rate and means acceptable to the OWNER. If additional piping, valves, or pumps are needed the TANK CONTRACTOR shall supply and install for testing.
5. Water tightness testing shall be performed prior to application of any coatings.

#### 3.05 CLEANING AND DISINFECTION

- A. The interior of the tank shall be cleaned to remove debris, construction items, and equipment prior to testing and disinfection.
- B. The following disinfection procedure shall be used to disinfect storage tanks used for potable water:
  1. Method 2 or 3 will be used for disinfection of the tank in accordance with ANSI/AWWA C652.
  2. When Method 3 is used, the disinfection plan shall address any compatibility issues with the form of chlorine used for disinfecting the storage tank with the type of disinfectant used in the normal production of the water used to fill the tank.
  3. The disposal plan shall address the dechlorination and discharge plan of the water at an acceptable rate to sewer or storm structures.

END OF SECTION 13216

## SECTION 15064

### PLASTIC PIPE AND FITTINGS

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install in the locations as shown on the drawings, the plastic piping, fittings and appurtenances as specified herein and installed in the locations as shown on the Drawings.
- B. All buried piping on the project with a diameter 4-inches and greater shall be restrained joint type. Locate wire shall be installed for all buried pipe with nominal diameter of 6-inches and greater.
- C. The OWNER has pre-purchased plastic pipe and fittings as specified in Appendix C. The MANUFACTURER shall include shop drawing submittals to the OWNER per this Section to show the piping layout and elevations for all piping regardless of whether it was supplied by the OWNER.
- D. The OWNER will provide the pre-purchased plastic pipe and fittings to the CONTRACTOR for installation. The CONTRACTOR will also be required to unload and store the pre-purchased pipe and fittings for the OWNER.

##### 1.02 RELATED WORK

- A. Excavation and backfill for yard piping is included in Section 02221.
- B. Painting is included in Section 09900.
- C. Pipe supports systems are included in Section 15090.
- D. Valves and appurtenances are included in Section 15100.

##### 1.03 DESCRIPTION OF SYSTEM

- A. Piping shall be installed in the locations as shown on the Drawings.

##### 1.04 QUALITY ASSURANCE

- A. All plastic pipe, fittings and appurtenances shall be furnished by a single manufacturer who is fully experienced, reputable, and qualified in the manufacture of the items to be furnished. The equipment shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these specifications.
- B. All pipe shall be stored out of the sunlight. Temporary shading shall be provided. The pipe shall be stored at ambient outdoor temperatures. Gaskets shall be stored in a cool, dark location, and shall not come into contact with petroleum products.

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### PLASTIC PIPE AND FITTINGS

- C. Inspections of the pipe or storage methods may be made by the ENGINEER or OWNER and may be subject to rejection at any time on account of failure to meet the requirements. Rejected pipe shall be marked and removed from the site.

#### 1.05 SUBMITTALS

- A. Shop drawings shall be submitted to the ENGINEER for approval in accordance with Section 01300 Submittals and shall include dimensioning and technical specification for all piping to be furnished.
- B. Submit shop drawings and scaled piping layout drawings for all pipe and fittings supplied for each piping system. Layouts should include pipe type, fittings, and elevations.
- C. Submit procedures and certified test reports confirming that pipe has been manufactured in accordance with ASTM and AWWA standards specified herein.

#### 1.06 TOOLS

- A. Special tools, solvents, lubricants, and caulking compounds required for normal installation shall be furnished with the pipe.

### PART 2 – PRODUCTS

#### 2.01 GENERAL

- A. All pipe shall be bundled or packaged in such a manner as to provide adequate protection for the ends, threaded, or flanged, during transportation from the manufacturer.
- B. All piping for potable water shall be blue, all piping for drain or sewer shall be green, and all piping for reclaimed water shall be purple.

#### 2.02 POLYVINYL CHORIDE (PVC) PIPE

- A. All PVC pipe less than 4-inch in diameter shall be suitable for field cutting, welding, bending and coupling and shall be Schedule 80 unless otherwise shown on the Drawings and of the sizes as shown on the Drawings. Pipe supports shall be provided where shown on the drawings.
- B. All pressurize pipe 4 inches through 16-inch shall have a dimension ratio (DR) of 18 and all piping greater than 16-inch shall be DR 25. PVC pipe 4-inch through 12-inch shall conform to AWWA C900. PVC pipe 14-inch and larger shall conform to AWWA C905. PVC gravity sewer pipe larger than 4-inch in diameter shall have a SDR of 26. PVC gravity pipe 4-inch through 15-inch shall conform to ASTM D3034. PVC gravity pipe 18-inch and larger shall conform to ASTM F679. The pipe shall be made of PVC compounds Class 12454-A or 12454-B as defined in ASTM D1784. Each pipe shall

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### PLASTIC PIPE AND FITTINGS

be marked with the manufacturers name, trademark, size, material code, pressure class, AWWA designation number. When used for potable water service, a seal of the testing agency confirming compliance with all applicable standards.

- C. Fittings for pipe less than 4 inches shall be the socket type for solvent welded joints as designated in ASTM D-2467, except where threaded as shown on the Drawings, and as designated in ASTM D-2464, or flanged as shown on the Drawings, and shall be compatible with the pipe material where installed. Flanges shall be furnished with 1/8-inch thick full-faced Teflon, Viton, or ENGINEER approved equal gaskets. Flange bolts and nuts shall be ASTM A276, Type 316 stainless steel.
- D. Fittings for pipe 4 inches and larger shall be ductile iron with restrained push-on or mechanically restrained configurations compatible with the type PVC utilized.
- E. Caulking for plastic pipe in wall sleeve shall be by a mechanical, modular, rubber sealing element placed in between the sleeve and pipe and expanded to make a tight fit or other method approved by the ENGINEER.
- F. Expansion joints shall have integral duck and rubber flanges. They shall have individual solid steel ring reinforcement with a carcass of highest grade woven cotton or acceptable synthetic fiber. Joints shall be constructed of pipeline size and to meet working pressure and corrosive conditions similar to the line where installed. They shall be of a filled arch-type construction with a minimum of three arches per joint. All joints must be finish-coated with Hypalon paint to prevent ozone attack. They shall be Style 500 as manufactured by Mercer Rubber Co. of Trenton, New Jersey, or equal.
- G. All PVC pipe and materials coming into contact with for raw or potable water service shall be certified NSF 14 and 61 approved.

#### 2.03 HIGH DENSITY POLYETHYLENE (HDPE)

- A. All HDPE pipe shall conform to AWWA C906 and ASTM D2447, and all fittings shall conform to ASTM D3261.
- B. Pipe shall be manufactured from HDPE base resin conforming to grade 34 (PPI PE 3406) or better in accordance with ASTM D2447. The pipe shall have a minimum hydrostatic design stress of 630 psi at 73 degrees F and be suitable for field cutting and heat fusion joining.
- C. Joints for HDPE shall be butt heat fusion made in accordance with D2657.
- D. Mechanical connections to valves and piping shall be made in accordance with the manufacturer's recommendations. Flanged connections shall consist of the following:
  - 1. Stainless steel backup, polyethylene flange shall be thermally butt fused to the stub end of the pipe.
  - 2. A type 316 SS backup ring on both sides of the connection shall be used as approved by the ENGINEER.



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### PLASTIC PIPE AND FITTINGS

3. Flange connections shall be provided with a full-face neoprene gasket.

#### 2.04 PLASTIC TUBING

- A. Plastic tubing shall be clear, flexible, non-cracking with a wall thickness that is adequate for the pressures involved and of the sizes as shown on the Drawings.
- B. All plastic tubing shall be chemically inert, resistant, and compatible for the chemical intended for its use.

#### 2.05 LOCATE WIRE

- A. Utility marking tape shall be 3-inch wide and 4-mil thick per ASTM D2103 with a 2,750-psi tensile strength per ASTM D882.
- B. Tape shall have adhesive backing and industrial standard repeatable message.
- C. External color of locate wire shall be blue for potable water, green for sewer, and pantone purple 522C for reuse.
- D. Locate wire shall be 10-gauge, single strand, UF rated for direct bury, copper wire with 30 mil insulation.

### PART 3 – EXECUTION

#### 3.01 INSTALLATION

- A. The installation of plastic pipe shall be strictly in accordance with the manufacturer's technical data and printed instructions.
- B. Joints for plastic pipe shall be solvent welded except flanged or threaded where required. In making solvent welded connections, clean dirt and moisture from pipe and fittings, bevel pipe ends slightly with emery cloth, if necessary, and apply solvent cement of the proper grade. Expansion joints shall be installed every 50 feet on long runs and in every straight run longer than 15 feet.
- C. Installation of valves and fittings shall be strictly in accordance with manufacturer's instructions. Particular care shall be taken not to overstress threaded connections at sleeves. In making solvent weld connections the solvent shall not be spilled on valves or allowed to run from joints.
- D. All piping have a sufficient number of unions to allow convenient removal of piping and shall be as approved by the ENGINEER.
- E. Where plastic pipe passes through wall sleeves, joints shall be sealed with a mechanical sealing element as shown on the drawings.
- F. All plastic pipe to metal pipe connections shall be made using flanged connections. Metal piping shall not be threaded into plastic fittings, valves, or couplings, nor shall plastic piping be threaded into metal valves, fittings or couplings.

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### PLASTIC PIPE AND FITTINGS

- G. Concrete inserts for hangers and supports shall be furnished and installed in the concrete as it is placed. The inserts shall be set in accordance with the requirements of the piping layout and the CONTRACTOR shall verify their locations from approved piping layout drawings and the structural drawings. Pipe hangers and supports are specified in Section 15090 and as detailed on the drawings.

#### 3.02 FIELD PAINTING

- A. Pipe normally exposed to view shall be painted and marked as specified in the Painting Section 09900. The CONTRACTOR shall coordinate with their elected pipe MANUFACTURER to ensure they have no issues with the specified painting. ENGINEER will assist in identifying pipe contents, direction of flow and all else required for proper marking of pipe.

#### 3.03 INSPECTION AND TESTING

- A. All piping shall be tested as per Paragraph 3.9 of the SJCUD Standard Specifications, latest version.
- B. The test pressures and temperatures for the various pipe lines shall be as follows:
  - 1. Drain and gravity sewer piping: 20 psi at ambient temperature
  - 2. All other piping: 150 psi for water mains or reclaimed water mains, 100 psi for force mains
- C. All pipelines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipelines shall be subjected to a hydrostatic pressure test for 4 hours at full working pressure. All leaks shall be repaired and lines retested as approved by the ENGINEER. Prior to testing, the pipelines shall be supported in an approved manner to prevent movement during tests.

#### 3.04 LOCATE WIRE TESTING

- A. Locate wire shall be brought to grade within a valve box or locating station box at 200 foot intervals or less. Locate wire shall be installed in a box along the pipeline in either the 5:00 o'clock or 8:00 o'clock position relative to the pipe. Connection or splices underground which are not inside a locate box or valve box is not allowed.
- B. Testing shall be performed by a person or company that has been certified by the manufacturer of the approved testing equipment as proficient in the use of the equipment. The certified tester shall be approved by SJCUD and the ENGINEER. A SJCUD representative may elect to be present during the testing period.
- C. The CONTRACTOR shall provide the tester with a copy of the yard piping plan that has been marked up by the CONTRACTOR to identify pipes where locate wiring has been installed. The tester shall trace the entire length of pipe and mark any piping location variations from the marked-up plans. The depth to top of pipe shall be recorded at 50 foot intervals.

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### PLASTIC PIPE AND FITTINGS

- D. A final locate wire report shall be submitted to SJCUD and the ENGINEER for review and approval. The report shall include a signed and sealed statement from the tester that certifies all installed wire was successfully sounded and traced with no open breaks. The report shall include all field notes, breaks found/repared, depths, and other applicable field remarks by the tester. The report shall be furnished prior to substantial completion of the project.

END OF SECTION 15064

## SECTION 15066

### STAINLESS STEEL PIPE AND FITTINGS

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install, test, complete and ready for operation all stainless steel pipe as shown on the Drawings and as specified herein.
- B. Where the word "pipe" is used it shall refer to pipe, fittings, hangers, supports and appurtenances unless otherwise noted.
- C. The work includes, but is not necessarily limited to:
  - 1. Furnishing and installing above grade, stainless steel pipe, fittings and specials with screwed, butt welded, or flanged and plain ends, as shown on the Drawings.

##### 1.02 RELATED WORK

- A. Concrete work is included in Division 3.
- B. Painting is included in Section 09900.
- C. Valves and appurtenances are included in Section 15100.

##### 1.03 SUBMITTALS

- A. Submit shop drawings including piping layouts, spool drawings, and schedules to the ENGINEER in accordance with Section 01300, including dimensioning, fittings, expansion joints, locations of valves and appurtenances, joint details, wall penetration details, methods and locations of supports and all other pertinent technical specifications for all piping to be furnished. Shop drawings shall include all data and information required for the complete piping systems, including alloys, diameter, pipe wall thickness, flanges, and other joint preparations. All dimensions shall be based on the actual equipment to be furnished. Types and locations of pipe hangers and/or supports shall be shown on the piping layouts for each pipe submittal. Not all dimensions will be checked by the ENGINEER, nor will detailed review be performed. TANK CONTRACTOR AND CONTRACTOR shall be responsible for accurate dimensioning of piping systems.
- B. Submit method and procedures for pickling and passivating by full immersion the piping spool after fabrication.
- C. Submit certifications that welders are qualified, in accordance with ASME Section IX for shop and project site welding of pipe work.
- D. Process piping layout which depict the piping layout, elevations, and all fittings.

## SECTION 15066

### STAINLESS STEEL PIPE AND FITTINGS

- E. Full and complete information regarding location, size, and extend of all welds shall be shown on the shop drawings. The shop drawings shall distinguish between shop and field welds. Shop drawings shall indicate by welding symbols or sketches the details of the welded joints and include the applicable Weld Procedure Specifications (WPS) along with the supporting Procedure Qualification Records (PQR) and Welder Qualification Record.
- F. Complete piping design pressure calculations shall be submitted to the ENGINEER. The calculations shall be in conformance with the ASME B31.3 standard and the requirements specified herein.

#### 1.04 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM A312 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipe
  - 2. ASTM A530 – Standard Specification for General Requirements for Specialized Carbon and Alloy Steel Pipe
  - 3. ASTM A778 – Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products
  - 4. ASMT A774 – Standard Specification for Stainless Steel Pipe Fittings
  - 5. ASTM A182 – Standard Specification for Forged or Rolled Alloy-Steel Pipe Flanges, Forged Fittings, and Valves and Parts for High-Temperature Service
  - 6. ASTM A240 – Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheets and Strip for Pressure Vessels
  - 7. ASTM A403 – Standard Specification for Wrought Austenitic Stainless Steel Piping Fittings
- B. American National Standards Institute (ANSI):
  - 1. ANSI B16.1 – Cast Iron Pipe Flanges and Flanged Fittings
  - 2. ANSI B16.5 – Flanges
  - 3. ANSI B16.9 – Factory-Made Wrought Steel Buttwelding Fittings
  - 4. ANSI B36.19 – Stainless Steel Pipe
- C. American Society of Mechanical Engineers (ASME):
  - 1. ASME B31.1 – Power Piping
- D. American Welding Society (AWS)
- E. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

## SECTION 15066

### STAINLESS STEEL PIPE AND FITTINGS

#### 1.05 QUALITY ASSURANCE

- A. Stainless steel pipe and fittings shall be furnished by a single manufacturer who is fully experienced, reputable, qualified and regularly engaged for the last five years in the manufacture of the materials to be furnished. The pipe and fittings shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications. Pipe and fittings shall be as manufactured by Aerex Industries, Fort Pierce, Florida; Felker Brothers, Marshfield, Wisconsin, or Duhig, Los Angeles, California, or approved equal.
- B. The manufacturer shall be qualified to perform work in accordance with ASME Code Standards and shall hold one or all of the following ASME accredited code stamps: "U", "S", or "PP".
- C. Welder Qualifications: All welding shall be performed by welders, welder operators and tackers fully qualified in accordance with ASME Section IX and have adequate experience in the methods and materials to be used. All field welding shall be per pipe manufacturer's written instructions and procedures unless otherwise approved by the ENGINEER.

#### 1.06 SYSTEM DESCRIPTION

- A. Piping shall be installed in those locations as shown on the Drawings.
- B. The equipment and materials specified herein are intended to be standard types of stainless steel pipe and fittings for use in transporting water.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Care shall be taken in loading, transporting, and unloading to prevent injury to the pipe and fittings. Pipe and fittings shall not be dropped. Pipe and fittings shall be examined before installation and no piece shall be installed which is found to be defective.
- B. In handling the pipe, wide cushioned slings or other devices and methods acceptable to the ENGINEER shall be used. No un-cushioned ropes, chairs, wedges or levers shall be used in handling the pipe, fittings and couplings.
- C. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe by the TANK CONTRACTOR or CONTRACTOR, at their own expense. All pipe and fittings shall be thoroughly cleaned before installation and shall be kept clean until they are put into service.

## SECTION 15066

### STAINLESS STEEL PIPE AND FITTINGS

#### PART 2 – PRODUCTS

##### 2.01 MATERIALS

- A. All stainless steel pipe and fittings for water service shall be fabricated from stainless steel sheet and conform to ASTM A312 and A403. Carbon content of Type 316L material shall be 0.03 percent maximum. Finish shall be No. 1 or No. 2B.
- B. Pipe shall be die-formed or rolled true to dimension and round. Tolerances for length, inside and outside diameter and straightness shall conform to ASTM A530. The two edges of sheet shall be brought to line so as not to leave a shoulder on the inside of the pipe. Ends of pipe and fittings shall be perpendicular to the longitudinal axis. Longitudinal seams on pipe and fittings shall be welded by either the tungsten gas or the metallic-gas method. The interior welds shall be smooth, even and shall not have an internal bead higher than 1/16-inch. All pieces shall be marked with gauge and type of stainless steel and with the initials of the inspector marked on the inside of each piece, at each end.
- C. Pipe and fittings shall be rated for a minimum of 150 psi at 300 degrees F. Flanges shall be ANSI B16.5 Class 150, no exceptions.
- D. Fittings shall be smooth curve type up to 18-inch diameter and mitered type 20-inch diameter and greater. Fittings shall conform to ANSI B16.9.
- E. Flanges for pipe 4-inch and smaller shall be of the type of stainless steel as the pipeline, and shall be welded directly to the pipe end, and shall be drilled to the 125 lb ANSI B16.5 standard. Flanges for pipe larger than 4-inch shall have stub ends or rolled angle rings of the type of stainless steel as the pipeline welded to the pipe end, with suitable gaskets between the mating surfaces and joined through the use of 125 lb rated back-up flanges, drilled to ANSI B16.5, and made of Type 316 stainless steel. Where the pipe stub is to pass through a sleeve during installation, a split-type back up flange shall be used. Bolts, washers, nuts and other hardware for flange bolting shall be Type 316 stainless steel.
- F. Gaskets for flanged connections shall be a minimum of 1/16-inch thick and shall be rubber, hypalon, teflon, BUNA-N, SBR, NBR or viton.
- G. Wall pipes shall have integral shop welded wall stops.
- H. All stainless steel pipe and fittings shall be pickled at the point of manufacture, scrubbed and washed until all discoloration is removed in accordance with ASTM A380.
- I. Pipe ends shall be prepared for couplings or other type ends where required by transport and handling limitations, where required by the support layout requirements and where noted on the Drawings. Plain end pipe may be coupled with

## SECTION 15066

### STAINLESS STEEL PIPE AND FITTINGS

"Pressfit"-style connectors, for pipe/tubing sizes 1/2-inch and smaller, manufactured by the Victaulic Co. or by the use of grooved end couplings. Grooving (or built-up ends for Schedule 5s or 10s pipe) shall be of the coupling manufacturers standard type. TANK CONTRACTOR and CONTRACTOR is responsible for ensuring rigidity of joints where required. All normal pipe joints at valves, bends, etc, shall be flanged, drilling per ANSI B16.1, Class 150.

- J. Shop welding of fabrications shall be done according to the procedures and by welders certified per ASME Section IX. Welds shall be by an inert gas shielding process using only extra low carbon filler metals. Welds shall have a bead height of no more than 1/16-in. Butt welds shall have 100 percent penetration to the interior or backside of the weld joint. Cross-sectional thickness of welds shall be equal or greater than that of the parent metal.

### PART 3 – EXECUTION

#### 3.01 INSTALLATION

- A. All pipe and fittings shall be installed true to grade and alignment and pipe anchorage and/or restraint shall be provided where required. Manufacturer's instructions shall be strictly followed.
- B. All pipe and fittings shall be protected from dirt, dust, oil, grease and other foreign matter during installation to prevent damage to pipe and to assure no foreign matter is left in the piping.
- C. To assemble the joints in the field, thoroughly clean all joint surfaces and gaskets, if any, with soapy water before assembly. Bolts shall be tightened alternately, evenly to the manufacturer's specified torques. Under no condition shall extension wrenches or pipe-over-handle ratchet wrenches be used to secure greater leverage. All electrical bonding or insulation shall be installed as joints are made up.
- D. Fittings, in addition to those shown on the Drawings, shall be provided if required. Due consideration shall be given to thermal expansion/contraction over a temperature range of 200 degrees F.
- E. Sleeves of the proper size shall be installed for all pipes passing through floors or walls as shown on the Drawings.
- F. When cutting of pipe is required, the cutting shall be done by machine neatly, without damage to the pipe. Cut ends shall be smooth and at right angles to the axis of the pipe.
- G. After installation, stainless steel pipe lines shall be washed clean with steam or hot water to remove any foreign material picked up during transport.



## SECTION 15066

### STAINLESS STEEL PIPE AND FITTINGS

#### H. Pipe Hangers and Supports

1. Pipe hangers and supports shall be provided at suitable distance along the pipeline regardless of whether they are shown or not shown on the drawings.
2. Pipe hangers and supports shall be as specified in Section 15090.

#### 3.02 JOINING MECHANICAL AND RESTRAINED JOINTS

- A. Mechanical joints shall be in accordance with the "Notes on Methods of Installation" under AWWA C111 and the instructions of the manufacturer.
- B. Restrained joint pipe and fittings shall be installed in the locations shown on the Drawings and as acceptable to the ENGINEER.

#### 3.03 JOINING FLANGED JOINTS

- A. Flanged joints shall be made with gasket, bolts and nut bolts stud with a nut on each end, or studs with nuts where the pipe is tapped. The number and size of bolts shall conform to the same standard requirements as the flange.

#### 3.04 FIELD WELDING

- A. Welding in the field shall be done only if approved by the ENGINEER. Field welds shall be made by welders certified under ASME Section IX and be equal in all respects to shop welds. After field welding has been done, all joints shall be thoroughly cleaned and buffed using deburring and finishing wheels.

#### 3.05 FIELD PAINTING

- A. Final painting is included in Section 09900 except that for all stainless steel pipe, only bands, labels, and arrows rather than full pipe painting will be required.

#### 3.06 TESTING

- A. All pipes shall be tested for compliance with this specification. If leaks are discovered, they shall be repaired under this Section and approved by the ENGINEER. Pressure and leakage tests will be required.
- B. After installation, all piping shall be flushed, cleaned with Oakite deoxidizer or similar deoxidizer as recommended by the manufacturer to remove all foreign matter, construction stains or shop markings. Cleaned lines shall be rinsed clear with steam or hot water.

END OF SECTION 15066

## SECTION 15072

### DUCTILE IRON PIPE AND FITTINGS

#### PART 1 – GENERAL

##### 1.01 SCOPE

- A. The work under this Section of the specifications shall include all materials, equipment, and labor for furnishing, laying, installing, testing, and disinfecting the piping work and appurtenances herein under described and as shown on the Contract Drawings.
- B. The CONTRACTOR shall furnish ductile iron pipe, fittings, accessories, and appurtenances necessary for installation, including but not limited to gaskets, nuts, and bolts for flanged joints; pipe supports; tie rods; and flexible couplings. The OWNER has pre-purchased ductile iron piping and fittings and will provide that to the CONTRACTOR for installation. All remaining ductile iron piping required for the project shall be purchased, unloaded, stored and installed by the CONTRACTOR. The CONTRACTOR will also be required to unload and store the pre-purchased pipe and fittings for the OWNER.
- C. All buried piping on the project shall be restrained joint type. Locate wire shall be installed for all buried pipe with nominal diameter of 6-inches and greater.
- D. The OWNER has pre-purchased the ductile iron pipe and fittings specified in Appendix C. The MANUFACTURER shall include shop drawing submittals to the OWNER as per this Section.

##### 1.02 RELATED WORK

- A. Mechanical equipment, pipe supports, sleeves, couplings, valves and appurtenances are included in respective sections of Division 11.
- B. Painting, except as specified herein, is included in Division 9.

##### 1.03 QUALITY ASSURANCE

- A. Dimensions shown on Contract Drawings are approximate only. CONTRACTOR shall verify all piping geometry in the field and shall be responsible for ensuring proper alignment and fit of all piping consistent with the intent of the Contract Drawings.

##### 1.04 SUBMITTALS

- A. Shop drawings and manufacturer's literature shall be promptly submitted to the ENGINEER for approval in accordance with Section 01300.
- B. The following items shall be submitted before delivery of pipe or fittings:
  - 1. Certification by the manufacturer or supplier that the pipe furnished for this project meets all pertinent AWWA and, if coming into contact with potable water, NSF 61 Standards, latest editions.
  - 2. Certifications of compliance with applicable standards for all piping.

## SECTION 15072

### DUCTILE IRON PIPE AND FITTINGS

3. Pipe laying schedule or assembly drawings which indicate overall dimensions, lengths of restrained joint pipe, the specific number of each pipe and fitting and the location and direction of lay of each pipe identified by mark number. Pipe laying schedules shall be submitted for all piping systems and shall include elevations of proposed piping.
4. Catalog cuts and installation instructions for all restrained joints including boltless restrained joint pipe and grooved end joint pipe for ductile iron pipe.
5. Certification that all bolts to be furnished conform to the referenced standards and are manufactured in the United States of America.
6. Shop drawings and schedules completely detailing and locating wall pipes shall be submitted for approval prior to their fabrication and well in advance of the concrete work.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. The Manufacturer shall legibly mark all pipe and specials in accordance with the approved laying schedules and marking diagram. Each pipe shall be numbered in sequence and said number shall appear on the laying schedule and marking diagram in its proper location for installation.
- B. The CONTRACTOR shall carefully examine all material for defects. Material which is known, or thought, to be defective shall not be installed.
- C. The ENGINEER reserves the right to inspect all material and to reject all defective material shipped to the job site or stored on the site. Failure of the ENGINEER to detect damaged material shall not relieve the CONTRACTOR from his total responsibility for the completed work if it leaks or breaks after installation. Lay all defective material aside for final inspection by the ENGINEER to determine if corrective repairs may be made, or if the material is to be rejected. The ENGINEER shall determine the extent of the repairs.
- D. CONTRACTOR shall classify defective pipe prior to ENGINEER's inspection as follows:
  1. Damage to interior and/or exterior paint seal coats.
  2. Damage to interior cement-mortar lining.
  3. Insufficient cement-mortar lining thickness.
  4. Poor quality interior paint seal coat.
  5. Pipe out of round.
  6. Damaged pipe barrel area to a point where pipe class thickness is reduced.
  7. Denting or gouges in plain end of pipe.
- E. The CONTRACTOR shall be solely responsible for the safe storage of all material until it has been incorporated in the completed project and accepted by the ENGINEER. The CONTRACTOR will inspect and note any defects to the OWNER and ENGINEER immediately for any pipe pre-purchased by the OWNER.
- F. Pipe fittings and accessories shall be loaded and unloaded by lifting with hoists or skidding to avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against another pipe. Handling of this material is to be in accordance with AWWA C600.

## SECTION 15072

### DUCTILE IRON PIPE AND FITTINGS

- G. The CONTRACTOR is cautioned to exercise care in handling, loading, unloading, and storing ductile iron pipe and fittings. All ductile iron pipe and fittings shall be stored under cover before use and shall be transported in a vehicle with a bed long enough to allow the length of pipe to lay flat so as not to be subject to undue bending or concentrated external load at any point.

#### PART 2 – PRODUCTS

##### 2.01 DUCTILE IRON PIPE

###### A. General

1. Ductile iron pipe and fittings 3-inch and larger shall be manufactured by U.S. Pipe and Foundry, American Ductile Iron Pipe Company, McWane Pipe Company, or ENGINEER approved equal.
2. Ductile iron pipe shall conform to the latest specifications as adopted by the American National Standards Institute, Inc., (ANSI) and the American Water Works Association (AWWA). Specifically, ductile iron pipe shall conform to ANSI/AWWA C151/A21.51, AWWA C150, and AWWA C111.
3. All buried pipe shall be coated outside with a bituminous coating in accordance with ANSI/AWWA C151/A21.51. Bituminous coating on any exposed piping is not acceptable.
4. Potable water and reclaimed water ductile iron pipe interior shall be cement mortar lined and seal coated in compliance with the latest revision of ANSI/AWWA C104/A21.4. High-speed cement lining (offered by American Pipe) is acceptable with no seal coat. All coatings shall be applied at the place of manufacture prior to shipment to the construction site. The coatings shall be protected throughout construction and shall maintain an approved factory condition free of defect.
5. Wastewater ductile iron pipe shall be coated inside with an approved amine cured novalac epoxy coating. Acceptable coatings include Protecto 401 ceramic epoxy, SP 2000 ceramic epoxy, poly bond plus, or approved equal.
6. Each length of pipe shall be subjected to a hydrostatic proof test by the manufacturer as required by ANSI/AWWA C151/A21.51.

###### B. Mechanical Joint Pipe

1. Push-on and mechanical joints shall conform to ANSI/AWWA C111/A21.11. All pipe installed on this project shall be furnished with restrained joints.
2. The pipe class of non-flanged pipe shall be as a minimum pressure Class 250. Where indicated on the Drawings, thicker classes shall be furnished.

###### C. Flanged Pipe

1. Flanged joints for piping shall conform to ANSI/AWWA C110/A21.10 for fittings and ANSI/AWWA C115/A21.15 for pipe. Flanged joints shall not be used in underground installations except where specifically shown on the Drawings.
2. All flanged pipe shall be a minimum of thickness Class 125, unless otherwise indicated on the Contract Drawings.

## SECTION 15072

### DUCTILE IRON PIPE AND FITTINGS

#### 2.02 DUCTILE IRON FITTINGS

##### A. General

1. Fittings shall be ductile iron conforming to ANSI/AWWA C110/A21.10, C111/A21.11, C115/A21.15, and/or C153/A21.53. Fittings shall also be certified by ISO 9000 by an accredited ENGINEER.
2. Fittings shall have a minimum working pressure of 250 psi.
3. Fittings shall be coated on the outside and inside to match the connecting pipes.
4. Fittings shall be manufactured by American Cast Iron Pipe Company, Clow, Tyler Union, U.S. Pipe and Foundry, Star Pipe Products, Sigma Corporation, and Pipe Components Inc.
5. All fittings shall be supplied by one manufacturer.

##### B. Mechanical Joint Ductile Iron Fittings

1. Mechanical and push-on joints including accessories shall conform to ANSI/AWWA C111/A21.11.
2. All buried steel lugs, rods, brackets and mechanical joint bolts and nuts shall be low alloy steel in accordance with ANSI C111 and shall be given one (1) coat of Koppers #50 coal tar coating prior to backfilling.

##### C. Flanged Ductile Iron Fittings

1. Flanges for fittings shall meet the requirements of ANSI/AWWA C110/A21.10 and C151/A21.51.
2. All above ground flanged piping shall be provided with 316 stainless steel bolts and nuts. Stainless steel nuts and bolts shall not be painted and should be properly protected to avoid painting.

##### D. Restrained Joint Fittings

1. Restrained joints may be restrained by utilizing a joint restraint gasket which includes a stainless-steel locking segments vulcanized into the rubber gasket. The gasket shall be rated for operating pressures up to 250 psi based on the performance requirements of ANSI/AWWA C111/A21.11.

#### 2.03 DUCTILE IRON PIPE MARKING

- A. All ductile iron pipe below ground shall be marked with a minimum 3-inch wide, non-detectable utility marking tape. The utility marking tape shall be installed on the pipe at the 12 o'clock position. Tape shall be 4 minimum millimeter ASTM D2103 thickness and constructed for prolonged use underground, meet industry standard (APWA) color code, tensile strength of 2750 psi (ASTM D882), and industrial standard repeatable message.
- B. All ductile iron piping above ground shall be color labeled "Water" stenciled in the center of each joint of pipe utilizing oil paint. Stenciled lettering shall be a minimum of 4-inches and be black in color.

## SECTION 15072

### DUCTILE IRON PIPE AND FITTINGS

#### 2.04 RETAINING RINGS

- A. The CONTRACTOR shall maintain, on-site, a suitable supply of field installed retaining rings for ductile iron boltless restrained joints for pipe installations which may require unavoidable field cutting, as approved by the ENGINEER. Field installed retaining rings shall be furnished by the same manufacturer as the pipe, and shall have the same pressure rating as factory installed rings.

#### 2.05 RETAINER GLANDS

- A. All mechanical joint fittings and valves shall be provided with ductile iron retainer glands. Retainer glands shall be "Megalug" Series 1100 as manufactured by EBAA Iron or equal. Retainer glands shall be supplied complete with torque limiting twist off nuts.

#### 2.06 LOCATE WIRE

- A. Utility marking tape shall be 3-inch wide and 4-mil thick per ASTM D2103 with a 2,750 psi tensile strength per ASTM D882.
- B. Tape shall have adhesive backing and industrial standard repeatable message.
- C. External color of locate wire shall be blue for potable water, green for sewer, and pantone purple 522C for reuse.
- D. Locate wire shall be 10 gauge, single strand, UF rated for direct bury, copper wire with 30 mil insulation.

### PART 3 – EXECUTION

#### 3.01 INSTALLATION - GENERAL REQUIREMENTS

- A. All pipe shall be laid and maintained to the required lines and depths. Fittings and valves shall be at the required locations with joints centered, spigots and all valve and hydrant stems plumb and otherwise in strict accordance with the Specifications.
- B. No deviation shall be made from the required alignment, depth or grade except with the written consent of the ENGINEER.
- C. All pipe shall be laid to the depth specified. The depth shall be measured from the final surface grade to the top of the pipe barrel. The minimum pipe cover shall be as shown on the Drawings or as specified in the Specifications.
- D. Do not lay pipe in a wet trench, on subgrade containing frost, and when trench conditions are unsuitable for such work. If all efforts fail to obtain a stable dry trench bottom and the ENGINEER determines that the trench bottom is unsuitable for trench foundation, he will order in writing the kind of stabilization to be constructed.

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### DUCTILE IRON PIPE AND FITTINGS

- E. Thoroughly clean the pipes and fittings before they are installed and this material shall be kept clean until the acceptance of the completed work. Lay pipe with the bell ends facing in the direction of laying, unless otherwise shown on the Drawings, or directed by the ENGINEER. Exercise care to ensure that each length abuts against the next in such manner that no shoulder or unevenness of any kind occurs in the pipe line.
- F. No wedging or blocking is permitted in laying pipe unless by written order of ENGINEER.
- G. Before joints are made, bed each section of pipe the full length of the barrel with recesses excavated so pipe invert forms continuous grade with invert of pipe previously laid. Do not bring succeeding pipe into position until the preceding length is embedded and securely in place.
- H. Dig bell holes sufficiently large to permit proper joint making and to ensure pipe is firmly bedded full length of its barrel.
- I. During "pushing home" of any style piping, timber shall be placed between the jacking device (backhoe, bucket, pipe jacket, etc.) and the pipe being driven home.
- J. Walking or working on completed pipeline, except as necessary in tamping and backfilling, is not permitted until trench is backfilled one-foot deep over top of pipes.
- K. Take up and relay pipe that is out of alignment or grade, or pipe having disturbed joints after laying.
- L. Take up and replace with new, such in-place pipe sections found to be defective. Replacement work at CONTRACTOR's expense.
- M. Take necessary precautions to prevent the floating of the pipeline by the accumulation of water in the trench, or the collapse of the pipeline from any cause. Should floating or collapse occur, restoration will be at the CONTRACTOR's expense.
- N. Bedding and backfilling materials for buried pipe shall be as specified previously in Division 2, as specified in subsequent paragraphs, and in accordance with the Contract Drawings.
- O. Take every precaution to prevent foreign material from entering the pipe while it is being placed. During laying operations, do not place debris, tools, clothing, or other materials in the pipe.
- P. Close all openings in the pipeline with watertight plugs when pipe laying is stopped at the close of the day's work or for other reasons, such as rest breaks or meal periods.
- Q. Place enough backfill over the center sections of the pipe to prevent floating.

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### DUCTILE IRON PIPE AND FITTINGS

- R. Carry out the cutting of pipe only with equipment specifically designed for that purpose such as an abrasive wheel, rotary wheel cutter, a guillotine pipe saw or a milling wheel saw. The use of chisels will not be permitted. Cut ends and rough edges should be ground smooth and for push-on connections, the cut end should be beveled slightly.
- S. In distributing material at the project site, each piece shall be unloaded opposite or near the place where it is to be laid in the trench. Each length of pipe shall be adequately blocked to prevent movement. Stockpiled pipe shall be adequately blocked to prevent movement. No pipe, material, or any other object shall be placed on private property, obstruct walkways or driveways, or in any manner interfere with the normal flow of traffic.
- T. In the case of ductile iron pipe, special care shall be exercised, during handling temporary storage or construction to avoid damage to the bells, spigots or flanged ends. If damaged pipe cannot be repaired to the ENGINEER's satisfaction, it shall be replaced at the CONTRACTOR's expense.
- U. The CONTRACTOR shall be responsible for maintaining the minimum required distance between the water main and other utility lines in strict accordance with all Federal, State and local requirements and all right-of-way limitations.
- V. The maximum allowable deflection at the joints for push-on joint pipe, regardless of pipe material shall be no more than 75 percent of the manufacturer's published recommendation.
- W. In case the curve is too sharp for the allowable deflection, short lengths of pipe may be used upon approval of the ENGINEER and at no additional cost to the OWNER.
- X. Care shall be exercised such that no high points are established where air can accumulate in the pipelines.

#### 3.02 CONSTRUCTION METHODS TO AVOID CONTAMINATION

- A. Heavy particulates generally contain bacteria and prevent even very high chlorine concentrations from contacting and killing such organisms. It is essential that the procedures of this section be observed to assure that a water main and its appurtenances are thoroughly clean for the final disinfection by chlorination.
- B. Precautions shall be taken to protect the interiors of pipes, fittings, and valves against contamination. Pipe delivered for construction shall be strung to minimize entrance of foreign material. All openings in the pipeline shall be closed with watertight plugs when pipe laying is stopped at the close of the day's work or for other reasons, such as rest breaks or meal periods. Rodent-proof plugs may be used where it is determined that watertight plugs are not practical and where thorough cleaning will be performed.



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### DUCTILE IRON PIPE AND FITTINGS

- C. Delay in placement of delivered pipe invites contamination. The more closely the rate of delivery is correlated to the rate of pipe laying, the less likelihood of contamination.
- D. Joints of all pipe in the trench shall be completed before work is stopped. If water accumulates in the trench, the plugs shall remain in place until the trench is dry.
- E. Yarning or packing material shall consist of molded or tubular rubber rings, or rope of treated paper or other approved materials. Materials such as jute, asbestos or hemp shall not be used. Packing material shall be handled in a manner that avoids contamination.
- F. No contaminated material or any material capable of supporting prolific growth of microorganisms shall be used for sealing joints. Sealing material or gaskets shall be handled in a manner that avoids contamination. The lubricant used in the installation of sealing gaskets shall be suitable for use in potable water. It shall be delivered to the job in closed containers and shall be kept clean.
- G. If dirt enters the pipe, and in the opinion of the ENGINEER the dirt will not be removed by the flushing operation, the interior of the pipe shall be cleaned by mechanical means and then shall be swabbed with a 1 percent hypochlorite disinfecting solution. Cleaning with the use of a pig, swab or "go-devil" should be undertaken only when the ENGINEER has specified such and has determined that such operation will not force mud or debris into pipe joint spaces.

### 3.03 DUCTILE IRON PIPE INSTALLATION

- A. The installation of buried iron piping, except as otherwise shown or specified, shall conform to AWWA C-600, "Standard for Installation of Ductile Iron Water Mains and Appurtenances". Boltless restrained joint pipe shall also be installed in accordance with manufacturer's recommended instructions.
- B. Assembly of push-on pipe and mechanical joints valves shall be in accordance with the manufacturer's printed instructions and AWWA C-600. Installation of retainer glands shall be in accordance with the manufacturer's printed instructions. Torque wrenches shall be used for installation of mechanical and retainer glands.
- C. The bell, plain end, and gasket shall be thoroughly cleaned and lubricated immediately before assembling the joint. The gasket shall then be inserted into the groove in the bell. Before starting joint assembly, a liberal coating of special lubricant shall be applied to the gasket and spigot end. With the spigot end centered in the bell, the spigot end is pushed home. Bolts for mechanical joints shall be tightened in an alternating top-to-bottom and side-to-side sequence to bring the gland up to the bell face evenly. If effective sealing is not achieved at the maximum torques listed AWWA C-600, the joint shall be disassembled, thoroughly cleaned, and reassembled. Over stressing of bolts to compensate for poor joint assembly will not be permitted.

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### DUCTILE IRON PIPE AND FITTINGS

- D. All flanges, unless otherwise required, shall have standard drillings. Flanges shall be firmly bolted with machine, stud, or bolts of the proper size bar steel, with good, true threads, and shall be so tightened as to evenly distribute the stress in the bolts and bring the pipe into uniform alignment.
- E. In general, no flanges shall be permitted underground except as directed by the ENGINEER, or as indicated on the Drawings.
- F. Where required, flanges shall be tapped for stud bolts.

#### 3.04 PRESSURE TESTS

- A. The CONTRACTOR shall provide all labor, materials, equipment, gauges, air, water and all else necessary to pressure test all ductile iron piping systems installed under this Contract.
- B. All piping shall be tested as per Paragraph 1.4.2.5 of the SJCUD Standard Specifications, latest version.
  - 1. The test pressures for process piping shall be as follows:
    - a. 50 percent above the normal operating pressure with a minimum of 150 psi.

#### 3.05 BACTERIOLOGICAL TESTING

- A. If pipe or fittings are intended for use or comes into contact with potable water, the requirements of this section shall be met.
- B. After final flushing and before the piping is placed in service, samples will be collected by the OWNER and tested by the OWNER for bacteriological quality in accordance with Standard Methods for the Examination of Water and Wastewater.
- C. Bacteriological tests must show complete absence of coliforms. If tests show presence of coliform CONTRACTOR will be required to perform additional flushing and disinfection of the pipeline until such time acceptable tests are obtained, all at no cost to the OWNER.

#### 3.06 DISINFECTION

- A. If pipe or fittings are intended for use or comes into contact with potable water, the requirements of this section shall be met.
- B. Upon completion of installation, the interior of all piping shall be thoroughly cleaned and flushed.
- C. After cleaning and flushing, and following pressure testing, all lines carrying water shall be disinfected in accordance with AWWA (C651) American Water Works Association Standard for Disinfection of Water Mains. Following chlorination and after the entire length is ready for service, all treated water shall be flushed thoroughly from the pipeline. The CONTRACTOR shall coordinate with the OWNER to take sample at the beginning and end of the new system and which will

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DUCTILE IRON PIPE AND FITTINGS

provide chemical and bacteriological tests on the samples. The tests shall prove that the entire piping system is free of pathogenic organisms.

- D. Should the initial treatment prove ineffective, the disinfection procedure shall be repeated until satisfactory results are obtained.

3.07 DISPOSAL OF HEAVILY CHLORINATED WATER

- A. After the applicable retention period, heavily chlorinated water should not remain in contact with the pipe for more than 48 hours. To prevent damage to the pipe lining or corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the distribution system, or is acceptable for domestic use.
- B. The chlorine residual of water being disposed shall be neutralized by treating with one of the chemicals listed in Table 1. The proposed disposal site to which chlorinated water is to be discharged shall be approved by the OWNER. A reducing agent shall be applied to the chlorinated water to be wasted to completely neutralize the chlorine residual remaining in the water. Where necessary, federal, state and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.
- C. The amount of chemicals (in pounds) required to neutralize various residual chlorine concentrations in 100,000 gallons of water are as follows:

Table 1				
Residual Chlorine Concentration (mg/L)	Sulfur Dioxide	Sodium Bisulfite	Sodium Sulfite	Sodium Thiosulfate
1	0.8	1.2	1.4	1.2
2	1.7	2.5	2.9	2.4
10	8.3	12.5	14.6	12.0
50	41.7	62.6	73.0	60.0

3.08 LOCATE WIRE TESTING

- A. Locate wire shall be brought to grade within a valve box or locating station box at 200 foot intervals or less. Locate wire shall be installed in a box along the pipeline in either the 5:00 o'clock or 8:00 o'clock position relative to the pipe. Connection or splices underground which are not inside a locate box or valve box is not allowed.
- B. Testing shall be performed by a person or company that has been certified by the manufacturer of the approved testing equipment as proficient in the use of the equipment. The certified tester shall be approved by SJCUD and the ENGINEER. An SJCUD representative may elect to be present during the testing period.
- C. The CONTRACTOR shall provide the tester with a copy of the yard piping plan that has been marked up by the CONTRACTOR to identify pipes where locate wiring has been installed. The tester shall trace the entire length of pipe and mark any

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### DUCTILE IRON PIPE AND FITTINGS

pipng location variations from the marked-up plans. The depth to top of pipe shall be recorded at 50 foot intervals.

- D. A final locate wire report shall be submitted to SJCUD and the ENGINEER for review and approval. The report shall include a signed and sealed statement from the tester that certifies all installed wire was successfully sounded and traced with no open breaks. The report shall include all field notes, breaks found/repared, depths, and other applicable field remarks by the tester. The report shall be furnished prior to substantial completion of the project.

END OF SECTION 15072

## SECTION 15100

### VALVES AND APPURTENANCES

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required and install complete and ready for operation all valves and appurtenances as shown on the Drawings and as specified herein.
- B. The equipment shall include, but not be limited to, the following:
  - 1. Valve boxes
  - 2. Gate valves
  - 3. Swing check valve
  - 4. Pressure gauges
  - 5. Air release valves
  - 6. Ball valves
  - 7. Reduced pressure backflow preventer assembly
  - 8. Hose bibbs
  - 9. Wash hose stations
  - 10. Proportional pressure reducing valve
  - 11. Pressure sustaining fill valve
- C. The SJCUD's Manual of Water, Wastewater, and Reclaimed Water Standards Manual, latest version will be used for the following items:
  - 1. Valve boxes Section 3.8.7
  - 2. Gate valve Section 3.8.2
  - 3. Swing check valves Section 3.8.3
  - 4. Air Release Valves Section 3.8.5
  - 5. Reduced pressure backflow preventer Section 3.12.1
    - a. These items must conform to those standards and shall be submitted for review and approval to the ENGINEER under this specification section.
- D. All valves or appurtenances that come into contact with potable water shall be certified as NSF 61 and NSF-372 (NSF 61-G) approved.
- E. For any buried valves provided by the TANK CONTRACTOR, the CONTRACTOR shall be responsible for providing the final valve pad as per the detail.

##### 1.02 RELATED WORK

- A. Excavation, Backfill, Fill and Grading for pipe is included in Division 2.

##### 1.03 DESCRIPTION OF SYSTEMS

- A. All of the equipment and materials specified herein are intended to be standard for use in controlling the flow of potable water, air, etc., depending on the applications.

## SECTION 15100

### VALVES AND APPURTENANCES

#### 1.04 QUALIFICATIONS

- A. All of the types of valves and appurtenances shall be products of well established reputable firms who are fully experienced, reputable and qualified in the manufacture of the particular equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these specifications as applicable.

#### 1.05 SUBMITTALS

- A. Complete shop drawings of all valves and appurtenances shall be submitted to the ENGINEER for approval in accordance with the requirements of Section 01300.
- B. Valve Submittals
  1. Valve tag number
  2. The manufacturer and supplier
  3. The address at which equipment will be fabricated or assembled
  4. Drawings showing assembly details, materials of construction and dimensions
  5. Descriptive literature, bulletins and/or catalogs of the equipment
  6. The total weight of each item
  7. A complete bill of materials
  8. Additional submittal data, where noted with individual pieces of equipment
  9. Actuator mechanical outline and electrical drawings with valve tag information
  10. Wiring diagrams, field wiring terminal diagrams, power requirements, and control panel drawings
- C. Test Reports
  1. Provide certified hydrostatic test data, per manufacturer's standard procedure or MSS-SP-61 for all valves.
  2. Each actuator shall be performance tested in accordance with AWWA and other standards. The valve manufacturer shall supply, mount, and test all electric actuators on valves at the factory.
- D. Certificates
  1. For each valve specified to be manufactured, tested and/or installed in accordance with AWWA and other standards, submit an affidavit of compliance with the appropriate standards, including certified results of required tests and certification of proper installation.
- E. Operation and maintenance manuals for each type valve in accordance with Section 01370.

#### 1.06 SPARE PARTS AND TOOLS

- A. Special tools, if required for normal operation and maintenance shall be supplied with the equipment.

SECTION 15100

VALVES AND APPURTENANCES

1.07 VALVE DESIGNATIONS AND SCHEDULE

- A. All valves shall be identified by a unique valve tag as identified in the valve schedule prepared by the CONTRACTOR. The specific type of valve to be used will be identified by the symbol and/or call out on the Drawings. The CONTRACTOR shall identify each valve by its assigned tag number on all shop drawings and equipment submittals or as designated on the drawings.
  
- B. The CONTRACTOR shall refer to the P&IDs and mechanical plans for type of each valve called out by abbreviation or drawing symbol. Prior to the first valve submittal, CONTRACTOR shall submit a detailed valve schedule listing all of the process valves to be furnished along with the Contract Drawing and P&IDs edited electronically to include the valve tag numbers prepared by the CONTRACTOR identifying each valve. The valve schedule shall include: valve tag number, valve designation, valve size, end connections, operator type and other information required by SJCUD details for buried valves. The valve tag shall be 4 digits long; numbering shall be linked to the P&ID Sheet on which it is shown. Identical valves in the same position in parallel processes (EX. Pump inlet/outlet isolation valves where there are 3 parallel pumps of same type) shall have same tag number followed by a hyphen and quantifier -1, 2, 3 etc. Where electric, hydraulic or pneumatic actuators are supplied their type shall be so noted with an E, H or P. Modulating duty actuators shall be noted with an M following the actuator type notation. An excerpt of an EXAMPLE schedule is as follows:
  
- C. Valve tags shall comply with requirements listed below.

Valve Tag	Designation	Size	Ends	Operator	Notes
1000-1	BFV1	8-in	Flanged	Gear/Handwheel	Extra descriptions necessary
1000-2	BFV1	8-in	Flanged	Gear/Handwheel	
1005	PV1	6-in	Flanged	EM	

1.08 WARRANTY

- A. All equipment supplied under this section shall be warranted for a period of one (1) year from substantial completion by the MANUFACTURER.
  
- B. The equipment shall be warranted to be free from defects in workmanship, design and materials. If any part of the equipment should fail during the warranty period, it shall be replaced in the machine(s) and the unit(s) restored to service at no expense to the OWNER.
  
- C. The MANUFACTURER'S warranty period shall run concurrently with the CONTRACTOR'S warranty period. No exception to this provision shall be allowed.

## SECTION 15100

### VALVES AND APPURTENANCES

#### PART 2 – PRODUCTS

##### 2.01 GENERAL

- A. All valves and appurtenances shall be of the size shown on the Drawings and as far as possible all equipment of the same type shall be from one manufacturer.
- B. All valves and appurtenances shall have the name of the maker and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.
- C. The valve manufacturer shall supply, mount, and test all actuators on valves at the factory. The valves and their individual actuators shall be shipped as a unit.
- D. Unless otherwise noted on the Drawings, valves shall be manually actuated; non-buried valves shall have an operating wheel, handle or lever mounted on the operator; those with operating nuts shall have a non-rising stem with an AWWA 2-inch nut. At least two tee handles shall be provided for all operating nuts. Unless otherwise noted, operation for all valves shall be CCW open.
- E. Each operating device shall have cast on it with the word "OPEN" and an arrow indicating the direction of operation.
- F. Buried valves shall have nut operator and valve box arrangement as shown on the Drawings.
- G. The valve manufacturer shall supply, mount, and test all actuators on valves at the factory. The valves and their individual actuators shall be shipped as a unit.
- H. All actuators shall be capable of moving the valve from the full open to full close position and in reverse and holding the valve at any position part way between full open or closed.
- I. For all valves, all exposed hardware including nuts and bolts shall be 316 stainless steel and shall remain unpainted to allow easy removal.

##### 2.02 VALVE BOXES

- A. Valve boxes shall meet the standard specifications as listed in Section 3.8.7 of SJCUD Standards Manual.

##### 2.03 GATE VALVES

- A. Gate valves shall meet the standard specifications as listed in Section 3.8.2 of the SJCUD Standards Manual.



## SECTION 15100

### VALVES AND APPURTENANCES

#### 2.04 SWING CHECK VALVES

- A. Swing check valves shall meet the standard specifications as listed in Section 3.8.3 of the SJCUD Standards Manual.

#### 2.05 PRESSURE GAUGES

- A. Each pressure gauge shall be direct mounted, 304 SS with a minimum 4 inch diameter dial and furnished with a clear glass window, ¼ inch shut-off valve, and a bronze pressure snubber. Provide diaphragm seals between shut-off valve and pressure gauge. All gauges shall be weatherproofed. The face dial shall be white finished aluminum with jet black graduations and figures. The face dial shall indicate the units of pressure being measured (e.g., feet, inches, etc.) or be dual scale.
- B. Pressure gauges shall be liquid filled and equal to Series 750 as manufactured by H.O. Trerice Co., Detroit, Michigan; Marshalltown Instruments, Marshalltown, Iowa; or equal.
- C. Install as per details provided on the drawings.
- D. Gauge rating shall be the range as shown on the Drawings and confirmed during the shop drawing process, provide a table of all pressure gauges, location, application, and pressure range for review and approval.
- E. Diaphragm seals shall be installed for all pressure gauges and pressure switches to protect pressure gauges and pressure switches from contact with the fluid in the pipeline. Gauges shall be furnished as part of a complete factory assembly including gauge, snubber, diaphragm seal, liquid fill, bar stock isolation valve and threaded Type 316 stainless steel interconnecting piping. Furnish also a ½-in backflushing connection and valve.
- F. Diaphragm seals shall be minimum 2-1/2-inch diameter, or as required for the connected pressure gauges. The diaphragm shall be "thread attached" to both piping and pressure switches or gauges. Furnish mineral oil fill between the diaphragm seal and the gauge.
  - 1. Diaphragm seals shall have an upper housing of Type 316 stainless steel, with the lower housing of a material specifically chosen according to the fluid type and pressure being monitored, with Type 316 stainless steel bolts. Diaphragms shall be Type 316 ELC stainless steel.
  - 2. Each diaphragm seal shall be connected to its respective piping or equipment with threaded Type 316 stainless steel pipe and fittings. Pipe size and diaphragm tap size shall match the size of the gauge tap on the equipment, but shall not be less than ¾-inch, except for connections to plant water piping which shall be minimum ½-inch. Furnish a plug valve shut-off valve between the pipeline or equipment and the diaphragm seal.
  - 3. Each diaphragm seal shall have a minimum ¼-inch NPT flush connection with plug valve and gauge tap to match the size of the gauge.

## SECTION 15100

### VALVES AND APPURTENANCES

4. Furnish pulsation dampeners adequate to prevent pulsation and/or vibration of the gauge indicator under all system operating conditions.

#### 2.06 AIR RELEASE VALVES

- A. Air release valves shall meet the standard specifications as listed in Section 3.8.5 of SJCUD Standards Manual.
- A. The CONTRACTOR shall provide connecting stainless steel piping, valves, and appurtenances to route ARV drain piping to drain as shown on the Drawings.

#### 2.07 BALL VALVES

- A. Stainless Steel
  1. Ball valves shall be 316 stainless steel body per ASTM A351 Grade CF8M, two piece split body, full port, and fire safe as per API 607 4th edition.
  2. Ball valves shall be manufactured with 150 lb flanges.
  3. The design of the valves shall be such that it shall provide suitable seating in both directions. In order to determine the position of the ball within the valve (open or closed), there shall be an easily visible, permanent indicator on the valve. Ball valves shall have a 316 stainless steel ball.
  4. Seats shall be TFM 1600 enhanced Teflon seats. The fully open port area shall be approximately 100 percent of the nominal pipe area.
  5. Valve shafts shall be ground and polished and shall be type 304 stainless steel Teflon-lined bearings shall be supplied in both trunnions of the valve body.
  6. Stainless handles on sizes ½ – 2-inch with travel stops and lockout devices and carbon steel handles on sizes 2 ½ – 12-inch with travel stops and lock out devices.
  7. Valves to be furnished with an actuator shall have ISO 5211 secure mount actuator mounting pad. Valve actuators shall conform to AWWA C507 as specified herein.
  8. Stainless steel ball valves shall be model F150 as manufactured by Flo-tite, F15 by Flow-tek, Apollo Series 76, or Ohio Valve Fig. 166RT.

#### 2.08 REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY

- A. Reduced pressure backflow preventer assembly shall meet the standard specifications as listed in Section 3.12.1 of SJCUD Standards Manual.

#### 2.09 HOSE BIBBS

- A. Hose bibbs shall be brass, polished chromium plated, as manufactured by Chicago Faucet Company. Potable water bibbs shall be No. 952, 1-inch with vacuum breaker and shut off valve as detailed on the Drawings.
- B. CONTRACTOR shall provide hose, mounting hardware and supports, and pipe supports at all locations as detailed on the drawings.

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### VALVES AND APPURTENANCES

#### 2.10 WASH HOSE STATION

- A. Shall be a single supply, wall-mounted, guardrail mounted, or free standing hose station as shown on the Drawings.
- B. Hoses shall be red, 1-inch rubber at all locations.
- C. Hose nozzle shall be lever operated, encased in rubber equal to Strahman No. 70.
- D. Wall anchors for hose rack shall be 5/16-inch 316 stainless steel hex bolts.
- E. Isolation valve shall be a stainless-steel ball valve as specified herein.

#### 2.11 PROPORTIONAL PRESSURE REDUCING VALVE

- A. The pressure reducing valve shall automatically reduce a higher upstream pressure to a lower downstream pressure at a fixed ratio. The valve's control loop shall not consist of any pilot.
- B. The main valve shall be a hydraulically operated, diaphragm actuated globe valve of either angle or oblique (Y) pattern design, having semi- straight flow with no right angle turns. The valve shall be center guided, having an unobstructed flow path with no stem guides, bearings, or supporting ribs. The valve shall have a maximum pressure rating of 250 psi for ANSI Class 150# flanges and 400 psi for all other end connections (threaded, grooved, or Class 300# flanges). All necessary repairs shall be possible without removing the valve from the line. The valve body shall be provided with a 1/2 inch NPT port on the upstream portion of the valve for a CONTRACTOR installed 1/2 inch tube to be run to the sensing chamber of the pressure sustaining valve. The proportional pressure reducing valve shall have an integral downstream pressure gauge.
- C. The actuator assembly shall be a double-chambered diaphragm design with a sealed inherent separating partition between the lower surface of the diaphragm and the main valve. The entire actuator assembly shall be removable from the valve as a single, integral unit. The seal shall be rectangular in cross section contained on three- and one-half sides, and the seal disc shall be capable of accepting a V-Port throttling plug. The diaphragm within the main valve actuator assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure.
- D. The control system shall consist of a control tube connecting the upper control chamber to the valve outlet. The valve shall be factory assembled with all control tubing.
- E. The valve body and cover shall be ductile iron to ASTM A536, with an approved fusion bonded epoxy coating. External nuts and bolts shall be SAE 316 stainless steel. The interior trim shall be stainless steel. Valve bearing shall be tin bronze

## SECTION 15100

### VALVES AND APPURTENANCES

C90500. The nylon reinforced diaphragm and all O-rings shall be EPDM, with the seat seal being Buna-N. The control loop accessories, tubing and fittings shall all be SAE 316 stainless steel.

- F. The valves shall be Bermad Model WW-8"-720-EN-PD-P2-Y-C-A5-EB-NN-N.

#### 2.12 PRESSURE SUSTAINING FILL VALVE

- A. The valve shall be installed as shown on the drawings. The pressure relief/sustaining valve shall fulfill either of two separate functions. When installed in-line, it shall sustain minimum pre-set, upstream (back) pressure regardless of fluctuating flow or varying downstream pressure. When installed as a circulation valve, it shall relieve excessive line pressure when above maximum pre-set.
- B. The main valve shall be a hydraulically operated, diaphragm actuated globe valve of either angle or oblique (Y) pattern design, having semi- straight flow with no right angle turns. The valve shall be center guided, having an unobstructed flow path with no stem guides, bearings, or supporting ribs. The valve shall have a maximum pressure rating of 250 psi for ANSI Class 150# flanges and 400 psi for all other end connections (threaded, grooved, or ANSI Class 300# flanges). All necessary repairs shall be possible without removing the valve from the line.
- C. The actuator assembly shall be a double-chambered diaphragm design with an inherent separating partition between the lower surface of the diaphragm and the main valve. The entire actuator assembly shall be removable from the valve as a single, integral unit. The seal shall be rectangular in cross section contained on three and one-half sides, and the seal disc shall be capable of accepting a V-Port Throttling Plug. The diaphragm within the main valve actuator assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure.
- D. The pressure sustaining pilot control shall be a direct-acting, adjustable, spring-loaded, normally closed, diaphragm valve designed to permit flow when controlled pressure is greater than the spring setting. The standard spring setting range shall be 15-230 psi, with options for 15-430 psi. The valve shall be factory assembled with all control tubing, isolations ball valves, control filter and pilot. The control system shall also include a 120V 3-way ASCO 8320 series solenoid which shall allow the valve to be closed by a remote signal. Port 1 or 3 shall include ½-inch tube fitting to connect the sensing line to the upstream port on the proportional pressure reducing valve. It is the CONTRACTOR's responsibility to coordinate the length and appurtenances required to connect the pilot on the pressure sustaining valve to the proportional pressure reducing valve.
- E. The valve body and cover shall be ductile iron to ASTM A536, with an approved fusion bonded epoxy coating. External nuts and bolts shall be SAE 316 stainless steel. The interior trim shall be stainless steel. Valve bearing shall be tin bronze

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### VALVES AND APPURTENANCES

C90500. The nylon reinforced diaphragm and all O-rings shall be EPDM, with the seat seal being Buna-N. The control loop accessories, pilot, tubing and fittings shall all be SAE 316 stainless steel.

- F. The valve shall be Bermad Model WW-8"-730-EN-55-P0-Y-C-A5-EB-5AC-NN-N.
- G. SPARE: Provide one spare three-way solenoid valve properly packaged for long-term storage.
- H. STARTUP SERVICES: The manufacturer shall provide a factory-authorized service representative to commission and verify the installation meets the requirements of the manufacturer and prepare the valve for operation in accordance with design requirements. Representative shall prepare and submit a signed certificate of installation prior to ENGINEER witnessed site acceptance testing. Commissioning and verification shall be provided for a total of 16 hours over a 2-day period. CONTRACTOR shall engage a factory-authorized service representative to train OWNER's maintenance personnel to adjust, operate, and maintain the equipment provided under this specification and all accessories associated therewith. Training shall be provided for a total of 8 hours over a single day. This work is inclusive of the proportional pressure reducing valve above.

## PART 3 – EXECUTION

### 3.01 INSTALLATION

- A. All valves and appurtenances shall be installed in the locations shown, true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of the ENGINEER before they are installed.
- B. After installation, all valves and appurtenances shall be tested at least 2 hours at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any joint proves to be defective, it shall be repaired to the satisfaction of the ENGINEER.
- C. Install all floor boxes, brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings that are in masonry floors or walls, and install concrete inserts for hangers and supports as soon as forms are erected and before concrete is poured. Before setting these items, the CONTRACTOR shall check all plans and figures which have a direct bearing on their location and he shall be responsible for the proper location of these valves and appurtenances during the construction of the structures.
- D. Pipe for use with flanged couplings shall have plain ends as specified in the respective pipe sections in Division 15.

## SECTION 15100

### VALVES AND APPURTENANCES

- E. Fire hydrants shall be set at the locations designated by the ENGINEER and bedded on a firm foundation. Each hydrant shall be set in true vertical alignment and properly braced. Concrete thrust blocks shall be placed between the back of the hydrant inlet and undisturbed soil at the end of the trench. Minimum bearing area shall be as shown on the Drawings. Felt roofing paper shall be placed around hydrant elbow before placing concrete. If directed, the hydrant shall be tied to the pipe with suitable rods or clamps, galvanized, painted, or otherwise rustproof treated. Concrete used for backing shall be no leaner than 1 part cement, 2-1/2 parts sand, and 5-1/2 parts stone. Hydrant paint shall be touched up as required after installation.
- F. Flanged joints shall be made with stainless steel bolts, nuts and washers. Mechanical joints shall be made with mild corrosion resistant alloy steel bolts and nuts. All buried bolts and nuts shall be heavily coated with two (2) coats of bituminous paint comparable to Inertol No. 66 Special Heavy.
- G. Prior to assembly of split couplings, the grooves as well as other parts shall be thoroughly cleaned. The ends of the pipes and outside of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap or graphite paste, and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, the gasket shall be centered properly over the pipe ends with the lips against the pipes. The housing sections then shall be placed. After the bolts have been inserted, the nuts shall be tightened until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.
- H. Prior to the installation of sleeve-type couplings, the pipe ends shall be clean thoroughly for a distance of 8 inches. Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6 inches from the end, and the middle ring shall be placed on the already laid pipe end until it is properly centered over the joint. The other pipe end shall be inserted into the middle ring and brought to proper position in relation to the pipe already laid. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flares. After the bolts have been inserted and all nuts have been made up finger tight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, preferably by use of a torque wrench of the appropriate size and torque for the bolts.
- I. Valve boxes with concrete bases shall be installed as shown on the Drawings. Mechanical joints shall be made in the standard manner. Valve stems shall be vertical in all cases. Place cast iron box over each stem with base bearing on compacted fill and top flush with final grade. Boxes shall have sufficient bracing to maintain alignment during backfilling. Knobs on cover shall be parallel to pipe. Remove any sand or undesirable fill from valve box.

### 3.02 SHOP PAINTING

- A. Ferrous surfaces of valves and appurtenances shall receive an exterior coating of rust-inhibitive primer as specified in Section 09900. Interior coatings shall be the manufacturer's standard except that valves on raw and potable water pipes shall be

## SECTION 15100

### VALVES AND APPURTENANCES

coated with paints approved by both EPA and AWWA NSF 61 approved for potable water service. All pipe connection openings shall be capped after shop painting to prevent the entry of foreign matter prior to installation.

#### 3.03 FIELD PAINTING

- A. All metal valves and appurtenances specified herein and exposed to view will be painted as part of the work in Section 09900. All exposed pipe joints on pipe, valves and fittings shall be caulked 360 degrees prior to painting.

#### 3.04 INSPECTION AND TESTING

- A. Completed pipe and valves shall be subjected to hydrostatic pressure test for 2 hours at 150 psi. All leaks shall be repaired and lines retested as approved by the ENGINEER. Prior to testing, the gravity pipelines shall be supported in an approved manner to prevent movement during tests.

END OF SECTION 15100

## SECTION 15120

### PIPING SPECIALTIES

#### PART 1 - GENERAL

##### 1.01 SCOPE OF WORK

- A. This Section specifies the basic piping specialties and testing requirements for piping. Specific piping materials, systems and related installation and testing requirements are provided in the respective sections.
- B. The items shall include the following:
1. Unions
  2. Flanged Joints
  3. Plugs and Caps
  4. Miscellaneous Adaptors
  5. Vents and Drains
  6. Line Strainers
  7. Service Clamps
  8. Service Saddles
  9. Floor Drains
  10. Quick Connect Couplings
  11. Mechanical Sleeve Seals
  12. Flexible Connectors
    - a. Sleeve Couplings
    - b. Split or Grooved Couplings
    - c. Flange Adapters
    - d. Pump and Equipment Flexible Connectors
    - e. Flexible Connectors
  13. Expansion Joints
    - a. Single- and Multiple-Arch Type
    - b. Bellows Style
    - c. Flexible Metal Hose
  14. Harnessing and Restraints
  15. Harnessed Flange Adapter Couplings (HFAC)
  16. Restrained Dismantling Joints
  17. Appurtenances and Miscellaneous Items
  18. Hose End Valves
  19. Clean Outs
- C. The SJCUD's Manual of Water, Wastewater, and Reclaimed Water Standards Manual, latest version will be used for the following items:
1. HFAC Section 3.7.4

##### 1.02 RELATED WORK

- A. Piping materials and systems are included in other Sections of Division 15.
- B. Valves are included in Section 15100.
- C. Pipe insulation is included in Section 15081.



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#### 1.03 SUBMITTALS

- A. Submit, in accordance with Section 01300, general submittals for piping, piping systems and pipeline appurtenances are listed below. It is not intended that all submittals listed below be provided for all piping materials and systems.
- B. Shop Drawings and Product Data
  - 1. Piping layouts in full detail.
  - 2. Location of pipe hangers and supports.
  - 3. Location and type of backup block or device to prevent joint separation.
  - 4. Large scale details of wall penetrations and fabricated fittings.
  - 5. Schedules of all pipe, fittings, special castings, couplings, expansion joints and other appurtenances.
  - 6. Catalog cuts of joints, couplings, harnesses, expansion joints, gaskets, fasteners and other accessories.
  - 7. Catalog cuts of all pipeline appurtenances specified herein.
  - 8. Brochures and technical data on coatings and linings and proposed method for application and repair.
- C. Test Reports
  - 1. Four (4) copies of certified shop tests showing compliance with appropriate standard.
  - 2. Four (4) copies of all field test reports, signed by CONTRACTOR.
- D. Certificates
  - 1. Copies of certification for all welders performing work in accordance with ANSI 831.1.
- E. Manufacturers Installation (or application) instructions
- F. Operation and Maintenance Data in accordance with Section 01730
- G. Warranties in accordance with Section 01740

#### 1.04 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - 1. ASTM A36 - Standard Specification for Carbon Structural Steel
  - 2. ASTM A126 - Standard Specification for Gray Iron Casting for Valves, Flanges and Pipe Fittings
  - 3. ASTM A183 - Standard Specification for Carbon Steel Track Bolts and Nuts
  - 4. ASTM A278 - Standard Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures up to 650 Degrees F
  - 5. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength
  - 6. ASTM A325 - Standard Specification for Strength Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
  - 7. ASTM A536 - Standard Specification for Ductile Iron Castings

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8. ASTM A575 - Standard Specification for Steel Bars, Carbon, Merchant Quality, M-Grades
  9. ASTM 862 - Standard Specification for Composition Bronze or Ounce Metal Castings
  10. ASTM 888 - Standard Specification for Seamless Copper Water Tube
- B. American National Standards Institute (ANSI)
1. ANSI A 13.1 - Scheme for the Identification of Piping Systems
  2. ANSI BI. I - Unified Inch Screw Threads (UN and UNR Thread Form)
  3. ANSI B 18.2 - Square and Hex Bolts and Screws Inch Series Including Hex Cap Screws and Lag Screws
  4. ANSI B3 I - Code for Pressure Piping
  5. ANSI B3 I.1 - Power Piping
- C. American Society of Mechanical Engineers (ASME)
1. ASME B2. 1 - Specifications, Dimensions, Gauging for Taper and Straight Pipe Threads (except dry seals)
  2. ASME B 16.1 - Cast Iron Pipe Flanges and Flanged Fittings
  3. ASME B16.5 - Pipe Flanges and Flange Fittings
- D. American Welding Society (A WS)
1. A WS B3.0 - Welding Procedure and Performance Qualifications
- E. American Water Works Association (A WWA)
1. A WWA C 110 - Ductile-Iron and Gray-Iron Fittings, 3-inch Through 48-inch (75mm Through 1200mm), for Water and Other Liquids
  2. A WWA CI 11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
  3. A WWA C219 - Bolted Sleeve-Type Couplings for Plain-End Pipe
  4. A WW A C606 - Grooved and Shouldered Joints
  5. A WW A Manual MI 1 - Steel Pipe - A Guide for Design and Installation
- F. Plumbing and Drainage Institute (POI)
1. WH 201 - Water Hammer Arrestors
- G. Underwriters Laboratories (UL)
- H. Factory Mutual (FM)
- I. 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. All materials shall be new and unused.
- B. The CONTRACTOR shall install piping to meet requirements of local codes.
- C. The CONTRACTOR shall provide manufacturer's certification that materials meet or

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exceed minimum requirements as specified.

- D. The CONTRACTOR shall coordinate dimensions and drilling of flanges with flanges for valves, pumps and other equipment to be installed in piping systems. Bolt holes in flanges to straddle vertical centerline.
- E. The CONTRACTOR shall reject materials contaminated with gasoline, lubricating oil, liquid or gaseous fuel, aromatic compounds, paint solvent, paint thinner and acid solder.
- F. Pipe-joint compound, for pipe carrying flammable or toxic gas, must bear approval of UL or FM.
- G. Unless otherwise specified, pressures referred to in all piping sections are expressed in pounds per square inch, gauge above atmospheric pressure, psig and all temperature are expressed in degrees Fahrenheit (F).

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. During loading, transportation and unloading, take care to prevent damage to pipes and coating. Carefully load and unload each pipe under control at all times. Place skids or blocks under each pipe in the shop and securely wedge pipe during transportation to ensure no injury to pipe and lining. Cover or cap all pipe ends while pipe is in storage, until it is made a part of the work.

#### 1.07 WARRANTY

- A. All equipment supplied under this section shall be warranted for a period of one (1) year from substantial completion by the MANUFACTURER.
- B. The equipment shall be warranted to be free from defects in workmanship, design and materials. If any part of the equipment should fail during the warranty period, it shall be replaced in the machine(s) and the unit(s) restored to service at no expense to the OWNER.
- C. The MANUFACTURER'S warranty period shall run concurrently with the CONTRACTOR'S warranty period. No exception to this provision shall be allowed.

## PART 2 - PRODUCTS

### 2.01 MATERIALS AND EQUIPMENT

- A. Specific piping materials and appurtenances are specified in the respective piping or system sections or as shown on the Drawings. The use of a manufacturer's name and/or model number is for the purpose of establishing the standard of quality and general configuration desired.
- B. Equipment shall be of the size shown on the Drawings or as noted and as far as possible equipment of the same type shall be identical and from one manufacturer.

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- C. Equipment shall have the name of the maker, nominal size, flow directional arrows (if applicable), working pressure for which they are designed and standard referenced specifications cast in raised letters or indelibly marked upon some appropriate part of the body.
- D. Unless otherwise noted, items shall have a minimum working pressure of 150 psi or be of the same working pressure as the pipe they connect to, whichever is higher and suitable for the pressures noted where they are installed.

#### 2.02 UNIONS

- A. Unions shall be brass or bronze unions for joining nonferrous pipe; malleable brass or bronze-seated iron or steel unions for joining ferrous pipe; PVC unions for joining PVC pipe; CPVC unions for joining CPVC pipe.
- B. Unions shall be provided at valve locations whether they are or are not shown on the Drawings.

#### 2.03 PLUGS AND CAPS

- A. Provide standard plug or cap as required for testing; plugs, caps suitable for permanent service.
- B. Plug or cap or otherwise cover all piping work in progress.

#### 2.04 MISCELLANEOUS ADAPTORS

- A. Between different types of pipe and/or fittings special adapters may be required to provide proper connection. Some of these may be indicated on the Drawings or specified with individual types of pipe or equipment. However, it is the CONTRACTOR's responsibility to ensure proper connection between various types of pipe, to structures and between pipe and valves, gates, fittings, and other appurtenances. Provide all adapters as required, whether specifically noted or not.
- B. As required, these adapters shall be suitable for direct bury, with proper dielectric insulation and as a minimum, if metallic (not stainless steel or galvanized), with two coats of coal tar epoxy.

#### 2.05 VENTS AND DRAINS

- A. 1/2-inch vents shall be provided at the high point in each system. Vent connections may be tapped, provided the tap will accept three full threads on the bronze nipple.
- B. 1-1/2-inch drains shall be provided to permit drainage of each system located on the invert of the blind flange; provide hose-end valve.

#### 2.06 LINE STRAINERS

- A. "Y" Type Strainers
  - 1. Manual strainers furnished for pipe diameters smaller than 2-inch shall be "Y"

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type, capable of removing solids 0.01-inch in diameter and larger. The strainer body shall be of semi-steel construction for steel pipe and brass or bronze for copper pipe and shall conform to the latest revision of ASTM A278, Class 30. Strainer elements, including woven wire mesh, shall be constructed of stainless steel.

2. The design of the strainer body shall be such that the cleanout plug and screen may be easily removed to permit inspection and cleaning without disassembly of the inlet and outlet piping. End connections shall be ANSI screwed pipe threads.
3. Sufficient spare screen shall be furnished for replacement of all "Y" type units at least once. The strainers shall be designed for a maximum operating pressure of 150 psig. They shall be as manufactured by GA Industries Inc., Pittsburg, PA or equal.

#### 2.07 SERVICE CLAMPS

- A. Service clamps for outlet sizes up to 2-inch shall have malleable or ductile iron bodies which extend at least 160 degrees around the circumference of the pipe and shall have neoprene gaskets cemented to the saddle body. Bodies shall be tapped for IPS. Clamps shall be of the double strap design. Service clamps shall be Style 91 by Dresser Industries, Inc.; Smith Blair; Mueller or equal.
- B. Service clamps for outlet sizes 4-inch through 12-inch where the outlet size is not greater than half the size of the main pipe shall have ductile iron bodies and a neoprene circular cross section O-ring gasket confined within the body. Outlet shall be AWWA C 110 flange or AWWA C 111 mechanical joint as required for the application. Straps shall be alloy steel, minimum 1/4-inch by 1-1/2-inch in cross section and fabricated with 3/4-inch threaded ends. Service clamps shall be Fig. A-10920 or A-30920 by American Cast Iron Pipe Company or equal.

#### 2.08 SERVICE SADDLES

- A. Service saddle for outlet sizes up to 2-inch shall be dual band, anchored by a minimum of four bolt pattern on a fused epoxy coated ductile iron saddle body. Service saddles shall have BUNA-N rubber gaskets cemented to the saddle body and shall utilize the wide stainless steel band sized exactly to the pipe outside diameter. Bodies shall be tapped for IPS. All hardware shall be 316 stainless steel. Service saddles shall be manufacturer by Ford or Smith Blair.
- B. Tapping sleeves shall be provided for outlets larger than 2-inches and shall meet the standard specifications as listed in Section 3.10.2 of SJCUD Standards Manual.

#### 2.09 FLOOR DRAINS

- A. Floor drains shall have 8-inch square, vertically adjustable, medium duty, Type 304 stainless steel top strainers and Type 316 stainless steel bodies with an anchor flange.

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- B. Floor drains shall have caulked outlet connections for compatible with the type of pipe indicated on the Drawings.
- C. Floor drains shall be by Zurn model ZM-1727 or equal.

#### 2.10 QUICK CONNECT COUPLINGS

- A. Couplings shall be of the cam and groove type consisting of a male adapter conforming to MIL-C-27487. Male adapters shall be designed to receive a female coupler without requiring threading, bolting, or tools. Connections shall remain tight and leakproof under pressures up to 100 psig. Each adapter shall be furnished with a dust cap complete with an 18-inch long security chain of corrosion resistant material. Couplings shall be by Civacon, a Division of Dover Corporation; Ever-tite or equal. Units shall be "drip proof", providing totally dry connections and dis-connections.
- B. Adapters shall be furnished in accordance with the Drawings, or as required by the installation.

#### 2.11 MECHANICAL LINK SLEEVE SEALS

- A. Mechanical sleeve seals shall be used to secure and seal the annular space around all new sleeved and core-drilled wall penetrations.
- B. A single seal shall be provided for all sleeve and cores in walls up to 14-inch thick; dual sleeves shall be provided in larger walls or as shown on the Drawings.
- C. Galvanized steel wall sleeves and concrete core diameter shall be sized sufficiently larger to accommodate the modular elements, per the manufacturer's recommendations.
- D. Bolts and hardware shall be carbon steel, zinc-plated. Pressure plates shall be corrosion-resistant acetal resin.
- E. Mechanical link sleeve seals shall consist of modular bolted, synthetic rubber sealing elements, Link Seal by Thunderline Corp. or equal.

#### 2.12 FLEXIBLE CONNECTORS

- A. Sleeve Couplings
  1. Provide plain end type ends to be joined by sleeve couplings as stipulated in AWWA C219.
    - a. Join welds on ends by couplings without pipe stops. Grind flush to permit slipping coupling in at least one direction to clear pipe joint.
    - b. Outside diameter and out-of-round tolerances shall be within limits specified by coupling manufacturer.
    - c. Provide lugs in accordance with ASTM A36.
    - d. Provide hardened steel washers in accordance with ASTM A325.
    - e. Plastic plugs shall be fitted in coupling to protect bolt holes.
    - f. Nuts and bolts

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- 1) Provide type 316 stainless steel bolts and bolt-studs in accordance with ASTM A193 Grade 88M and ANSI 818.2 with hexagonal or square heads, coarse thread fit, threaded full length with ends chamfered or rounded.
  - 2) Project ends 1/4-inch beyond surface of nuts.
  - 3) Hexagonal type 316 stainless steel nuts (ASTM A193 Grade B8M) with dimensions in accordance with ANSI B 18.2 and coarse threads in accordance with ANSI B 1.1.
2. Middle ring of each mechanical coupling shall have a thickness at least equal to that specified for size of pipe on which coupling is to be used and shall not be less than 10-inch long for pipe 30-inch and larger and not less than 7-inch long for pipe under 30-inch in diameter.
    - a. Omit pipe stop from inner surface of middle rings of couplings whenever necessary to permit removal of valves, flowmeters and other installed equipment.
    - b. Provide pipe stops in other couplings.
  3. Clean and shop prime with manufacturer's standard rust inhibitive primer.
  4. Furnish gaskets of a composition suitable for exposure to the fluid service.
  5. Where shown on the Drawings, anchor sleeve-coupled joints with harness bolts. Weld harness lugs to steel pipe.
    - a. Joint harness bolts shall be of sufficient length, with harness lugs placed so that coupling can be slipped at least in one direction to clear joint. Provide harnesses of sufficient number and strength to withstand test pressure as recommended in AWWA M-11.
    - b. Each harness shall have a minimum of two 5/8-inch diameter bolts.
  6. Unless otherwise specified with the individual type of pipe, sleeve couplings (mechanical couplings) shall be Victaulic Depend-O-Lok ExE (unrestrained) or FxF (self-restrained); ITT (formerly Smith Blair) Style 411; Dresser Style 38, similar models by Baker or equal, with the pipe stop removed.
  7. Similar insulation type couplings shall be provided at the face of buildings, between different type metals or where otherwise noted.
  8. In addition to those locations noted on the Drawings, sleeve couplings shall be provided on all piping where it connects with a structure or buried directly under a structure at the structure's expansion joints. Special treatment will be required where pipe is encased in concrete, utilizing minimum 3-inch thick Styrofoam placed perpendicular to the horizontal centerline of the coupling.
- B. Split or Grooved Couplings
1. Split couplings shall be cast in two or more parts. When secured together with ASTM A183 bolts and nuts, couplings shall engage grooved or shouldered pipe ends and encase an elastomeric gasket to create a pipe seal. Gasket material shall be as recommended by the manufacturer for the service required.
  2. Split couplings shall be as manufactured by Victaulic Company of America or equal. Numbers below refer to Victaulic Co. items, for reference only.
  3. Unless otherwise specified with the individual type of pipe:
    - a. Flexible split ring couplings shall be:
      - 1) Grooved ends - Style 77 (for steel/stainless steel) or Style 31 (for grooved ductile iron)

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- 2) Shouldered ends - Victaulic Style 44 or Fluid Master
  - 3) Fixed ends - Victaulic Depend-O-Lok, FxF (fixed by fixed)
  - b. Rigid split ring couplings shall be:
    - 1) Grooved ends - rigid groove with Style 31 couplings on ductile iron 36-inch and smaller diameter with sufficient wall thickness per AWWA C606, or manufacturer's recommendation, or standard groove with Style 07 Zero-Flex coupling on manufactured steel or JPS pipe.
    - 2) Shouldered ends - Style 44 coupling on ductile iron over 36-inch diameter or without sufficient wall thickness per AWWA C606 or on manufactured steel pipe or thin wall stainless steel pipe. Field welding of shoulders of ductile iron pipe is specifically prohibited.
  4. Ductile iron pipe for use with split-type coupling joints shall have radius grooved ends conforming to AWWA C606. Pipe shall have grooved ends to provide either a rigid joint or flexible joint as shown on the Drawings and as specified herein. Flexible joint grooving shall permit expansion and contraction, and angular deflection. Rigid joint grooving shall allow no angular or linear movement. Minimum pipe wall thickness for grooved pipe shall be class 53.
  5. Grooved couplings for steel and stainless steel piping shall have roll grooving, machine-grooving, or ring collars fully welded to the pipe or fitting.
  6. Rigid split couplings may be substituted for flanges as noted on the Drawings and in the individual pipe requirements.
  7. Certain minimum thickness of pipe walls are required by AWWA C606 and coupling manufacturers for use of various type split couplings with certain pipes. Utilize at least those minimum wall thicknesses required (unless a greater thickness is specified or required in the individual pipe specifications) with split couplings.
  8. If minimum thicknesses are not utilized with grooving, then a shouldered end treatment with couplings as noted shall be utilized.
- C. Flexible Connectors
1. The CONTRACTOR shall install flexible connectors on the discharge of each turbo blower as indicated on the contract drawings or as required to accommodate any thermal expansion, contraction, or seismic movement of the piping system. The connectors shall be mechanically restrained to prevent uncoupling of the connector to the piping system. The connectors and restraints shall allow for lateral movement of the discharge piping of each blower prior to connection to the discharge header. The restraining rods and nuts shall not be fully tightened to allow for lateral movement. Coordinate installation with ENGINEER.
  2. The CONTRACTOR shall install per manufacturers' installation instructions and Mechanical Contractors Association of America "Guidelines for Quality Piping Installation."
  3. Flexible hose connectors shall be capable of compensating for lateral movement and vibration.
  4. Flexible hose connectors shall be manufactured complete with section of corrugated metal hose, compatible braid, with inlet and outlet connections as required and shall have a maximum pressure of 150 psi at 70°F.
  5. Flexible hose connectors shall be rated for temperatures up to 300 degrees F.



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6. Flexible hose connectors shall be of 321 SS hose with 304 SS braid and 150 lb carbon steel plate flanges. The flexible hose connectors shall be manufactured by The Metraflex Company®, Chicago, IL or an approved equal.

#### 2.13 EXPANSION JOINTS

##### A. Expansion Couplings

1. Bolted split sleeve type couplings to allow for thermal expansion and contraction at the pipe joints shall consist of one piece housing, gasket assembly, bolts and nuts, and end rings to hold the coupling in the proper location.
2. Couplings shall be manufactured from ASTM A240 type 316 stainless steel material for use on stainless steel pipe. Couplings for use on carbon steel or ductile iron pipe shall be manufactured from ASTM A36 material. Gaskets shall be of a composition suitable for exposure to the fluid or air service.
3. Stainless steel couplings shall be passivated after all welding is completed.
4. End rings of the same material as the coupling housing shall be welded to the plain end of the pipe ends that form the joint per the coupling manufacturer's recommendations to hold the coupling in the proper location.
5. The expansion joints shall be designed for the axial movements shown on the Drawings along with the maximum axial force required to compress the joint. The joints shall prevent axial, lateral and rotational movement and vibration from being transmitted to the piping and equipment and shall be suitable for 50 psig operating pressure unless otherwise indicated.
6. Expansion couplings for expansion joints for plain end pipe shall be Depend-O-Lok FxE by Victaulic Depend-O-Lok, equal by Red Valve Company, or equal.

##### B. Rubber-filled Arch Type

1. The expansion joints for the air service shall be of the rubber spool type, double-arch, soft rubber filled, steel reinforced expansion joint suitable for 225 degrees F continuous service, unless otherwise indicated. Expansion joints for liquid service shall be rated for 150 degrees F continuous service and shall be of the single-arch type.
2. All expansion joints shall be rated for outside service with no degradation due to sunlight or UV radiation. The rubber used shall be EPDM, including three-ply abrasion resistant liner.
3. Provide type 316 stainless steel retaining rings to mate with adjacent pipe flanges.
4. The expansion joints shall be designed for the axial movements shown on the Drawings along with the maximum axial force required to compress the joint. The joints shall prevent axial, lateral and rotational movement and vibration from being transmitted to the piping and equipment.
5. All expansion joints shall be restrained and yoked in manner to provide transmission of tension loading to which expansion joint may be subjected during system operation. Compressive or lateral movement of expansion joint shall not be impaired by yoking system. Details of expansion joint yoking shall be submitted to ENGINEER for approval.
  - a. The expansion joint shall be restrained to 100 psi. The manufacturer

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shall provide the required size and number of rods to restrain to this pressure.

- b. Restraining rods shall be tightened to prevent joint expansion after installation.
  6. Provide guides for each expansion joint.
  7. Manufacturers:
    - a. Mercer Rubber Company
    - b. U.S. Rubber Supply Company, USA
    - c. ENGINEER approved equal
- C. Bellows Style
1. Expansion joints shall be hydraulically formed (with dies on the outside only) and having only longitudinal seam welds. These seams shall have the same strength, physical properties, and thickness as the parent metal without grinding. Expansion joints, bellow, and internal sleeves shall be made of Type 316 stainless steel with stainless steel flanges at each end. The entire inside length of the expansion joint shall be straight. Manufacturer to provide lifting lugs at each flange for ease in handling and removal sheet metal coverage for any expansion joint.
  2. Expansion joints shall be designed to prevent rotational movement and vibration from being transmitted to the piping and equipment and shall be suitable for 25 psig operation pressure unless otherwise specified.
  3. Expansion joints shall be suitable for continuous operating temperature range of 200 to 300 degrees F.
  4. Hinged or Gimbal expansion joints shall be used at horizontal and vertical bends in strict accordance with the standards of the EJMA, Inc.
  5. Drilling and facing of flanges shall match or be suitable for use with equipment or companion flanges.
  6. Guides shall be furnished with all bellows style expansion joints.
  7. Manufacturer shall warrant this product to be suitable for the proposed conditions and shall furnish drawings for approval giving materials of construction, including gauge of corrugated element, maximum test pressure force to compress joint, bellows spring rate, shear force and end moment due to calculated traverse only. Manufacturer shall also furnish evidence of completing cycle life testing for the maximum diameter to be installed and shall indicate such assured cycle life test results on material submitted for approval.

#### 2.14 HARNESSING AND RESTRAINT

- A. Where harnessed couplings or adapters are noted, they shall conform to AWWA Manual M 11 except as modified by the Drawings or this Section.
- B. Unless otherwise noted, size and material for tie rods, clamps, plates and hex nuts shall be as shown on the Drawings, or, if not shown on the Drawings, shall be as required in AWWA Manual M 11. Manufactured restraining clamp assemblies shall be as manufactured by Stellar Corporation, Columbus, OH, or equal.
- C. Restrained joints (such as welded, locking mechanical joints) shall be of the type specified with the individual type of pipe. If not specified, restrained (locking)

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mechanical joint pipe shall be of the manufacturer's standard design utilizing a locking device (ring or ears) integrally cast with the pipe.

- D. For up through 18-inch diameter ductile iron pipe only, the following may be used as an alternative to other restraint system:
  - 1. The optional mechanical joint restraints shall be incorporated in the design of a follower gland. The gland shall be manufactured of ductile iron conforming to ASTM A536. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell and tee-head bolts as specified with the pipe.
  - 2. The restraint mechanism shall consist of numerous individually activated gripping surfaces to maximize restraint capability. The gripping surfaces shall be wedges designed to spread the bearing surfaces on the pipe. Twist-off nuts, sized same as tee-head bolts, shall be used to ensure proper actuating of restraining devices. When the nut is sheared off, standard hex nut shall remain.
  - 3. The mechanical joint restraint device for ductile iron pipe shall have a working pressure of at least 250 psi with a minimum safety factor of 2: 1.
  - 4. The mechanical joint restraint devices shall be of the type listed below or equal.
  - 5. For Ductile Iron Pipe: EBAA Iron, Inc. Megalug 1100 series.
- E. The CONTRACTOR shall be responsible for anchorage including restraint as noted elsewhere in Division 15.

#### 2.15 HARNESSED FLANGE ADAPTER COUPLINGS (HFAC)

- A. HFACs are not shown on the Drawings. Consideration will be made for the addition of HFACs for constructability purposes. CONTRACTOR shall submit the location, type, and quantity to the ENGINEER for review and approval prior to adding any HFAC.
- B. HFACs shall meet the standard specification as listed in Section 3.7.4 of the SJCUD Standards Manual.
- C. HFACs shall be type 2100 MEGAFLANGE® by EBAA Iron Industries or ENGINEER approved equal. Materials which will be in contact with the potable water shall contain no lead components and shall be NSF 61 certified.
- D. Provide joints meeting the requirements of AWWA C.219 as applicable and with tie rods as shown on the drawings and called out as HFAC. All connecting hardware shall be type 304 stainless steel. The spigots and flange adapters shall be ductile iron or steel meeting ASTM A283 Grade C, and shall be provided with a shop-coat primer compatible with the field applied coating specified. The joints shall be a complete assembly consisting of a spigot piece, flange adapter, tie rods and gaskets. The tie rod restraint system shall be capable of withstanding the full pressure thrust that the pipe system can develop at no more than 50% of the yield strength of the tie rod material. The design pressure rating of the joints shall be equal to or greater than the mating flanges. Dismantling joints shall be type FCG by Romac Industries or ENGINEER approved equal.

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#### 2.16 RESTRAINED DISMANTLING JOINTS

- A. The tie rod restraint system shall be capable of withstanding the full pressure thrust that the pipe system can develop at no more than 50 percent of the yield strength of the tie rod material. The design pressure rating of the dismantling joints shall be equal to or greater than the mating flanges or 175 psi, whichever is greater. Dismantling joints shall be type DJ 400 Dismantling Joints by Romac Industries, Dismantling Joints by Viking Johnson, Style 131 Dismantling Joints by Dresser Industries, or ENGINEER approved equal.
- B. The flanged spool shall be constructed with an AWWA C207 Class D Steel Ring Flange and compatible with ANSI Class 125 and 150 bolt circles. Pipe shall be STD Weight Class per ASTM A53.
- C. The end ring and body shall be made from ASTM A536 65-45-12 Ductile Iron.
- D. Gaskets used for potable water systems should be meet the requirements of ASTM D 2000, be fusion bonded epoxy, and NSF 61 certified. All surfaces shall be coated, including flange faces.
- E. Bolts, nuts, tie rods, and all other hardware shall be 316 stainless steel.

#### 2.17 APPURTENANCES AND MISCELLANEOUS ITEMS

- A. All gaskets, glands, bolts, nuts, and other required hardware shall be provided for connection of piping and appurtenances. Bolts and nuts for all above ground piping shall be high strength, Type 316 stainless steel. All buried lugs, rods, brackets, bolts and nuts shall be low alloy steel in accordance with ANSI C111 and shall be given one (1) coat of Koppers #50 coal tar epoxy coating.
- B. All gaskets for flanges shall be full face and suitable for 150 degrees F operating temperature, and the fluids carried and 300 degrees F for air services.
- C. Plugs, caps and similar accessories shall be of the same material as the pipe and of the locking type, unless otherwise noted.
- D. Unions shall be of the same material as the pipe, except for dielectric connections.
- E. Special protective tape shall be fabric reinforced petroleum tape by Denso Inc., Houston, TX or equal.

#### 2.18 HOSE END VALVES

- A. Hose end valves shall be globe pattern valves, similar to Fairbanks Fig. 074; Jenkins Fig. 112 or equal. Furnish cap and chain.

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#### PART 3 - EXECUTION

##### 3.01 GENERAL

- A. All dirt, scale, weld splatter, water and other foreign matter shall be removed from the inside and outside of all pipe and sub-assemblies prior to installing.
- B. All pipe joints and connections to equipment shall be made in such a manner as to produce a minimum of strain at the joint.
- C. Install piping in a neat manner with lines straight and parallel or at right angles to walls or column lines and with risers plumb. Run piping to avoid passing through ductwork or directly under electric light outlets, and/or interference with other lines or extending beyond furring lines as determined by Architectural Drawings. All work shall be accomplished using recognized methods and procedures of pipe fabrication and in accordance with the latest revision of applicable ANSI Standards, ASME Codes and Pipe Fabrication Institute Standards.
  - 1. Use full length of pipe except where cut lengths are necessary. Do not spring or deform piping to make up joints.
  - 2. Pipe shall be cut square, not upset, undersize or out of round. Ends shall be carefully reamed and cleaned before being installed. Bending of pipe is not permitted. Use fittings for all changes in direction.
  - 3. Do not use bushings except where specifically approved by the ENGINEER. Reducers shall be eccentric to provide for drainage from all liquid-bearing lines and facilitate air removal from water lines.
  - 4. Verify the locations and elevations of any existing piping and manholes before proceeding with work on any system. Any discrepancies between the information shown on the Drawings and the actual conditions found in the field shall be reported at once to the ENGINEER. No claim for extra payment will be considered if the above provision has not been complied with.
  - 5. Where lines of lower service rating tie into services or equipment of higher service rating the isolation valve between the two shall conform to the higher rating.
  - 6. Mitering of pipe to form elbow is not permitted.
  - 7. All piping interiors shall be thoroughly cleaned after installation and kept clean by approved temporary closures on all openings until the system is put in service. Open pipe ends shall be subjected to recleaning and retesting.
  - 8. End caps on pre-cleaned pipe shall not be removed until immediately before assembly. All open ends shall be capped immediately after completion of installation.
  - 9. Provide temporary strainers within the piping ahead of every piece of equipment. The strainers shall be cleaned and reinserted immediately before start-up. The strainers shall be kept in service until at least 7 days after the equipment has been put in service.

## SECTION 15120

### PIPING SPECIALTIES

#### D. Test Connections

1. Provide 1/2-inch female NPT test connection equipped with 1/2-inch brass plug on all pump suction and discharge lines. Where indicated on the Drawings, test connections should be equipped with bar stock valve and gauge. Provide test connections at all steam traps. The connection shall be located on the discharge side of the trap between the trap and the first valve. It shall consist of a 1/2-inch branch connection terminated with a gate valve.

#### E. Installation of Expansion Joints and Flexible Connectors

1. Piping systems shall be aligned prior to installation of expansion fittings. Alignment shall be provided by fitting a rigid pipe spool in place of the expansion joint. Prior to testing of the piping system, the pipe spool shall be replaced with the specified expansion or flexible fitting.
2. In addition to the locations noted on the Drawings and in PART 2, expansion fittings and anchors shall be located and spaced as specified by the Expansion Joint Manufacturer's Association. The expansion joints/flexible connectors shall not be installed during times of temperature extreme or in a fully compressed or fully expanded condition.

#### F. Installation of Sleeve Couplings

1. Unless otherwise required by the manufacturer's instructions, prior to installation of sleeve couplings, the pipe ends shall be cleaned thoroughly for a distance of at least 12-inch. Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to a distance of about 6-inch from the end, the middle ring shall be placed on the already installed pipe and shall be inserted into the middle ring flange and brought to proper position in relation to the pipe already installed. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flanges.
2. After the bolts have been inserted and all nuts have been made up fingertight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, preferably by use of a torque wrench of the appropriate size and torque for the bolts.
3. The correct torque as indicated by a torque wrench shall not exceed 75 ft-lb for 5/8-inch bolts and 90 ft-lb for 3/4-inch bolts.
4. If a wrench other than a torque wrench is used, it should be no longer than 12-inch so that when used by the average person the above torque values shall not be exceeded.
5. To prevent sleeve couplings from pulling apart under pressure, a suitable harnessing or flange clamp assembly shall be provided and installed where shown on the Drawings, directed by the ENGINEER or required elsewhere under Division 15 concerning anchorage.
6. Note the additional locations required for sleeve couplings in PART 2. Also note CONTRACTOR's responsibility for locating, providing and installing restraints.

#### G. Installation of Split Couplings

1. Prior to assembly of split couplings, grooves or shoulders of the pipe as well as other parts shall be thoroughly cleaned. The ends of the pipes and outside of the gaskets shall be moderately coated with manufacturer's recommended

## SECTION 15120

### PIPING SPECIALTIES

lubricant, petroleum jelly, cup grease, soft soap, or graphite paste and the gasket shall be slipped over one pipe end. Lubricant shall be compatible with potable water application. After the other pipe has been brought to the correct position, the gasket shall be centered properly over the pipe ends with the lips against the pipes. The housing sections then shall be placed.

2. Ensure that the joints are fully extended after the rings are in place and prior to tightening the bolts. After the bolts have been inserted, the nuts shall be tightened until the housing sections are firmly in contact, as required by the manufacturer, without excessive bolt tension or strain on the pipe.
- H. Installation of Pipeline Appurtenances
1. All pipeline appurtenances shall be installed as required and in accordance with the manufacturer's recommendations, as acceptable to the ENGINEER.
  2. Gauges, meters and similar in-line items shall be isolated from testing pressures in excess of the rated pressure of the assembly.
  3. Use Teflon tape on all screwed fittings.
- I. Installation of Unions
1. Use unions to allow dismantling of pipe, valves, and equipment.
- J. Welding
1. Welding shall be in accordance with ANSI 831 and A WS 83.0.
  2. Install welding fittings on all welded lines. Make changes in direction and intersection of lines with welding fittings. Do not miter pipes to form elbows or notch straight runs to form tees, or any similar construction. Do not employ welder who has not been fully qualified in above specified procedure and so certified by approved welding bureau or similar locally recognized testing authority.
- K. Installation of Flanged Joints
1. Make flanged joints with bolts; bolt studs with nut on each end; or studs with nuts where one flange is tapped. Use number and size of bolts conforming to same ANSI Standard as flanges. Before flanges pieces are assembled, remove rust resistant coating from machined surfaces, clean gaskets and smooth all burrs and other defects. Make up flanged joints tight, care being taken to prevent undue strain upon valves or other pieces of equipment.

### 3.02 TESTING

- A. Test all pipelines for water/gas tightness as specified in the piping or system sections. Furnish all labor, testing plugs or caps, pressure pumps, pipe connections, gauges and all other equipment required. Testing shall be performed in accordance with one or more of the testing procedures appended to this Section as specified in each piping or system sections. All testing shall be performed in the presence of the ENGINEER.
- B. Repair faulty joints or remove defective pipe and fittings and replace as approved by the ENGINEER and retest.

SECTION 15120  
PIPING SPECIALTIES

END OF SECTION 15120



## SECTION 15141

### DISINFECTION

#### PART 1 – GENERAL

##### 1.01 SECTION INCLUDES

- A. Disinfection of all pipelines, conduits, pumps, tanks, structures, and equipment which are to store, handle or carry potable water. All labor, chlorine and equipment, including taps, corporation stops, temporary pumps, hoses, miscellaneous piping and other items necessary to perform the work, shall be furnished and installed by the CONTRACTOR/TANK CONTRACTOR, and removed after completion of the disinfection procedure.

##### 1.02 REFERENCES

- A. AWWA C651- Disinfecting Water Mains
- B. AWWA C652- Disinfection of Water-Storage Facilities
- C. Florida Building Code, Plumbing (Latest Edition)

##### 1.03 QUALITY ASSURANCE

- A. Disinfection shall be in accordance with AWWA C651 for water mains and AWWA C652 for water storage facilities and equipment, except as modified herein. Disinfection procedures for new water mains and water storage facilities shall also conform to the requirements of the International Plumbing Code, Section 610 “Disinfection of Potable Water System” except as modified herein.

#### PART 2 – PRODUCTS

(NOT USED)

#### PART 3 – EXECUTION

##### 3.01 PIPELINES

- A. Pumps, hydrants, and other water handling equipment items that are part of the potable water distribution system shall be disinfected in the same manner as described herein for the pipelines.
- B. Pipelines shall first be flushed with clean water. Disinfection shall be accomplished by the Continuous Feed Method, as specified in AWWA C651, using sodium hypochlorite solution.
- C. Water-chlorine solution with a concentration not less than 50 mg/l of available chlorine shall then be added at one end of the section being disinfected and discharged at the far end. The water-chlorine solution shall be added until the water coming from each downstream blowoff has a residual of not less than 25 mg/l of chlorine.

## SECTION 15141

### DISINFECTION

- D. The pipelines shall then be closed and the solution allowed to remain in the lines for at least 24 hours. The chlorine residual in the pipeline shall then be rechecked. If the free chlorine residual is less than 10 mg/l after 24 hours, the procedure shall be repeated until the free chlorine residual after 24 hours is 10 mg/l or greater.
- E. After the 24-hour holding period, the pipelines and equipment shall be thoroughly flushed and filled with clean water. Flushing water shall not be permitted to enter existing water mains.
- F. Flushing water shall not be discharged to sanitary or storm sewers without permission of local authority. Where necessary, Federal, State and local regulatory agencies shall be contacted to determine special provisions for the disposal of heavily chlorinated water.
- G. When new potable water pipelines are to be connected to an existing water distribution system, the connecting piping shall be disinfected and tested in accordance with the procedure set forth in Section 9.1 or Section 9.2, as applicable, of AWWA C651.

#### 3.02 WATER SUPPLY

- A. The CONTRACTOR/TANK CONTRACTOR shall provide all necessary apparatus to convey the water to the point of use and perform the disinfection procedure.

#### 3.03 VERIFICATION OF DISINFECTION

- A. After the completion of disinfection, bacteriological samples shall be taken by the CONTRACTOR/TANK CONTRACTOR and tested at a certified laboratory. Samples shall be taken as required by the FDEP. The test reports shall be submitted to the ENGINEER for review and approval. If the samples are not satisfactory, the entire disinfection procedure shall be repeated at the expense of the CONTRACTOR/TANK CONTRACTOR until satisfactory samples are obtained.

END OF SECTION 15141

# Appendix A

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## Geotechnical Report

**Draft Report of Geotechnical Exploration**  
For

**SJCUD – CR 208 Ground Storage Tank and Booster pump Station**

**MAE Project No. 0103-0026**  
**July 15, 2022**

**Prepared for:**

**M**  
**M**  
**MOTT**  
**MACDONALD**



**Prepared by:**



3728 Philips Highway, Suite 208  
Jacksonville, Florida 32207  
Phone (904) 519-6990  
Fax (904) 519-6992

July 15, 2022



Ms. Lindsey Tracey, P.E.  
Mott MacDonald Florida, LLC  
10245 Centurion Parkway North, Suite 320  
Jacksonville, Florida 32256

Subject: Draft Report of Geotechnical Exploration  
SJCUD – CR 208 Ground Storage Tank and Booster Pump Station  
St. Johns County, Florida  
MAE Project No. 0103-0026

Dear Ms. Tracey:

**Meskel & Associates Engineering, PLLC (MAE)** has completed a geotechnical exploration for the subject project. Our work was performed in general accordance with our revised proposal dated November 19, 2020. The geotechnical exploration was performed to evaluate the general subsurface conditions within the area of the planned Potable Water Storage and Booster Pump facility, and to provide recommendations for foundation design and site preparation for the proposed construction. This report is an update to the original report sent on May 28, 2021, to include the findings and recommendations for the proposed pipeline.

As further discussed in this report, the borings generally encountered a surficial topsoil layer 3 to 6 inches thick, underlain by loose to very dense fine sands and fine sands with silt (A-3, A-2-4, SP, SP-SM, SM) to a depth of approximately 55 feet below existing grade. Below these sands were loose to medium dense, fine sands with silt (SP-SM) and silty fine sands (SM) to the top of the regional limestone stratum beginning at a depth of about 88 feet below existing grade. Gravelly silty sands (SM), layers of hard limestone and Marl (silty sands, sandy silts) were encountered within the limestone stratum to the boring termination depth of 125 feet at boring location B-4. Groundwater was encountered at all boring locations and measured at depths ranging from approximately 2 inches to 1.5 feet below existing grade in April 2021 and at depths ranging from approximately 5 feet to 7.5 feet below existing grade in June 2022.

Based on our field exploration and laboratory testing, it is our opinion that the site is adaptable to support the planned structures on conventional shallow foundation systems.

We appreciate this opportunity to be of service as your geotechnical consultant on this phase of the project. If you have any questions, or if we may be of any further service, please contact us.

Sincerely,

**MESKEL & ASSOCIATES ENGINEERING, PLLC**

**DRAFT**

---

G. Clayton Purvis, EI  
Staff Engineer

---

P. Rodney Mank, PE  
Principal Engineer

Distribution: Lindsey Tracey, P.E. – Mott MacDonald Florida, LLC

1 pdf

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- Appendix A. Soil Boring Logs
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  - Key to Boring Logs
  - Key to Soil Classification
- Appendix B. Summary of Laboratory Index Test Results
  - Laboratory Test Procedures
  - Particle Size Distribution Reports
- Appendix C. Summary of Corrosion Series Test Results

## 1.0 PROJECT INFORMATION

### 1.1 General

Project information was provided to us by Ms. Lindsey Tracey, P.E. Mr. Chad Liner P.E., and Ms. Leslie Samel P.E., with Mott MacDonald Florida, LLC (MM) via several emails and telephone conversations. For our review and reference, we were provided with several CADD drawings of the proposed site and the requested boring locations, and a pdf copy of a Yard Piping Plan, prepared by MM, dated May 2021, which shows the locations of the requested borings along with tabulated Northing and Easting values and requested depths for each boring location. We were provided a PDF titled Figure 1 – Water Main Route and subsequent CADD design files on June 29, 2022, which show the alignment of the proposed water main as well as the requested said boring locations. Lastly, updated design details for the proposed Ground Storage Tank (GST) were provided during a meeting on June 28, 2022.

### 1.2 Project Description

The site for the subject project is an approximate 1.5-acre, undeveloped parcel located on the west side of Agriculture Center Drive, approximately 970 feet south of County Road 208 in St. Johns County, Florida. The general site location is shown on Figure 1.

Based on the provided information and our discussions with Ms. Tracey, it is our understanding the proposed project includes the construction of a 2.7 million gallon (MG) prestressed concrete GST with an approximate diameter of 142 feet, a booster pump station, mechanical/electrical building, emergency generator, entrance road and parking area, and a stormwater treatment pond. A 12-inch diameter ductile iron water main (WM), approximately 1,100 feet in length, and a 20-inch diameter PVC Reclaimed Water Main, approximately 1,200 feet in length, will be constructed within the same easement west of the proposed stormwater pond and running north to intersect CR 208.

If the project design details change from those described above, then the recommendations in this report may need to be re-evaluated. Any changes in these conditions should be provided so the need for re-evaluation of our recommendations can be assessed prior to final design.

## 2.0 FIELD EXPLORATION

Our initial field exploration was performed during the period of April 15 through April 29, 2021. Northing and Easting coordinates were provided by MM for each boring location. These coordinates were converted into Latitude and Longitude coordinates, and a MAE field representative located each boring using a Garmin GPSMAP 78 hand-held receiver. Each location was then marked for reference, and a utility locate request was submitted to the Sunshine State One-Call Center (SSOC). Once the site utilities were cleared, our field crew mobilized to the site. A copy of the provided Yard Piping Plan, which shows the current layout of the proposed structures and the approximate boring locations, is included as the *Boring Location Plan*, Figure 2.

A second exploration was performed on June 24, 2022, and July 12, 2022, for the proposed water main and reclaimed water main alignment. CADD design files showing the alignment and requested boring locations were provided to us by Ms. Tracey. The CADD files were then exported into a .kmz file and placed within google earth then uploaded into a Garmin GPSMAP 78 hand-held receiver. The boring locations as shown on Figures 2A and 2B should be considered accurate only to the degree implied by the method of layout used.

### 2.1 Hand Auger and Standard Penetration Test Borings

To initially measure the groundwater levels across the site, we located and performed 3 auger borings,



advanced to depths of approximately 4 feet below the existing ground surface using a handheld bucket auger in general accordance with the methodology outlined in ASTM D 1452. Representative soil samples were recovered from the auger borings and returned to our laboratory for classification.

To explore the subsurface conditions within the area of the proposed construction on the Pump Station site, we located and performed 11 Standard Penetration Test (SPT) borings, drilled to depths of approximately 6, 20, 60, and 125 feet below the existing ground surface, in general accordance with the methodology outlined in ASTM D 1586. Split-spoon soil samples recovered during performance of the borings were visually described in the field and representative portions of the samples were transported to our laboratory for testing and classification.

To explore the subsurface conditions along the planned route of the watermain and reclaimed water main pipelines, we located and performed 3 auger borings, advanced to depths of approximately 6 feet below the existing ground surface using a handheld bucket auger in general accordance with the methodology outlined in ASTM D 1452. We also located and performed one Standard Penetration Test (SPT) boring, drilled to a depth of approximately 10 feet below the existing ground surface, in general accordance with the methodology outlined in ASTM D 1586. Split-spoon soil samples recovered during performance of the boring were visually described in the field and representative portions of the samples were transported to our laboratory for testing and classification.

A summary of the field procedures is included in Appendix A.

## 3.0 LABORATORY TESTING

### 3.1 Laboratory Index Testing

Representative soil samples obtained during our field exploration were visually classified by a geotechnical engineer. The soil samples obtained within the areas of the planned structures were classified using the Unified Soil Classification System (USCS) in general accordance with ASTM 2487. The soil samples obtained within the areas of the planned roadway, pipelines, and pond were classified using the AASHTO Soil Classification System in general accordance with ASTM D 3282. Keys to both soil classification systems are included in Appendix A.

Quantitative laboratory testing was performed on selected samples of the soils encountered during the field exploration to better define the composition of the soils encountered and to provide data for correlation to their anticipated strength and compressibility characteristics. The laboratory testing determined the percent passing a U.S. No. 200 standard sieve (percent fines), and the natural moisture and organic contents of selected soil samples. In addition, full sieve analyses (gradation) tests were performed on samples obtained from a depth of 78.5 to 85 feet at the center of the planned GST location. The results of the laboratory testing are shown in the *Summary of Laboratory Index Test Results* table included in Appendix B. Also, these results are shown on the *Generalized Soil Profiles* sheets, Figures 3 through 10, and on the Soil Boring Logs at the respective depths from which the tested samples were recovered. Soil gradation curves are presented as the *Particle Size Distribution Reports* in Appendix B. A summary of the laboratory test procedures is also included in Appendix B.

### 3.2 Corrosion Series Test

A bulk soil sample was collected for corrosion property testing adjacent to tank center boring location B-4 between depths of 2 to 4 feet below the existing ground surface. A second sample was obtained along the watermain and reclaimed watermain alignment between depths of 2 and 4 feet below existing grade. The purpose of these samples was to determine the environmental subsoil classification. The testing included soil pH, resistivity, and chloride and sulfate contents. The test results are summarized in Section 5.7 and

included on the *Summary of Corrosion Series Test Results* table in Appendix C.

## 4.0 GENERAL SUBSURFACE CONDITIONS

### 4.1 General Soil Profile

Graphical presentation of the generalized subsurface conditions is presented on the *Generalized Soil Profile* sheets, Figures 3 through 10. Detailed boring records are included in Appendix A. When reviewing these records, it should be understood that the soil conditions will vary between the boring locations. The following table summarizes the soil conditions encountered.

GENERAL SOIL PROFILE: BUILDING AREA, PAVEMENT AREA, ETC			
TYPICAL DEPTH (ft)		SOIL DESCRIPTION	AASHTO <sup>(1)</sup> /USCS <sup>(2)</sup>
FROM	TO		
0	8	Topsoil, loose to dense fine sands, fine sands with silt, silty fine sands.	A-3, A-2-4/SP, SP-SM, SM
8	23.5	Medium dense to very dense fine sands, fine sands with silt.	A-3/ SP, SP-SM
23.5	73.5	Loose to medium dense fine sands with silt, silty fine sands	SP-SM, SM
73.5	98.5	Medium Dense to very dense fine soils with silt and silty fine sands with varying amounts of gravel (shell, rock fragments)	SP-SM, SM
98.5	125	Loose to medium dense silty fine sands (Marl), very stiff sandy silty (Marl), Hard Weathered Limestone	SM, MH

<sup>(1)</sup> American Association of State Highway and Transportation Officials  
<sup>(2)</sup> Unified Soil Classification System

### 4.2 Groundwater Level

During our initial field exploration from April 15 through April 29, 2022, the groundwater level was encountered at each of the boring locations and recorded at the time of drilling at depths varying from 2 inches to 1 foot 4 inches below the existing ground surface. During our second exploration from June 24 through July 12, 2022, the groundwater level was encountered along the watermain alignment at depths varying from 5 feet to 7 feet 6 inches below the existing ground surface.

It should be anticipated that groundwater levels will fluctuate seasonally and with changes in climate. As such, we recommend that the water table be remeasured prior to construction. Measured groundwater levels are shown on the *Generalized Soil Profiles* sheets, Figures 3 through 10, and on the soil boring logs.

### 4.3 Review of the USDA Web Soil Survey Map

A review of the USDA Soil Survey Conservation Service (SSCS) Web Soil Survey of St. Johns County show that there are 2 predominant soil map units at the project site as tabulated below. The soil drainage class, hydrological group, and estimated seasonal high groundwater levels reported in the Soil Survey are as follows:

Map Unit Symbol	Map Unit Name	Drainage Class	Hydrologic Group	Depth to the Water Table <sup>(1)</sup> (inches)
3	Myakka-Myakka, wet, fine sands, 0 to 2 percent slopes	Poorly Drained	A/D	3 to 18
13	St. Johns fine sand	Poorly Drained	B/D	0 to 18

<sup>(1)</sup> The “Water table” above refers to a saturated zone in the soil which occurs during specified months, typically the summer wet season. Estimates of the upper limit shown in the Web Soil Survey are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

#### 4.4 Seasonal High Groundwater Level

In estimating seasonal high groundwater level, several factors are taken into consideration including antecedent rainfall, soil redoximorphic features (i.e., soil mottling), stratigraphy (including presence of hydraulically restrictive layers), vegetative indicators, effects of development, and relief points such as drainage ditches, low-lying areas, etc.

Based on our interpretation of the current site conditions, including the boring logs and review of published data, we estimate the seasonal high groundwater level at the Pump Station site to be within 6 inches of the existing ground surface. We estimate the seasonal high groundwater level along the watermain and reclaimed watermain alignment to be 2 to 3 feet above the groundwater levels measured at the time of our field exploration.

It is possible that higher groundwater levels may exceed the estimated seasonal high groundwater level because of significant or prolonged rains, particularly within the Pump Station site due to the Hardpan soils encountered within the borings. Therefore, we recommend that design drawings and specifications account for the possibility of groundwater level variations, and construction planning should assume that such variations will occur.

## 5.0 DESIGN RECOMMENDATIONS

### 5.1 General

The following evaluation and recommendations are based on the provided project information as presented in this report, the results of the field exploration and laboratory testing performed, and the construction techniques recommended in Section 6.0 below. If the described project details are incorrect or changed after this report, or if subsurface conditions encountered during construction are different from those reported, then MAE should be notified so that these recommendations can be re-evaluated and revised, if necessary. We recommend that MAE be allowed to review the foundation plans and earthwork specifications to verify that the recommendations in this report have been properly interpreted and implemented.

### 5.2 Booster Pump Station, Mechanical/Electrical Building, and Generator Pad

Based on the results of our exploration, we consider the subsurface conditions at the site adaptable for support of the proposed structures when constructed on a properly designed shallow foundation systems. Provided the site preparation and earthwork construction recommendations outlined in Section 6.0 of this report are performed, the following parameters may be used for foundation design.

### 5.2.1 Bearing Pressure

The maximum allowable net soil bearing pressure for use in shallow foundation design should not exceed 2,500 psf. Net bearing pressure is defined as the soil bearing pressure at the foundation bearing level more than the natural overburden pressure at that level. The foundations should be designed based on the maximum load that could be imposed by all loading conditions.

### 5.2.2 Foundation Size

The minimum widths recommended for any isolated column footings and continuous wall footings are 24 inches and 18 inches, respectively. Even though the maximum allowable soil bearing pressure may not be achieved, these width recommendations should control the size of the foundations.

### 5.2.3 Bearing Depth

The exterior foundations should bear at a depth of at least 18 inches below the exterior final grades, and the interior foundations should bear at a depth of at least 12 inches below the finished floor elevation to provide confinement to the bearing level soils. It is recommended that surface grades adjacent to the exterior foundations of the buildings be graded to divert surface water away from the building exterior to reduce the possibility of erosion beneath the footings.

### 5.2.4 Bearing Material

The shallow foundations may bear in either the compacted suitable natural soils or compacted structural fill. The bearing level soils, after compaction, should exhibit densities equivalent to 95 percent of the modified Proctor maximum dry density (ASTM D 1557), to a depth of at least 2 feet below the foundation bearing level.

### 5.2.5 Settlement Estimates

Post-construction settlement of the structure will be influenced by several interrelated factors, such as (1) subsurface stratification and strength/compressibility characteristics; (2) footing size, bearing level, applied loads, and resulting bearing pressures beneath the foundations; and (3) site preparation and earthwork construction techniques used by the contractor. Our settlement estimates for the structure are based on the use of site preparation/earthwork construction techniques recommended in Section 6.0 of this report. Any deviation from these recommendations could result in an increase in the estimated post-construction settlement of the structure.

Due to the sandy nature of the encountered soils, we expect most of the settlement to occur in an elastic manner and rapidly during construction. Using the recommended maximum bearing pressure, an assumption of the maximum structural loads, and the field and laboratory test data that we have correlated to geotechnical strength and compressibility characteristics of the subsurface soils, we estimate that total settlements of the structure could be on the order of one inch or less.

Differential settlements result from differences in applied bearing pressures and variations in the compressibility characteristics of the subsurface soils. Because of the general uniformity of the subsurface conditions and the recommended site preparation and earthwork construction techniques outlined in Section 6.0, we anticipate that differential settlements of the structure should be less than a half-inch.

### 5.2.6 Floor Slabs

The floor slabs may be constructed as slabs-on-ground, provided any unsuitable material is removed and replaced with compacted structural fill as outlined in Section 6.0. It is recommended that the bearing soils for floor slabs within enclosed or climate-controlled areas be covered with an impervious membrane to

reduce moisture entry and floor dampness. Care should be exercised not to tear large sections of the membrane during placement of reinforcing steel and concrete. In addition, we recommend that a minimum separation of 2 feet be maintained between the finished floor levels and the estimated seasonal high groundwater level.

### **5.3 Ground Storage Tank**

Based on the results of our exploration, we consider the subsurface conditions at the site adaptable for support of the proposed GST structure when constructed on a properly designed shallow foundation system. We expect that the prestressed concrete GST structure will be supported on 4-inch-thick concrete slab-on-grade. The slab will be thickened at the tank edges to support the tank walls and dome. Provided the site preparation and earthwork construction recommendations outlined in Section 6.0 of this report are performed, the following parameters may be used for foundation design.

#### **5.3.1 Bearing Pressure**

The maximum allowable net soil bearing pressure for use in design of the GST foundation should not exceed 2,000 psf. Net bearing pressure is defined as the soil bearing pressure at the foundation bearing level more than the natural overburden pressure at that level. The foundations should be designed based on the maximum load that could be imposed by all loading conditions.

#### **5.3.2 Foundation Size**

The minimum width of the perimeter footing supporting the tank walls should be 18 inches. Even though the maximum allowable soil bearing pressure may not be achieved, this width recommendation should control the size of the foundation.

#### **5.3.3 Bearing Depth**

The minimum embedment depth for the upturned, thickened edge footing portion of the tank slab is 12 inches below the adjacent outside finished grades. It is recommended that surface grades adjacent to the tank structures be graded to divert surface water away from the tanks to reduce the possibility of erosion beneath the thickened edge slabs. In addition, we recommend a minimum separation of one foot between the tank bottom and the estimated seasonal high groundwater level.

#### **5.3.4 Bearing Material**

The tank slab including the thickened-edge portion may bear in either the compacted suitable existing site soils or compacted structural fill. The bearing level soils, after compaction, should exhibit densities equivalent to 95 percent of the modified Proctor maximum dry density (ASTM D 1557), to a depth of at least two feet below the foundation bearing levels.

#### **5.3.5 Settlement Estimates**

Post-construction settlements of the tank structure will be influenced by several interrelated factors, such as (1) subsurface stratification and strength/compressibility characteristics; (2) the size of the tank foundation and the bearing level, applied loads, and resulting bearing pressures beneath the foundation; and (3) site preparation and earthwork construction techniques used by the contractor. The settlement estimates presented below are based on the results of our field exploration at the site, laboratory test results, and the use of the site preparation/earthwork construction techniques as recommended in this report. Any deviation from these recommendations could result in an increase in the estimated post-construction settlements of the storage tank structure.

Based on the provided details for the GST, we had estimated a content pressure of 2,000 pounds per square foot applied by the GST. Given the field and laboratory test data that we have correlated to geotechnical strength and compressibility characteristics of the subsurface soils, we estimate the total settlement of the GST structure at the center to be approximately 2.5 inches. This estimate was calculated using the soil profiles encountered at the tank centers and the Boussinesq method for determining settlement under a circular loaded area. Differential settlements result from differences in applied bearing pressures and variations in the compressibility characteristics of the subsurface soils. Because of the general uniformity of the subsurface conditions, and assuming the recommended site preparation and earthwork construction techniques outlined in Section 6.0 are followed, we estimate the differential settlement between the center and perimeter of each GST tank to be on the order of 1 to 1.5 inches. We recommend that piping, tank nozzles, and other attachments be designed with adequate consideration for the anticipated settlement.

The soil borings encountered predominately sandy soils within the expected stress zone of influence for the tank structures. Therefore, we expect most of the estimated total and differential settlement to occur in an elastic manner during construction and initial filling of the tanks. The remainder of the estimated settlement will likely occur within approximately 2 to 4 weeks once the tanks are constructed and filled to its design water level, as pore water pressures within the foundation’s soils recede.

## 5.4 Pavement Considerations

Based on the results of our exploration, we consider the subsurface conditions at the site favorable for support of a flexible pavement section, when constructed on properly prepared subgrade soils as outlined in Section 6.0 of this report. Typical pavement sections used in northeast Florida are shown on the following table. If requested, we can prepare a project-specific pavement design if specific traffic data is provided.

TYPICAL FLEXIBLE PAVEMENT SECTION			
Pavement Layer	Light Duty	Heavy Duty	Alternate Heavy Duty
Asphaltic Concrete Wearing Surface	1.5"	2.5"	2"
Base <sup>(1)</sup>	6"	8"	10"
Stabilized Subgrade <sup>(1)</sup>	12"	12"	12"
<sup>(1)</sup> Groundwater should be maintained at least 2 feet below the bottom of the base course if a limerock material is used. If a more water-tolerant base course material is used, such as Graded Aggregate Base or Recycled Concrete Aggregate, then this separation should be one foot.			

### 5.4.1 Wearing Surface

For flexible pavement design, the wearing surface should consist of Florida Department of Transportation (FDOT) Superpave Type SP-12.5 or SP-9.5 asphaltic. Specific requirements for asphaltic wearing surface are outlined in the latest edition of the *Florida Department of Transportation, Standard Specifications for Road and Bridge Construction*.

### 5.4.2 Base and Stabilized Subgrade

The base course may consist of a commercially produced limerock material that should have a minimum Limerock Bearing Ratio (LBR) value of 100. Alternatively, a Graded Aggregate Base (GAB) or a Recycled Concrete Aggregate (RCA) material could be used, which should meet the specifications as noted in the latest edition of the FDOT’s *Standard Specifications for Road and Bridge Construction*. The base material should be compacted to 100 percent of the modified Proctor maximum dry density (AASHTO T-180) value.

The subgrade soil should be stabilized with approved stabilizer material to have a minimum LBR value of 40.

The stabilized subgrade should be compacted to 98 percent of the modified Proctor maximum dry density (AASHTO T-180) value.

### 5.4.3 Underdrains

Satisfactory pavement life is dependent on dry/strong pavement support provided by the base and subgrade courses. Accordingly, a minimum clearance of 2 feet must be maintained between the estimated seasonal high groundwater table and the bottom of the base layer. If a GAB or RCA base, which are more water-tolerant base materials, are used, then this separation may be reduced to one foot. Depending on final pavement grades, subsurface drains may be required to maintain dry base and subgrade materials. Once the final paving and drainage plans are prepared, we would be pleased to review them and the need for underdrains.

## 5.5 Pipeline Support Recommendations

Based on the results of the subsurface explorations, laboratory testing, and provided information, as included in this report, we consider the subsurface conditions at the site adaptable for supporting the proposed watermain and reclaimed watermain pipelines and any below-grade pipelines on the pump station site when constructed upon properly prepared subgrade soils.

As discussed earlier in the report, the borings generally encountered a surficial topsoil layer 1 to 6 inches thick, underlain by loose to very dense fine sands (A-3). These A-3/SP, SP-SM soils are suitable for use as pipe bedding and backfill soil and should be placed and compacted as discussed in Section 6.0 below. Soils with greater than 4 percent organic fines content are not suitable for use as backfill material.

Several borings encountered medium dense to very dense sands with silt (A-3, SP-SM) containing cemented sands and trace to little amounts of organics beginning as shallow as 4 feet below existing grade and continued to depths of up to 24 feet. These soils may be difficult to excavate using normal methods and may require additional efforts. They are suitable for use as pipe bedding as long as they are undisturbed at the pipe bearing elevation. Any disturbed soils should be removed and replaced with suitable structural fill as discussed in section 6.4.

Topsoils and any organic-laden soils should be stockpiled separately from soils intended for reuse as structural fill or backfill. However, these soils can be used in landscape berms and grassed areas.

Provided the site preparation and earthwork construction recommendations outlined in Section 6.0 of this report are performed, the following parameters may be used for design of below-grade utilities.

### 5.5.1 Lateral Pressure Design Parameters

Any below-grade walls that are backfilled on one side and restrained against rotation at the top, should be designed to resist lateral pressures from soil and groundwater based on the following equivalent fluid unit weights:

- Above Water Table - Equivalent Fluid Density 60 lb/ft<sup>3</sup>
- Below Water Table - Equivalent Fluid Density 90 lb/ft<sup>3</sup>

For the design of lateral loads on below-grade walls, we recommend that the groundwater level be assumed to be at the ground surface. Lateral pressure distributions in accordance with the above do not consider forces from construction equipment, wheel loads or other surcharge loads. To account for this loading, a pressure equal to 0.5 times the anticipated surface surcharge should be applied over the full height of all walls.



### 5.5.2 Resisting Lateral Forces

Horizontal forces that act on pipeline structures such as thrust and anchor blocks can be resisted to some extent by the earth pressures that develop in contact with the buried perpendicular face of the block structure, and by shearing resistance mobilized along the block structures base and subgrade interface. Allowable passive earth pressure resistance may be determined using the following equivalent fluid densities:

- Above Water Table - Equivalent Fluid Density 100 lb/ft<sup>3</sup>
- Below Water Table - Equivalent Fluid Density 60 lb/ft<sup>3</sup>

A factor of safety of 3 was used for the above values. It is assumed the block structures are surrounded by well compacted structural backfill, as described in Section 6.5 below, extending at least 5 feet horizontally beyond the vertical bearing face. In addition, it is presumed that the block structures can withstand horizontal movements on the order of 0.5-inch before mobilizing full passive resistance.

The allowable sliding shearing resistance mobilized along the base of the block structure may be determined by the following formula:

$$P = \frac{1}{3} V \tan \left( \frac{2}{3} \phi \right)$$

- Where:
- P = Allowable shearing resistance force
  - V = Net vertical force (total weight of block and soil overlying the structure minus hydrostatic uplift forces)
  - $\phi$  = Angle of internal friction = 30°

The following unit weights can be used to calculate the weight of the overburden soil:

- Compacted Moist Soil 110 lb/ ft<sup>3</sup>
- Saturated Soil 120 lb/ ft<sup>3</sup>

### 5.5.3 Hydrostatic Uplift Resistance

It is anticipated that the buried pipeline structures will exert little or no net downward pressure on the soils, rather, the structures may be subject to hydrostatic uplift pressure when empty. Below grade structures should be designed to resist hydrostatic uplift pressures appropriate for their depth below existing grade assuming the groundwater level is at the existing ground surface elevation. Hydrostatic uplift forces can be resisted in several ways including:

- Addition of dead weight to the structure.
- Mobilizing the dead weight of the soil surrounding the structure through extension of footings outside the perimeter of the structure.

A moist compacted soil unit weight of 110 lb/ft<sup>3</sup> may be used in designing structures to resist buoyancy.

## 5.6 Pond Considerations

### 5.6.1 Borrow Suitability

Based on the boring results and classification of the soil samples, the fine sands and fine sands with silt (A-3) as encountered at the pond boring locations, are considered suitable for use as fill soil. The soils containing surficial organic material (topsoil) or an organic content greater than 4 percent will require removal and are not recommended for use as structural fill.

It should be anticipated that the soils in the proposed pond area that are below the groundwater level will have moisture contents more than the modified Proctor optimum moisture content (ASTM D 1557) and will require stockpiling or spreading to bring the moisture content within 2 percent of the soil's optimum moisture



content corresponding to the required degree of compaction.

The hardpan soils encountered in the pond borings B-1 and B-2 below depths of 10 and 4 feet, respectively, may be difficult to excavate. Additional efforts may be necessary to facilitate excavation.

## 5.7 Environmental Classification

One corrosion series test was performed on a bulk soil sample obtained adjacent to the tank center boring location B-4 at a depth range of approximately 2 to 4 feet below ground surface to determine the environmental subsoil classification. The sample was classified in accordance with FDOT procedures contained in Section 1.3.2, C-1 of the January 2022 edition of the *FDOT Structures Design Guidelines*. Based on the results of these tests, the encountered soil was classified as Extremely Aggressive for steel substructures, and Moderately Aggressive for concrete substructures. Sample location and test results are shown on the *Summary of Corrosion Series Test Results* table in Appendix C.

A second sample was obtained along the watermain alignment between depths of 2 and 4 feet below existing grade to determine the environmental subsoil classification. That test will be completed and the result reported in the final version of this report.

## 6.0 SITE PREPARATION AND EARTHWORK RECOMMENDATIONS

Site preparation as outlined in this section should be performed to provide more uniform foundation bearing conditions, to reduce the potential for post-construction settlements of the planned structures and their associated pipelines, and to maintain the integrity of a flexible pavement section.

### 6.1 Clearing and Stripping

Prior to construction, the location of existing underground utility lines within the construction areas should be established. Provisions should then be made to relocate interfering utilities to appropriate locations. It should be noted that, if underground pipes are not properly removed or plugged, they may serve as conduits for subsurface erosion, which may subsequently lead to excessive settlement of overlying structures.

The "footprint" of the proposed structures plus a minimum additional margin of 5 feet, and of the hardscape areas (parking/driveway) plus a minimum additional margin of 3 feet, should be stripped of all surface vegetation, stumps, debris, organic topsoil, or other deleterious materials. During grubbing operations, roots with a diameter greater than 0.5-inch, stumps, or small roots in a concentrated state, should be grubbed and completely removed.

Based on the results of our field exploration, it should be anticipated that 1 to 6 inches of topsoil and soils containing significant amounts of organic materials may be encountered across the site. The actual depths of unsuitable soils and materials should be determined by MAE using visual observation and judgment during earthwork operations. Any topsoil removed from the structures and parking/drive areas can be stockpiled and used subsequently in areas to be grassed.

### 6.2 Temporary Groundwater Control

The groundwater level was encountered at depths varying from 2 inches to 7 feet 6 inches below the existing ground surface at the time of our exploration. Because of the need for compaction of the surface soil following stripping and grubbing of the topsoil and for excavation to the pipeline invert elevations followed by compaction of the bedding and backfill soils, temporary groundwater control measures may be necessary to dewater the area to facilitate the excavation and compaction processes.

Groundwater control measures should be determined by the contractor but can consist of sumps or wellpoints (or a combination of these or other methods) capable of lowering the groundwater level to at

least 2 feet below the required depth of excavation. The dewatering system should not be decommissioned until excavation, compaction, and fill placement is complete, and sufficient deadweight exists on the structures to prevent uplift. It should be anticipated that well point installation into the dense to very dense soils encountered at several of the borings may be difficult, and additional efforts may be necessary to adequately dewater excavations in these soils. The site should be graded to direct surface water runoff from the construction area.

Note that discharge of produced groundwater to surface waters of the state from dewatering operations or other site activities is regulated and requires a permit from the State of Florida Department of Environmental Protection (FDEP). This permit is termed a *Generic Permit for the Discharge of Produced Groundwater From Any Non-Contaminated Site Activity*. If discharge of produced groundwater is anticipated, we recommend sampling and testing of the groundwater early in the site design phase to prevent project delays during construction. MAE can provide the sampling, testing, and professional consulting required to evaluate compliance with the regulations.

### 6.3 Compaction

The exposed surface soils for the structures and pavements should be compacted with a heavy vibratory drum roller having a minimum static, at-drum weight, on the order of 10 to 15 tons. Typically, the material should exhibit moisture contents within  $\pm 2$  percent of the modified Proctor optimum moisture content (ASTM D 1557) during the compaction operations. As a minimum, we recommend several passes in each direction across the construction area, with each pass overlapping the previous pass by 30 percent. Compaction should continue until densities of at least 95 percent of the modified Proctor maximum dry density (ASTM D 1557) have been achieved within the upper 2 feet of the compacted natural soils at the site. Prior to compaction, proof-rolling of the site with a loaded dump truck is recommended to locate any unforeseen soft areas, or unsuitable surface or near-surface soils.

Should the surface soils experience pumping and soil strength loss during the compaction operations, compaction work should be immediately terminated. The disturbed soils should be removed and backfilled with dry structural fill soils, which are then compacted, or the excess moisture content within the disturbed soils should be allowed to dissipate before recompacting.

Care should be exercised to avoid damaging any nearby structures while the compaction operation is underway. Prior to commencing compaction, the existing conditions of the adjacent structures should be documented with photographs and survey. Compaction should cease if deemed detrimental to adjacent structures, and MAE should be contacted immediately. It is recommended that the vibratory roller remain a minimum of 50 feet from existing structures. Within this zone, use of a track-mounted bulldozer, front-end loader, or a vibratory roller, operating in the static mode is recommended.

### 6.4 Structural Backfill and Fill Soils

Any structural backfill or fill required for site development should be placed in loose lifts not exceeding 12 inches in thickness and compacted by the use of the above-described vibratory drum roller. The lift thickness should be reduced to 8 inches if the roller operates in the static mode or if track-mounted compaction equipment is used. If hand-held compaction equipment is used, the lift thickness should be further reduced to 6 inches.

Import structural fill should consist of non-plastic, inorganic, granular soil having less than 10 percent material passing the No. 200 mesh sieve and containing less than 4 percent organic material. The fine sand and slightly silty fine sands, without roots, as encountered in the borings, are suitable as fill materials and, with proper moisture control, should densify using conventional compaction methods.

Though not encountered in the soil borings, any silty sands, which contain more than 12 percent passing the

No. 200 sieve, encountered during construction will be more difficult to compact, due to their nature to retain soil moisture, and will require drying if excavated below the groundwater table. However, those sands may be blended with clean sands (A-3, SP-SM) and reused provided the soil mixture can be compacted to the required soil density. Typically, structural fill should exhibit moisture contents within  $\pm 2$  percent of the modified Proctor optimum moisture content (ASTM D 1557) during the compaction operations. Compaction should continue until densities of at least 95 percent of the modified Proctor maximum dry density (ASTM D 1557) have been achieved within each lift of the compacted structural fill.

We recommend that material excavated from the pipeline trenches that will be reused as backfill be stockpiled a safe distance from the excavations and in such a manner that promotes runoff away from the open trenches and limits saturation of the materials.

## 6.5 Foundation Areas

After satisfactory placement and compaction of the required structural fill, the foundation areas may be excavated to the planned bearing levels. The foundation bearing level soils, after compaction, should exhibit densities equivalent to 95 percent of the modified Proctor maximum dry density (ASTM D 1557), to a depth of one foot below the bearing level. For confined areas, such as the footing excavations, any additional compaction operations can probably best be performed by the use of a lightweight vibratory sled or roller having a total weight on the order of 500 to 2000 pounds.

## 6.6 Pipeline Construction Recommendations

Excavation for the pipelines may commence once clearing and stripping and temporary dewatering measures are implemented, if necessary. Pipelines bearing on suitable sands (A-3) should be compacted to 95 percent of the bearing soil's modified Proctor maximum dry density (ASTM D 1557) to a depth of 12 inches below the pipe bearing level. Pipelines may bear on the slightly silty (A-3, SP-SM) cemented sand (Hardpan) if the sands at the pipe bearing level are left undisturbed. It should be expected that excavation of these soils by normal means may be difficult, and that additional efforts may be necessary to facilitate excavation. Any disturbed sands should be removed and replaced with structural fill as noted in section 6.4. The pipe trench excavation should be backfilled in compacted lifts with suitable fill as described in Section 6.4 above.

## 6.7 Pavement Areas

After completing the clearing/stripping operations in the pavement areas, any underlying soils with an organic content greater than 4 percent that are within 2 feet of the bottom of the pavement base should be over-excavated from within the pavement areas. Structural backfill and fill required to achieve the finish pavement grades then can be placed and compacted as described Section 6.3 above. As an exception, densities of at least 98 percent of the modified Proctor maximum dry density (ASTM D1557) should be obtained within the upper one foot of the materials immediately below the proposed base course.

## 6.8 Excavation Protection

Excavation work for pipeline construction will be required to meet OSHA Excavation Standard Subpart P regulations for Type C Soils. The use of excavation support systems will be necessary where there is not sufficient space to allow the side slopes of the excavation to be laidback to at least 1.5H:1V (1.5 horizontal to 1 vertical) to provide a safe and stable working area and to facilitate adequate compaction along the sides of the excavation.

The method of excavation support should be determined by the contractor but can consist of a trench box, drilled-in soldier piles with lagging, interlocking steel sheeting or other methods. The support structure should be designed according to OSHA sheeting and bracing requirements by a Florida registered Professional Engineer.

## 7.0 QUALITY CONTROL TESTING

A representative number of field in-place density tests should be made in the upper 2 feet of compacted natural soils, in each lift of compacted backfill and fill, and in the upper 12 inches below the bearing levels in the footing excavations. The density tests are considered necessary to verify that satisfactory compaction operations have been performed. We recommend density testing be performed as listed below:

- One location for every 5,000 square feet of slab area within the GST Tank footprint areas.
- One location for each of the slab-on-ground supported structures.
- One location for every 5,000 square feet of building area.
- 25 percent of any isolated column footing locations.
- One location for every 100 linear feet of continuous wall footings.
- One location for every 200 feet of below-grade pipeline.
- One location for every 5,000 square feet of pavement area.

## 8.0 REPORT LIMITATIONS

This report has been prepared for the exclusive use of Mott MacDonald Florida, LLC and the St. Johns County Utility Division for specific application to the design and construction of the *CR 208 Ground Storage Tank and Booster Pump Station* project. An electronically signed and sealed version, and a version of our report that is signed and sealed in blue ink, may be considered an original of the report. Copies of an original should not be relied on unless specifically allowed by MAE in writing. Our work for this project was performed in accordance with generally accepted geotechnical engineering practice. No warranty, express or implied, is made.

The analyses and recommendations contained in this report are based on the data obtained from this project. This testing indicates subsurface conditions only at the specific locations and times, and only to the depths explored. These results do not reflect subsurface variations that may exist away from the boring locations and/or at depths below the boring termination depths. Subsurface conditions and water levels at other locations may differ from conditions occurring at the tested locations. In addition, it should be understood that the passage of time may result in a change in the conditions at the tested locations. If variations in subsurface conditions from those described in this report are observed during construction, the recommendations in this report must be re-evaluated.

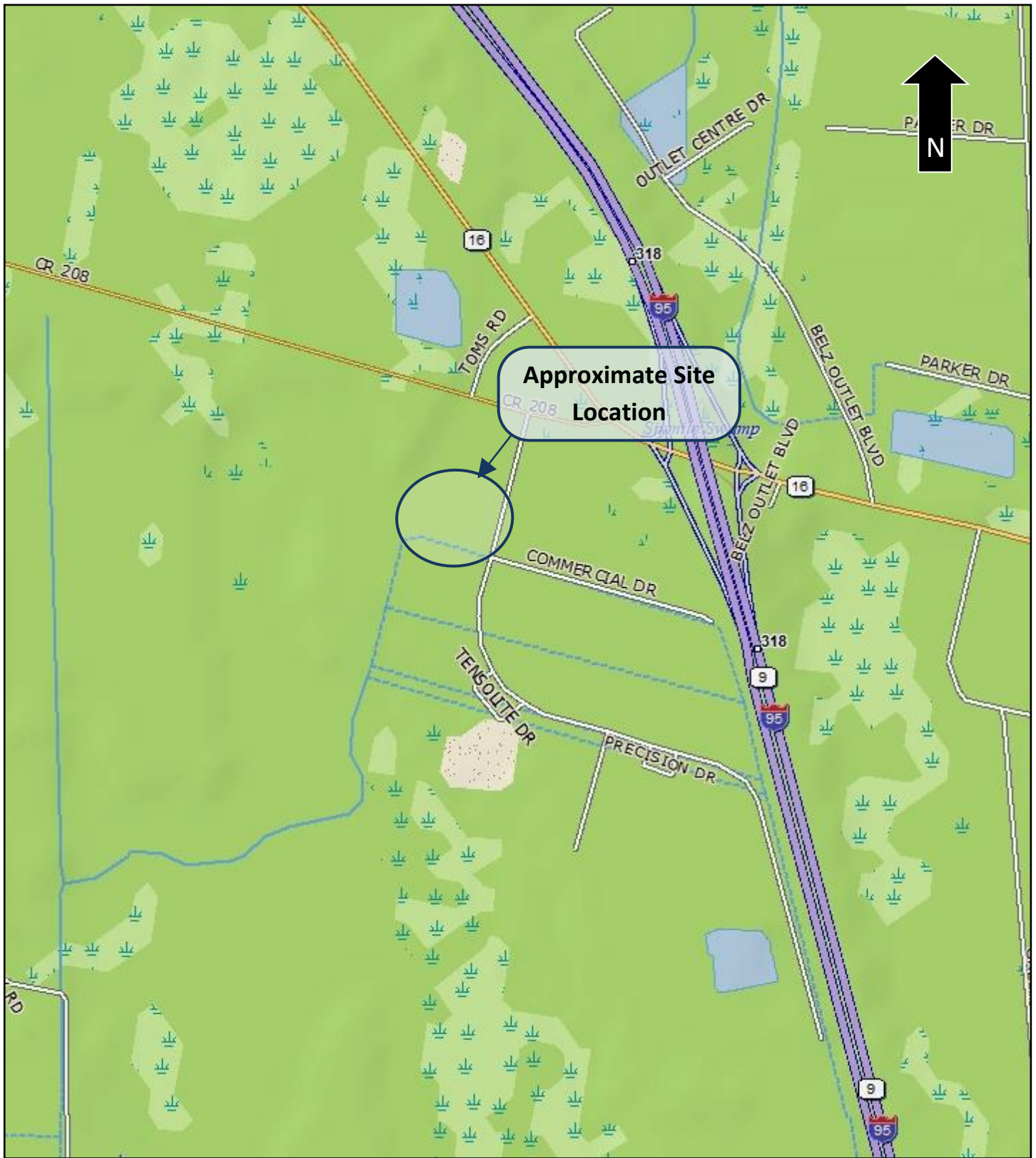
The scope of our services did not include any environmental assessment or testing for the presence or absence of hazardous or toxic materials in the soil, groundwater, or surface water within or beyond the subject site. Any statements made in this report, and/or notations made on the generalized soil profiles or boring logs, regarding odors or other potential environmental concerns are based on observations made during execution of our scope of services and as such are strictly for the information of our client. No opinion of any environmental concern of such observations is made or implied. Unless complete environmental information regarding the site is already available, an environmental assessment is recommended.

If changes in the design or location of the structures, pipelines, roadway, and/or pond occur, the conclusions and recommendations contained in this report may need to be modified. We recommend that these changes be provided to us for our consideration. MAE is not responsible for conclusions, interpretations, opinions or recommendations made by others based on the data contained in this report.


*Figures*

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### Site Location Map

<p>PREPARED BY</p>	<p>PROJECT NAME</p>	
	<p><b>SJCUD-CR 208 Potable Water Storage Tank &amp; Booster Pump Station</b>  <b>St. Johns County, Florida</b></p>	
<p>PREPARED FOR</p>	<p>REFERENCE          Delorme XMap 7.0</p>	<p>SCALE          NTS</p>
<p><b>Mott MacDonald Florida, LLC</b></p>	<p>MAE PROJECT NO.          0103-0026</p>	<p>FIGURE NO.          1</p>



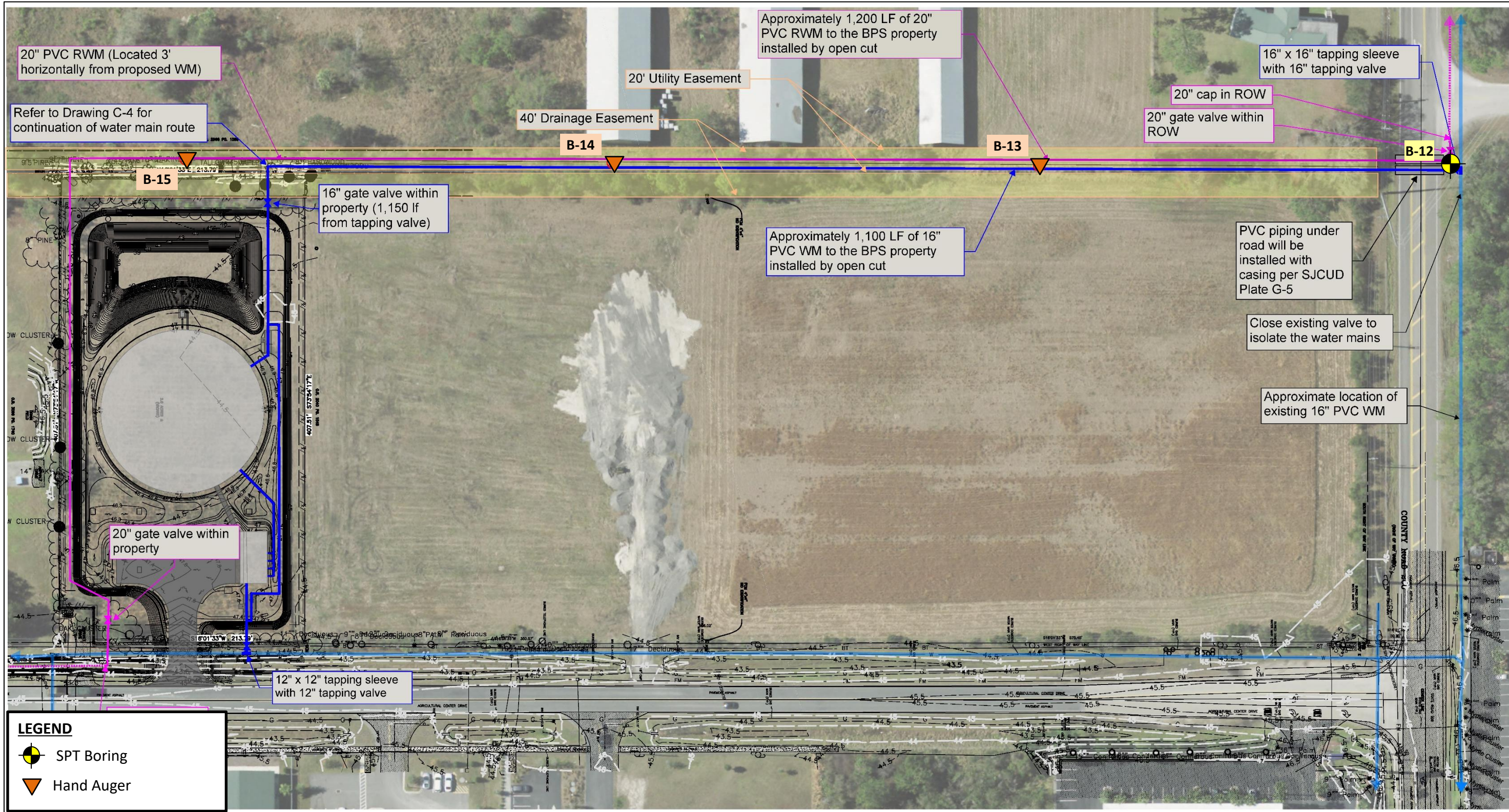
Project Manager:	PRM	Project No.	0103-0026
Drawn by:	MCV	Scale:	AS SHOWN
Checked by:	MCV	File Name:	0103-0026.BLP
Approved by:	WJM	Date:	7/15/2022



3728 PHILIPS HIGHWAY, SUITE 208, JACKSONVILLE, FL 32207  
 PH. (904) 519-6990 • FAX (904) 519-6992 • www.MeskelEngineering.com

<b>BORING LOCATION PLAN</b>	<b>FIG NO.</b>  <b>2A</b>
<b>SJUCD-CR 208 POTABLE WATER STORAGE TANK &amp; BOOSTER PUMP STATION ST. JOHNS COUNTY, FLORIDA</b>	





NOTE: Proposed Water Main and Reclaimed Water Main Route dated 6/9/2022 as provided Mott MacDonald Florida, LLC; Plan altered to show Boring locations only.

Project Manager:	PRM
Drawn by:	MCV
Checked by:	MCV
Approved by:	WJM

Project No.	0103-0026
Scale:	AS SHOWN
File Name:	0103-0026.BLP
Date:	7/15/2022



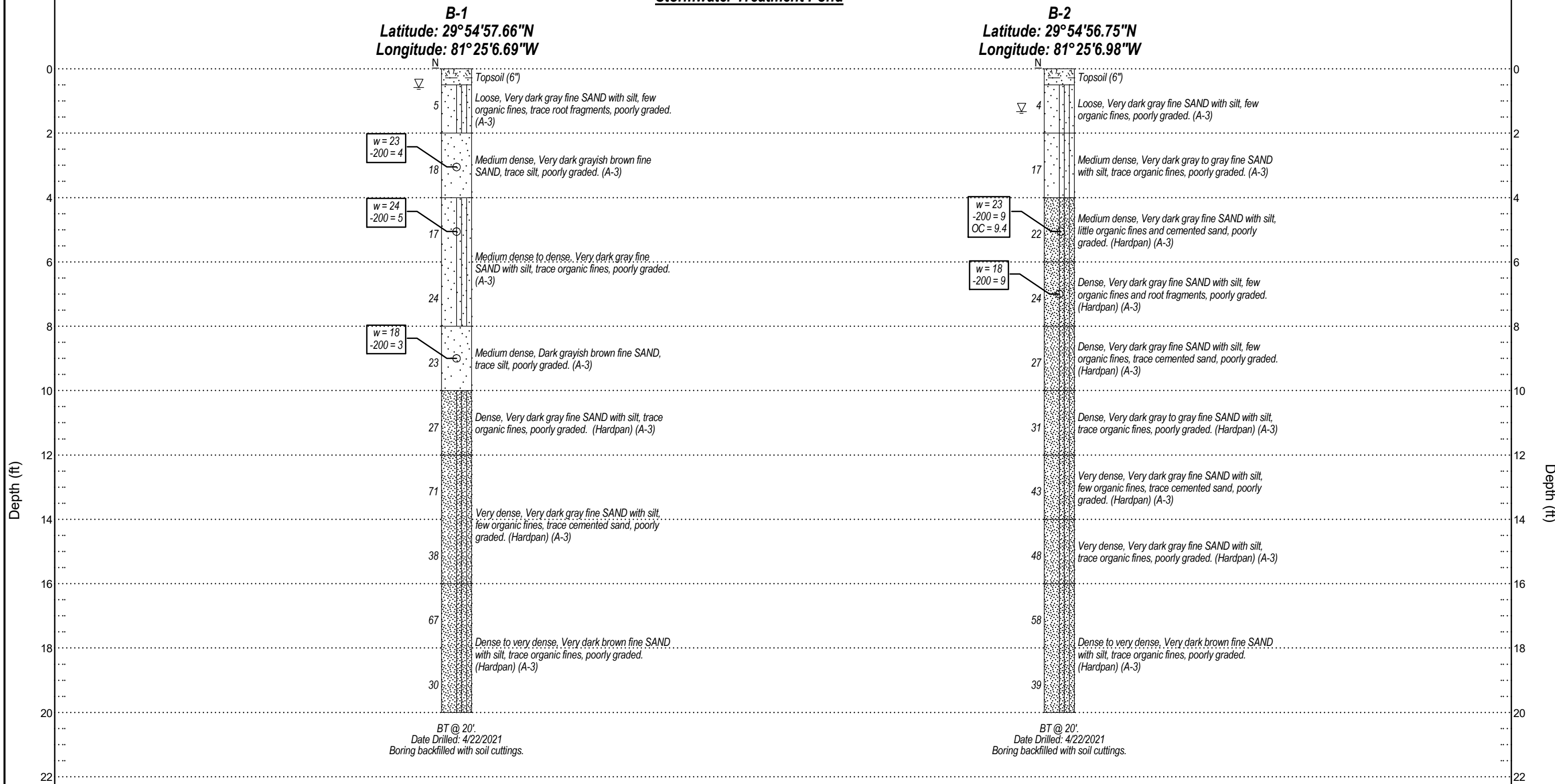
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<b>BORING LOCATION PLAN</b>
SJCUD-CR 208 PROPOSED WATER MAIN AND RECLAIMED WATER MAIN ST. JOHNS COUNTY, FLORIDA

FIG NO.
2B



**Stormwater Treatment Pond**

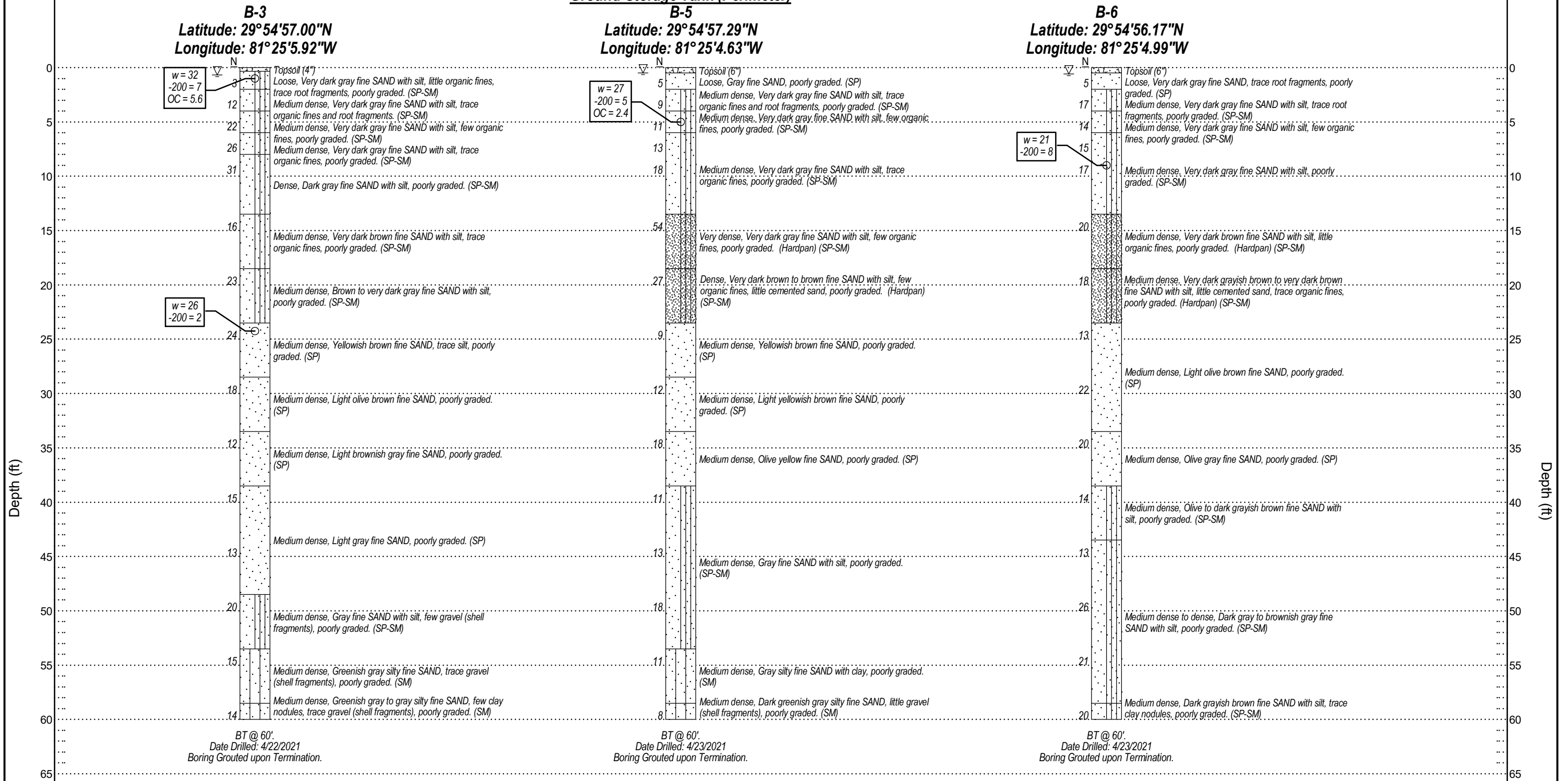


**Legend**

- Topsoil
- Fine Sand with Silt
- Fine Sand
- Fine Sand with Silt (Hardpan)
- Standard Penetration Resistance, Blows/Foot
- AASHTO Soil Classification System
- Natural Moisture Content (%)
- Organic Content (%)
- Boring Terminated at Depth Below Existing Grade
- Depth to Groundwater at Time of Drilling
- % Passing No. 200 U.S. Standard Sieve

REVISIONS						 P. RODNEY MANK, P.E. P.E. NO.: 41986 Meskel & Associates Engineering FL Registry No. 28142 3728 Philips Highway, Suite 208, Jacksonville, FL 32207	<b>Mott MacDonald Florida, LLC</b> DATE: 7/15/2022      MAE PROJECT NO.: 0103-0026		SHEET TITLE: <b>Generalized Soil Profiles</b>	
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		PROJECT NAME:	FIGURE NO.:		
						SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station St. Johns County, Florida	3			

**Ground Storage Tank (Perimeter)**



**Legend**

- |                 |                               |           |   |   |                                       |                     |
|-----------------|-------------------------------|-----------|---|---|---------------------------------------|---------------------|
| Topsoil         | Fine Sand with Silt           | Fine Sand | Standard Penetration Resistance, Blows/Foot | Unified Soil Classification System (USCS) | Natural Moisture Content (%)          | Organic Content (%) |
| Silty Fine Sand | Fine Sand with Silt (Hardpan) |           | Boring Terminated at Depth Below Grade      | Depth to Groundwater at Time of Drilling  | % Passing No. 200 U.S. Standard Sieve |                     |

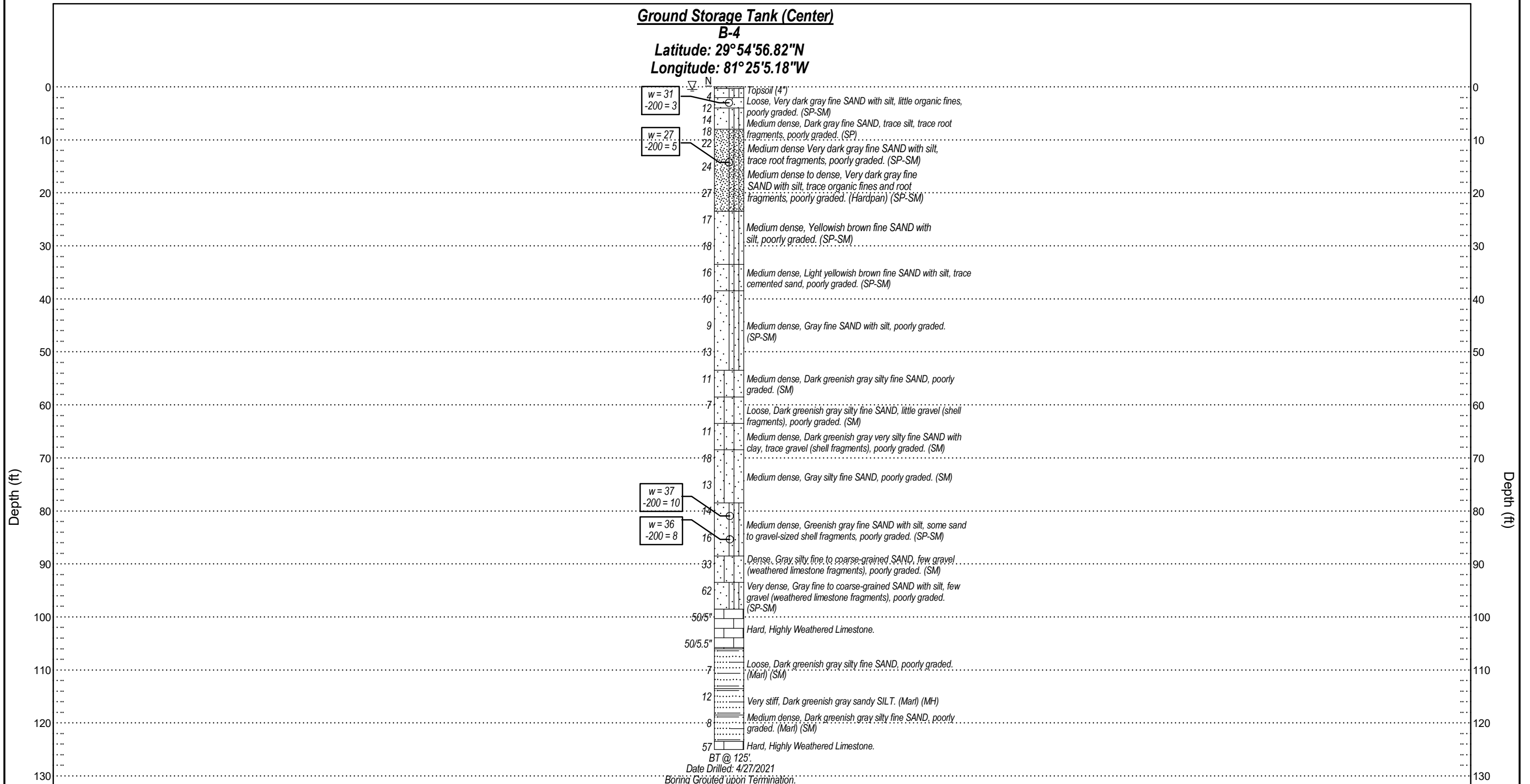
REVISIONS						P. RODNEY MANK, P.E. P.E. NO.: 41986  Meskel & Associates Engineering FL Registry No. 28142 3728 Philips Highway, Suite 208, Jacksonville, FL 32207	Mott MacDonald Florida, LLC		SHEET TITLE: Generalized Soil Profiles	
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION		DATE:	MAE PROJECT NO.	PROJECT NAME:	FIGURE NO.
							7/15/2022	0103-0026	SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station St. Johns County, Florida	
										4

**Ground Storage Tank (Center)**

**B-4**

**Latitude: 29°54'56.82"N**

**Longitude: 81°25'5.18"W**



**Legend**

- Topsoil
- Silty Fine Sand
- Limestone
- Fine Sand with Silt
- Marl
- Fine Sand with Silt
- Standard Penetration Resistance, Blows/Foot
- Boring Terminated at Depth Below Grade
- (SP) Unified Soil Classification System (USCS)
- Depth to Groundwater at Time of Drilling
- w Natural Moisture Content (%)
- 200 % Passing No. 200 U.S. Standard Sieve
- 50/5" Indicates 50 Hammer blows drove split spoon sampler 5 inches.

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FL Registry No. 28142  
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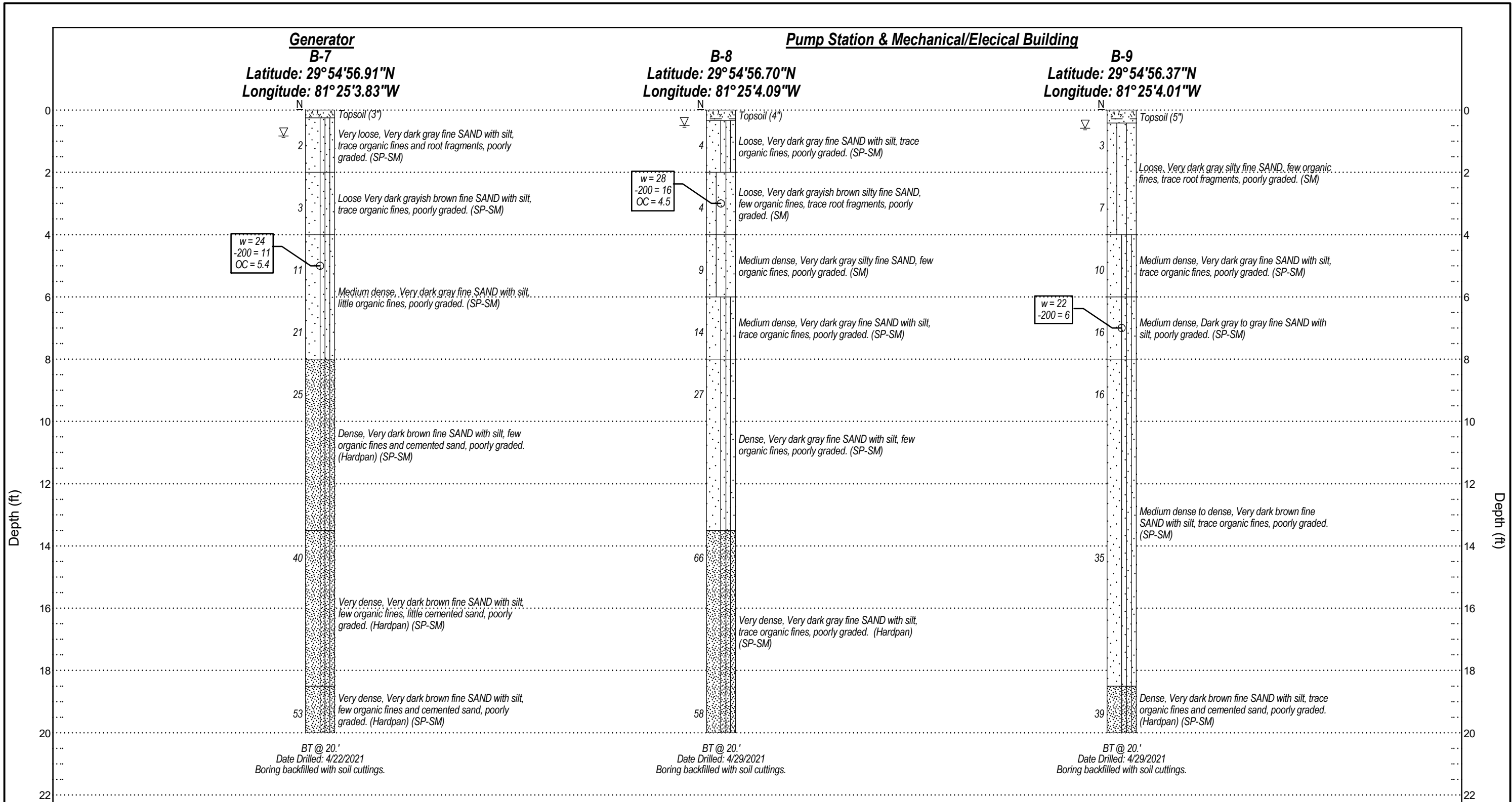
**Mott MacDonald Florida, LLC**

DATE: 7/15/2022  
MAE PROJECT NO.: 0103-0026

SHEET TITLE: **Generalized Soil Profiles**

PROJECT NAME: **SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station**  
St. Johns County, Florida

FIGURE NO.: **5**



**Legend**

- Topsoil
- Silty Fine Sand
- Fine Sand with Silt
- Fine Sand with Silt (Hardpan)

- N Standard Penetration Resistance, Blows/Foot
- BT Boring Terminated at Depth Below Existing Grade
- (SP) Unified Soil Classification System (USCS)
- ∇ Depth to Groundwater at Time of Drilling
- w Natural Moisture Content (%)
- 200 % Passing No. 200 U.S. Standard Sieve
- OC Organic Content (%)

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

P. RODNEY MANK, P.E. P.E. NO.: 41986

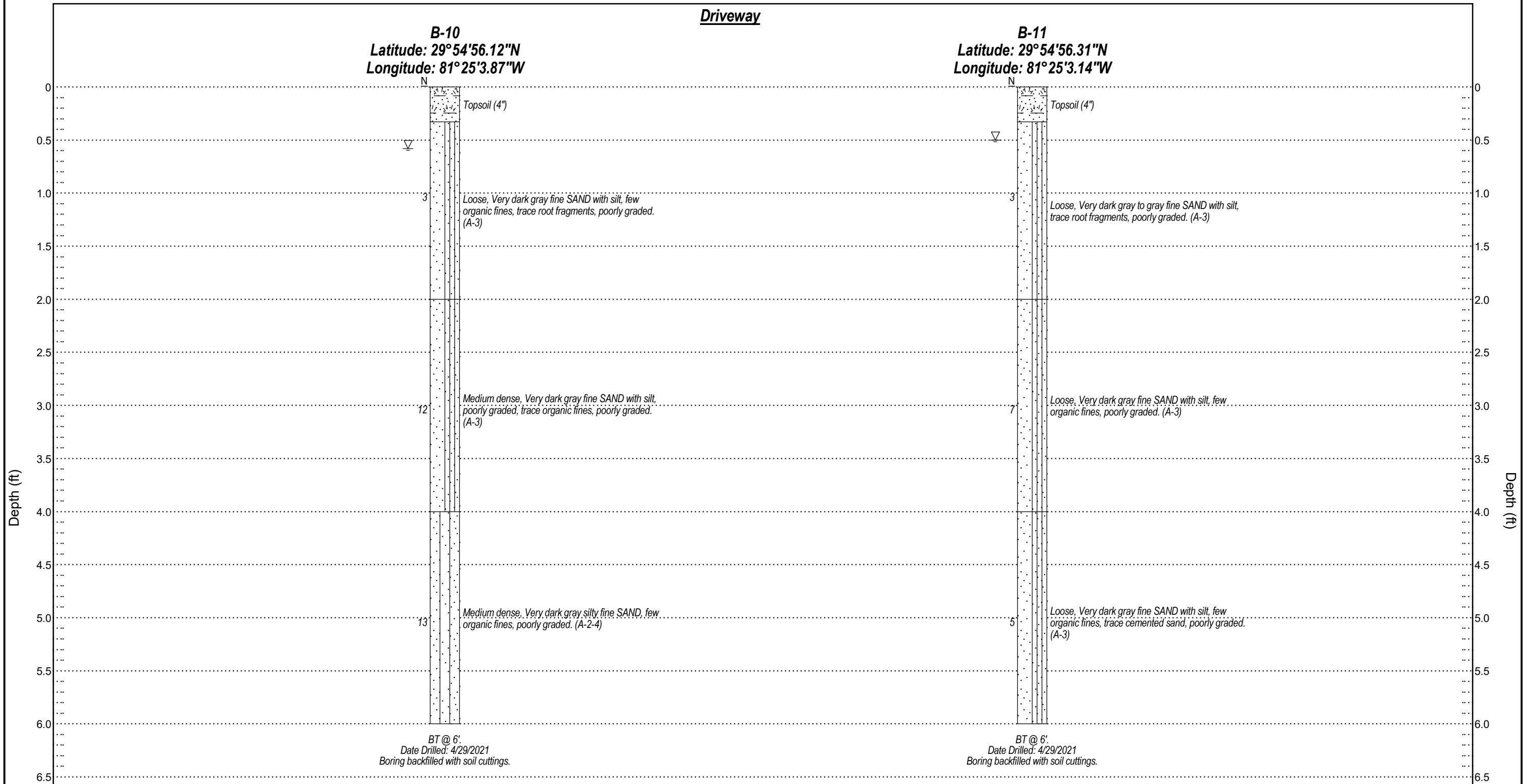
FL Registry No. 28142  
3728 Philips Highway, Suite 208, Jacksonville, FL 32207

**Mott MacDonald Florida, LLC**

DATE: 7/15/2022	MAE PROJECT NO. 0103-0026
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SHEET TITLE: <b>Generalized Soil Profiles</b>	FIGURE NO. 6
PROJECT NAME: SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station St. Johns County, Florida	

**Driveway**



**Legend**



Topsoil



Fine Sand with Silt



Silty Fine Sand

N Standard Penetration Resistance, Blows/Foot

(A-3) AASHTO Soil Classification System

BT Boring Terminated at Depth Below Existing Grade

▽ Depth to Groundwater at Time of Drilling

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

P. RODNEY MANK, P.E. P.E. NO.: 41986



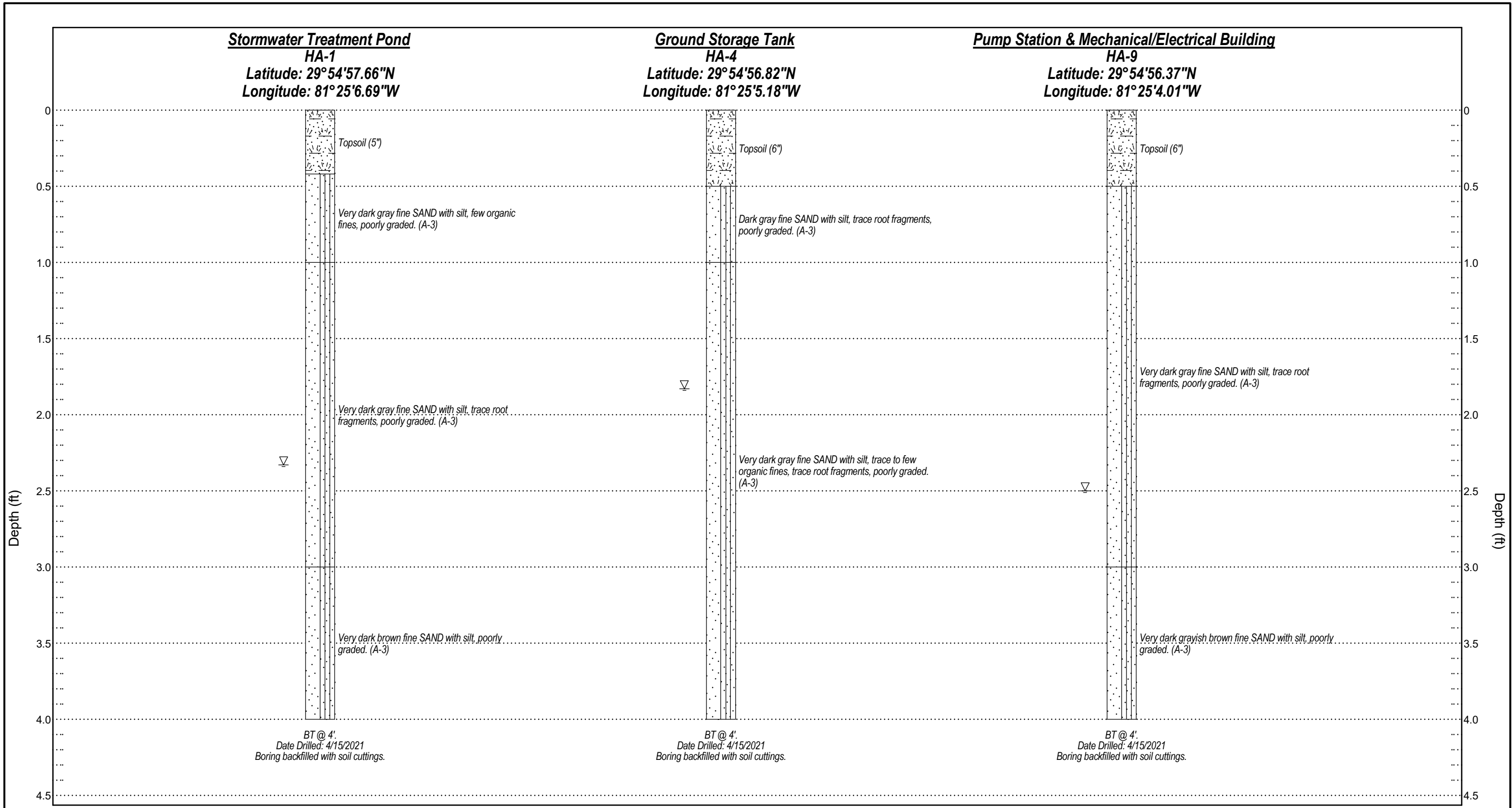
Meskel & Associates Engineering  
FL Registry No. 28142  
3728 Philips Highway, Suite 208, Jacksonville, FL 32207

**Mott MacDonald Florida, LLC**

DATE:	MAE PROJECT NO.
7/15/2022	0103-0026

SHEET TITLE:	<b>Generalized Soil Profiles</b>	
PROJECT NAME:	SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station St. Johns County, Florida	
FIGURE NO.:	7	





**Legend**



Topsoil



Fine Sand with Silt

(A-3) AASHTO Soil Classification System



Depth to Groundwater at Time of Drilling

BT Boring Terminated at Depth Below Existing Grade

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

P. RODNEY MANK, P.E. P.E. NO.: 41986

Meskel & Associates Engineering  
 FL Registry No. 28142  
 3728 Philips Highway, Suite 208, Jacksonville, FL 32207

**Mott MacDonald Florida, LLC**

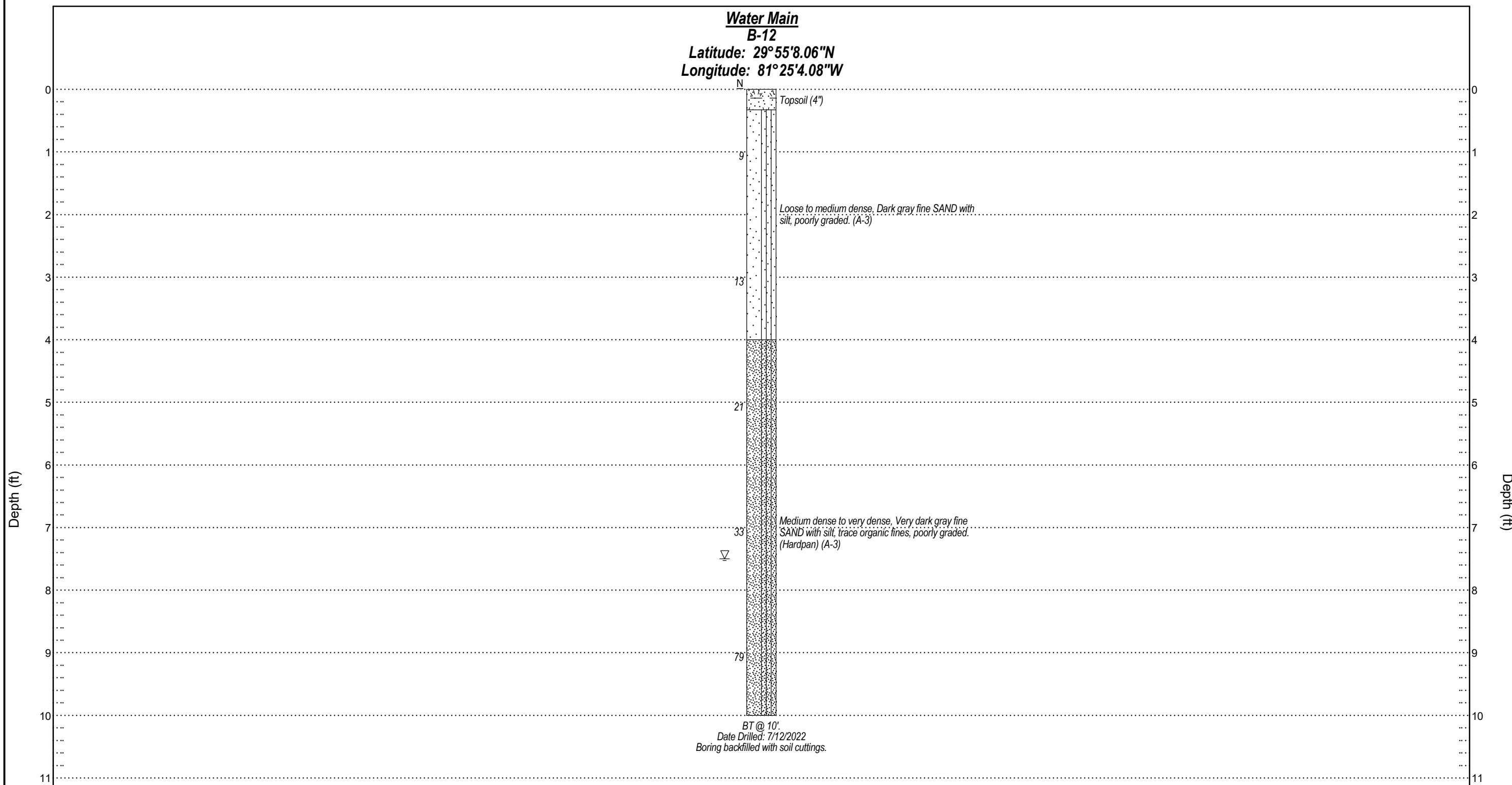
DATE: 7/15/2022  
 MAE PROJECT NO.: 0103-0026

SHEET TITLE: Generalized Soil Profiles

PROJECT NAME: SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station  
 St. Johns County, Florida

FIGURE NO.: 8

**Water Main  
B-12**  
Latitude: 29°55'8.06"N  
Longitude: 81°25'4.08"W



Note: Boring was drilled using Safety Hammer.



Topsoil



Fine Sand with Silt

**Legend**

- N Standard Penetration Resistance, Blows/Foot
- (A-3) AASHTO Soil Classification System
- BT Boring Terminated at Depth Below Existing Grade
- ▽ Depth to Groundwater at Time of Drilling

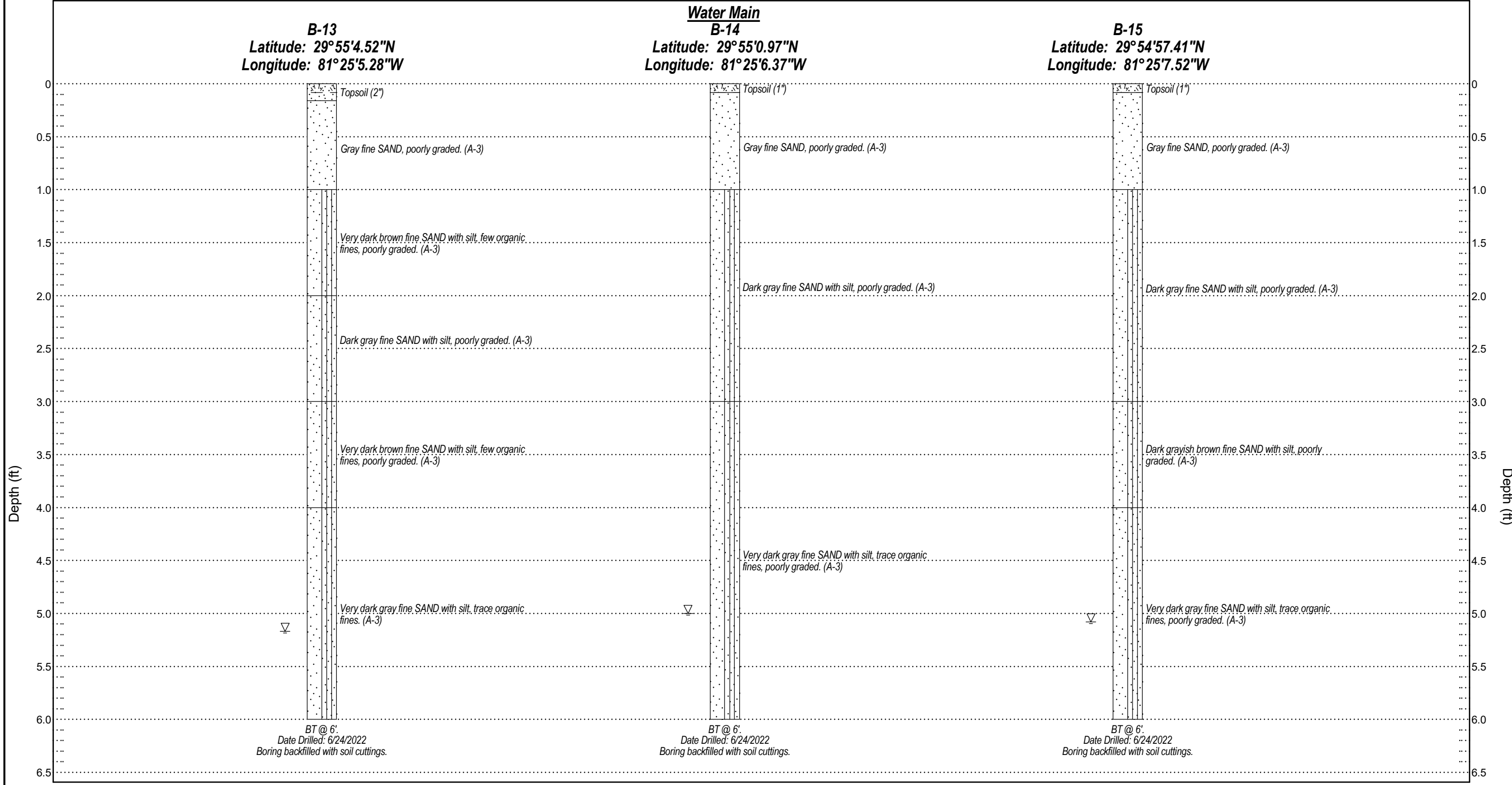
REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

P. RODNEY MANK, P.E. P.E. NO.: 41986

**Mott MacDonald Florida, LLC**

DATE:	MAE PROJECT NO.
7/15/2022	0103-0026

SHEET TITLE: <b>Generalized Soil Profiles</b>	
PROJECT NAME: SJCUD-CR 208 Proposed Water Main and Reclaimed Water Main St. Johns County, Florida	FIGURE NO.: <b>9</b>



**Legend**

- Topsoil
- Fine Sand
- Fine Sand with Silt
- (A-3) AASHTO Soil Classification System
- Depth to Groundwater at Time of Drilling
- BT Boring Terminated at Depth Below Existing Grade

REVISIONS					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

P. RODNEY MANK, P.E. P.E. NO.: 41986

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FL Registry No. 28142  
3728 Philips Highway, Suite 208, Jacksonville, FL 32207

**Mott MacDonald Florida, LLC**

DATE: 7/15/2022	MAE PROJECT NO. 0103-0026
--------------------	------------------------------

SHEET TITLE: <b>Generalized Soil Profiles</b>	FIGURE NO. 10
PROJECT NAME: SJCUD-CR 208 Proposed Water Main and Reclaimed Water Main St. Johns County, Florida	



*Appendix A*

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**Meskel & Associates Engineering, PLLC**

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 3728 Philips Highway, Suite 208  
 Jacksonville, FL 32207  
 P: (904)519-6990 F: (904)519-6992



**BORING B-1**

PROJECT NO. 0103-0026

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 4/22/2021 **COMPLETED** 4/22/2021 **LATITUDE** 29°54'57.66"N **LONGITUDE** 81°25'6.69"W

**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Open Hole Bentonite Fluid Rotary Drilling

**LOGGED BY** D.Hayward **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** Automatic

NEW MAE LOG AASHTO LAT. LONG - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:51 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	AASHTO	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0		Topsoil (6")			1									
1	1	Loose, Very dark gray fine SAND with silt, few organic fines, trace root fragments, poorly graded.	A-3		2 3 4	5								
2	2	Medium dense, Very dark grayish brown fine SAND, trace silt, poorly graded.	A-3		4 8 10 18	18	23	4						
5	3	Medium dense to dense, Very dark gray fine SAND with silt, trace organic fines, poorly graded.	A-3		7 7 10 12	17	24	5						
	4				7 12 12 12	24								
	5	Medium dense, Dark grayish brown fine SAND, trace silt, poorly graded.	A-3		7 10 13 15	23	18	3						
10	6	Dense, Very dark gray fine SAND with silt, trace organic fines, poorly graded. (Hardpan)	A-3		11 12 15 12	27								
	7	Very dense, Very dark gray fine SAND with silt, few organic fines, trace cemented sand, poorly graded. (Hardpan)	A-3		10 31 40 46	71								
15	8				16 18 20 31	38								
	9	Dense to very dense, Very dark brown fine SAND with silt, trace organic fines, poorly graded. (Hardpan)	A-3		23 27 40 37	67								
	10				10 15 15 15	30								
20		Bottom of borehole at 20 feet.												

**NOTES** Boring backfilled with soil cuttings.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 0 ft 7 in \*▽ END OF DAY ---

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**BORING B-2**

PAGE 1 OF 1

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 4/22/2021 **COMPLETED** 4/22/2021 **LATITUDE** 29°54'56.75"N **LONGITUDE** 81°25'6.98"W

**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Open Hole Bentonite Fluid Rotary Drilling

**LOGGED BY** D.Hayward **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** Automatic

NEW MAE LOG AASHTO LAT. LONG - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:51 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	AASHTO	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0		Topsoil (6")			1									
1	1	∇ Loose, Very dark gray fine SAND with silt, few organic fines, poorly graded.	A-3		1 1 3 4	4								
2	2	Medium dense, Very dark gray to gray fine SAND with silt, trace organic fines, poorly graded.	A-3		4 8 9 10	17								
5	3	Medium dense, Very dark gray fine SAND with silt, little organic fines and cemented sand, poorly graded. (Hardpan)	A-3		7 9 13 16	22	23	9	9.4					
10	4	Dense, Very dark gray fine SAND with silt, few organic fines and root fragments, poorly graded. (Hardpan)	A-3		9 12 12 14	24	18	9						
10	5	Dense, Very dark gray fine SAND with silt, few organic fines, trace cemented sand, poorly graded. (Hardpan)	A-3		11 12 15 18	27								
10	6	Dense, Very dark gray to gray fine SAND with silt, trace organic fines, poorly graded. (Hardpan)	A-3		13 15 16 14	31								
15	7	Very dense, Very dark gray fine SAND with silt, few organic fines, trace cemented sand, poorly graded. (Hardpan)	A-3		12 20 23 26	43								
15	8	Very dense, Very dark gray fine SAND with silt, trace organic fines, poorly graded. (Hardpan)	A-3		15 25 23 30	48								
20	9	Dense to very dense, Very dark brown fine SAND with silt, trace organic fines, poorly graded. (Hardpan)	A-3		23 26 32 40	58								
20	10				17 19 20 16	39								

Bottom of borehole at 20 feet.

**NOTES** Boring backfilled with soil cuttings.

**GROUND WATER LEVELS**

∇ AT TIME OF DRILLING 1 ft 4 in \* ∇ END OF DAY ---

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 3728 Phillips Highway, Suite 208  
 Jacksonville, FL 32207  
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**BORING B-3**

PAGE 1 OF 3

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 4/22/2021 **COMPLETED** 4/22/2021 **LATITUDE** 29°54'57.00"N **LONGITUDE** 81°25'5.92"W

**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Open Hole Bentonite Fluid Rotary Drilling

**LOGGED BY** D.Hayward **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** Automatic

NEW MAE LOG LAT/LONG-EOD\_G - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:54 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0		Topsoil (4")												
1	1	Loose, Very dark gray fine SAND with silt, little organic fines, trace root fragments, poorly graded.	SP-SM		1 1 2 3	3	32	7	5.6					
2	2	Medium dense, Very dark gray fine SAND with silt, trace organic fines and root fragments.	SP-SM		3 6 6 9	12								
5	3	Medium dense, Very dark gray fine SAND with silt, few organic fines, poorly graded.	SP-SM		5 9 13 13	22								
4	4	Medium dense, Very dark gray fine SAND with silt, trace organic fines, poorly graded.	SP-SM		10 13 13 15	26								
5	5				13 13 18 20	31								
10		Dense, Dark gray fine SAND with silt, poorly graded.	SP-SM											
15	6				4 5 11	16								
		Medium dense, Very dark brown fine SAND with silt, trace organic fines, poorly graded.	SP-SM											
20	7	Medium dense, Brown to very dark gray fine SAND with silt, poorly graded.	SP-SM		8 10 13	23								

**NOTES** Boring Grouted upon Termination.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 0 ft 8 in \*▽ END OF DAY ---

(Continued Next Page)

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**BORING B-3**

PAGE 2 OF 3

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida

**CLIENT** Mott MacDonald Florida, LLC

NEW MAE LOG LAT/LONG-EOD\_G - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:54 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
20		Medium dense, Brown to very dark gray fine SAND with silt, poorly graded. (continued)	SP-SM											
25	8	Medium dense, Yellowish brown fine SAND, poorly graded.	SP		5 11 13	24	26	2						
30	9	Medium dense, Light olive brown fine SAND, poorly graded.	SP		6 7 11	18								
35	10	Medium dense, Light brownish gray fine SAND, poorly graded.	SP		4 5 7	12								
40	11	Medium dense, Light gray fine SAND, poorly graded.	SP		5 6 9	15								

**NOTES** Boring Grouted upon Termination.

**GROUND WATER LEVELS**

∇ AT TIME OF DRILLING 0 ft 8 in \* ∇ END OF DAY ---


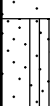


(Continued Next Page)

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida

**CLIENT** Mott MacDonald Florida, LLC

NEW MAE LOG LAT/LONG-EOD\_G - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:54 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
45	12	Medium dense, Light gray fine SAND, poorly graded. (continued)	SP		6 6 7	13								
50	13	Medium dense, Gray fine SAND with silt, few gravel (shell fragments), poorly graded.	SP-SM		3 7 13	20								
55	14	Medium dense, Greenish gray silty fine SAND, trace gravel (shell fragments), poorly graded.	SM		7 6 9	15								
60	15	Medium dense, Greenish gray to gray silty fine SAND, few clay nodules, trace gravel (shell fragments), poorly graded.	SM		7 8 6	14								
		Bottom of borehole at 60 feet.												

**NOTES** Boring Grouted upon Termination.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 0 ft 8 in \*▽ END OF DAY ---

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**BORING B-4**

PAGE 1 OF 6

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 4/27/2021 **COMPLETED** 4/27/2021 **LATITUDE** 29°54'56.82"N **LONGITUDE** 81°25'5.18"W

**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Open Hole Bentonite Fluid Rotary Drilling

**LOGGED BY** D.Hayward **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** Automatic

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS		
0		Topsoil (4")														
1	1	Loose, Very dark gray fine SAND with silt, little organic fines, poorly graded.	SP-SM		1 2 3	4										
2	2	Medium dense, Dark gray fine SAND, trace silt, trace root fragments, poorly graded.	SP		3 4 8 7	12	31	3								
5	3	Medium dense, Very dark gray fine SAND with silt, trace root fragments, poorly graded.	SP-SM		5 5 9 13	14										
	4				5 8 10 10	18										
10	5	Medium dense to dense, Very dark gray fine SAND with silt, trace organic fines and root fragments, poorly graded. (Hardpan)	SP-SM		8 10 12 13	22										
	6				8 11 13	24									27	5
15	7				7 12 15	27										
20																

NEW MAE LOG LAT/LONG-EOD\_G - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:54 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

**NOTES** Boring Grouted upon Termination.

**GROUND WATER LEVELS**





▽ AT TIME OF DRILLING 0 ft 6 in \*▽ END OF DAY ---

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida

**CLIENT** Mott MacDonald Florida, LLC

NEW MAE LOG LAT/LONG-EOD\_G - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:54 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
20		Medium dense to dense, Very dark gray fine SAND with silt, trace organic fines and root fragments, poorly graded. (Hardpan) (continued)	SP-SM											
25	8				5 7 10	17								
30	9	Medium dense, Yellowish brown fine SAND with silt, poorly graded.	SP-SM		5 9 9	18								
35	10	Medium dense, Light yellowish brown fine SAND with silt, trace cemented sand, poorly graded.	SP-SM		6 8 8	16								
40	11	Medium dense, Gray fine SAND with silt, poorly graded.	SP-SM		5 5 5	10								

**NOTES** Boring Grouted upon Termination.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 0 ft 6 in \*▽ END OF DAY ---



**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida

**CLIENT** Mott MacDonald Florida, LLC

NEW MAE LOG LAT/LONG-EOD. G - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:54 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
45	12	Medium dense, Gray fine SAND with silt, poorly graded. (continued)	SP-SM		4	9								
	5													
50	13				3	13								
	5													
55	14	Medium dense, Dark greenish gray silty fine SAND, poorly graded.	SM		7	11								
	6													
60	15	Loose, Dark greenish gray silty fine SAND, little gravel (shell fragments), poorly graded.	SM		3	7								
	4													

**NOTES** Boring Grouted upon Termination.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 0 ft 6 in \*▽ END OF DAY ---

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida

**CLIENT** Mott MacDonald Florida, LLC

NEW MAE LOG LAT/LONG-EOD\_G - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:54 - F:\GINT\GINT FILES\PROJECTS\103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
65	16	Medium dense, Dark greenish gray very silty fine SAND with clay, trace gravel (shell fragments), poorly graded. (continued)	SM		3	11								
					3									
70	17	Medium dense, Gray silty fine SAND, poorly graded.	SM		5	18								
					8									
75	18	Medium dense, Greenish gray fine SAND with silt, some sand to gravel-sized shell fragments, poorly graded.	SP-SM		5	13								
					5									
80	19	Medium dense, Greenish gray fine SAND with silt, some sand to gravel-sized shell fragments, poorly graded.	SP-SM		6	14	37	10						
					6									
85	20	Medium dense, Greenish gray fine SAND with silt, some sand to gravel-sized shell fragments, poorly graded.	SP-SM		7	16	36	8						
					7									

**NOTES** Boring Grouted upon Termination.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 0 ft 6 in \*▽ END OF DAY ---



**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida

**CLIENT** Mott MacDonald Florida, LLC

NEW MAE LOG LAT/LONG-EOD\_G - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:54 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
		Medium dense, Greenish gray fine SAND with silt, some sand to gravel-sized shell fragments, poorly graded. (continued)	SP-SM											
90	21				10 13 20	33								
		Dense, Gray silty fine to coarse-grained SAND, few gravel (weathered limestone fragments), poorly graded.	SM											
95	22				28 26 36	62								
		Very dense, Gray fine to coarse-grained SAND with silt, few gravel (weathered limestone fragments), poorly graded.	SP-SM											
100	23				50/5"	50/5"								
		Hard, Highly Weathered Limestone.												
105	24				50/5.5"	50/5.5"								
		Loose, Dark greenish gray silty fine SAND, poorly graded. (Marl)	SM											

**NOTES** Boring Grouted upon Termination.

50/5" Indicates 50 hammer blows drove split spoon sampler 5 inches.

**GROUND WATER LEVELS**

∇ AT TIME OF DRILLING 0 ft 6 in \* ∇ END OF DAY ---



**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida

**CLIENT** Mott MacDonald Florida, LLC

NEW MAE LOG LAT/LONG-EOD\_G - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:54 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
110	25	Loose, Dark greenish gray silty fine SAND, poorly graded. (Marl) <i>(continued)</i>	SM		2 4 3	7								
115	26	Very stiff, Dark greenish gray sandy SILT. (Marl)	MH		8 6 6	12								
120	27	Medium dense, Dark greenish gray silty fine SAND, poorly graded.	SM		3 3 5	8								
125	28	Hard, Highly Weathered Limestone.			21 29 28	57								
		Bottom of borehole at 125 feet.												

**NOTES** Boring Grouted upon Termination.

**GROUND WATER LEVELS**

∇ AT TIME OF DRILLING 0 ft 6 in \* ∇ END OF DAY ---

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FL. Registry No. 28142  
 3728 Phillips Highway, Suite 208  
 Jacksonville, FL 32207  
 P: (904)519-6990 F: (904)519-6992



**BORING B-5**

PAGE 1 OF 3

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 4/23/2021 **COMPLETED** 4/23/2021 **LATITUDE** 29°54'57.29"N **LONGITUDE** 81°25'4.63"W

**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Open Hole Bentonite Fluid Rotary Drilling

**LOGGED BY** D.Hayward **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** Automatic

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0		▽ Topsoil (6")												
1	1	Loose, Gray fine SAND, poorly graded.	SP		2 2 3 4	5								
2	2	Medium dense, Very dark gray fine SAND with silt, trace organic fines and root fragments, poorly graded.	SP-SM		3 5 4 4	9								
5	3	Medium dense, Very dark gray fine SAND with silt, few organic fines, poorly graded.	SP-SM		3 6 5 8	11	27	5	2.4					
4	4				6 6 7 12	13								
5	5				7 8 10 13	18								
10		Medium dense, Very dark gray fine SAND with silt, trace organic fines, poorly graded.	SP-SM											
15	6				16 24 30	54								
		Very dense, Very dark gray fine SAND with silt, few organic fines, poorly graded. (Hardpan)	SP-SM											
20	7	Dense, Very dark brown to brown fine SAND with silt, few organic fines, little cemented sand, poorly graded. (Hardpan)	SP-SM		16 16 11	27								

NEW MAE LOG LAT/LONG-EOD\_G - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:54 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

**NOTES** Boring Grouted upon Termination.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 0 ft 6 in \*▽ END OF DAY ---



**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida

**CLIENT** Mott MacDonald Florida, LLC

NEW MAE LOG LAT/LONG-EOD\_G - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:54 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
20		Dense, Very dark brown to brown fine SAND with silt, few organic fines, little cemented sand, poorly graded. (Hardpan) (continued)	SP-SM											
25	8	Medium dense, Yellowish brown fine SAND, poorly graded.	SP		4 4 5	9								
30	9	Medium dense, Light yellowish brown fine SAND, poorly graded.	SP		5 6 6	12								
35	10	Medium dense, Olive yellow fine SAND, poorly graded.	SP		5 7 11	18								
40	11	Medium dense, Gray fine SAND with silt, poorly graded.	SP-SM		4 5 6	11								

**NOTES** Boring Grouted upon Termination.

**GROUND WATER LEVELS**

∇ AT TIME OF DRILLING 0 ft 6 in \* ∇ END OF DAY ---



**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida

**CLIENT** Mott MacDonald Florida, LLC

NEW MAE LOG LAT/LONG-EOD\_G - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:54 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
45	12	Medium dense, Gray fine SAND with silt, poorly graded. (continued)	SP-SM		6	13								
	7													
50	13				7	18								
					8									
					10									
55	14	Medium dense, Gray silty fine SAND with clay, poorly graded.	SM		5	11								
60	15	Medium dense, Dark greenish gray silty fine SAND, little gravel (shell fragments), poorly graded.	SM		2	8								
					4									
		Bottom of borehole at 60 feet.												

**NOTES** Boring Grouted upon Termination.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 0 ft 6 in \*▽ END OF DAY ---

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 3728 Phillips Highway, Suite 208  
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**BORING B-6**

PAGE 1 OF 3

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 4/23/2021 **COMPLETED** 4/23/2021 **LATITUDE** 29°54'56.17"N **LONGITUDE** 81°25'4.99"W

**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Open Hole Bentonite Fluid Rotary Drilling

**LOGGED BY** D.Hayward **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** Automatic

NEW MAE LOG LAT/LONG-EOD\_G - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:54 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0		Topsoil (6")			1									
	1	Loose, Very dark gray fine SAND, trace root fragments, poorly graded.	SP		2 3 3	5								
	2	Medium dense, Very dark gray fine SAND with silt, trace root fragments, poorly graded.	SP-SM		3 7 10 11	17								
5	3	Medium dense, Very dark gray fine SAND with silt, few organic fines, poorly graded.	SP-SM		5 7 7 7	14								
	4				7 7 8 10	15								
	5	Medium dense, Very dark gray fine SAND with silt, poorly graded.	SP-SM		8 8 9 13	17	21	8						
10														
	6				10 9 11	20								
15		Medium dense, Very dark brown fine SAND with silt, little organic fines, poorly graded. (Hardpan)	SP-SM											
	7	Medium dense, Very dark grayish brown to very dark brown fine SAND with silt, little cemented sand, trace organic fines, poorly graded. (Hardpan)	SP-SM		7 8 10	18								
20														

**NOTES** Boring Grouted upon Termination.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 0 ft 7 in \*▽ END OF DAY ---





**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida

**CLIENT** Mott MacDonald Florida, LLC

NEW MAE LOG LAT/LONG-EOD\_G - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:54 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
20		Medium dense, Very dark grayish brown to very dark brown fine SAND with silt, little cemented sand, trace organic fines, poorly graded. (Hardpan) (continued)	SP-SM											
25	8				3 5 8	13								
30	9	Medium dense, Light olive brown fine SAND, poorly graded.	SP		7 8 14	22								
35	10	Medium dense, Olive gray fine SAND, poorly graded.	SP		5 8 12	20								
40	11	Medium dense, Olive to dark grayish brown fine SAND with silt, poorly graded.	SP-SM		3 7 7	14								

**NOTES** Boring Grouted upon Termination.

**GROUND WATER LEVELS**

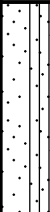
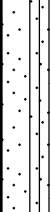
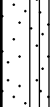
∇ AT TIME OF DRILLING 0 ft 7 in \* ∇ END OF DAY ---

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida

**CLIENT** Mott MacDonald Florida, LLC

NEW MAE LOG LAT/LONG-EOD\_G - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:54 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
45	12	Medium dense, Olive to dark grayish brown fine SAND with silt, poorly graded. <i>(continued)</i>	SP-SM		8 6 7	13								
50	13				8 16 10	26								
55	14	Medium dense to dense, Dark gray to brownish gray fine SAND with silt, poorly graded.	SP-SM		12 11 10	21								
60	15	Medium dense, Dark grayish brown fine SAND with silt, trace clay nodules, poorly graded.	SP-SM		10 12 8	20								
		Bottom of borehole at 60 feet.												

**NOTES** Boring Grouted upon Termination.

**GROUND WATER LEVELS**

∇ AT TIME OF DRILLING 0 ft 7 in \* ∇ END OF DAY ---

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**BORING B-7**

PAGE 1 OF 1

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 4/22/2021 **COMPLETED** 4/22/2021 **LATITUDE** 29°54'56.91"N **LONGITUDE** 81°25'3.83"W

**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Open Hole Bentonite Fluid Rotary Drilling

**LOGGED BY** D.Hayward **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** Automatic

NEW MAE LOG LAT/LONG-EOD\_CUTTINGS - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:56 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS	
0		Topsoil (3")													
1	1	Very loose, Very dark gray fine SAND with silt, trace organic fines and root fragments, poorly graded.	SP-SM		1 1 1 1	2									
2	2	Loose Very dark grayish brown fine SAND with silt, trace organic fines, poorly graded.	SP-SM		1 2 1 2	3									
5	3	Medium dense, Very dark gray fine SAND with silt, little organic fines, poorly graded.	SP-SM		2 4 7 8	11	24	11	5.4						
4	4				6 10 11 13										21
10	5	Dense, Very dark brown fine SAND with silt, few organic fines and cemented sand, poorly graded. (Hardpan)	SP-SM		12 12 13 16	25									
15	6				23 15 25										40
20	7				10 25 28										

Bottom of borehole at 20 feet.

**NOTES** Boring backfilled with soil cuttings.

**GROUND WATER LEVELS**

∇ AT TIME OF DRILLING 0 ft 10 in \*∇ END OF DAY ---

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**BORING B-8**

PAGE 1 OF 1

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 4/29/2021 **COMPLETED** 4/29/2021 **LATITUDE** 29°54'56.70"N **LONGITUDE** 81°25'4.09"W

**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Open Hole Bentonite Fluid Rotary Drilling

**LOGGED BY** D.Hayward **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** Automatic

NEW MAE LOG LAT/LONG-EOD\_CUTTINGS - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:56 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0		Topsoil (4")												
0	1	Loose, Very dark gray fine SAND with silt, trace organic fines, poorly graded.	SP-SM		2 2 2 2	4								
0	2	Loose, Very dark grayish brown silty fine SAND, few organic fines, trace root fragments, poorly graded.	SM		2 2 2 2	4	28	16	4.5					
5	3	Medium dense, Very dark gray silty fine SAND, few organic fines, poorly graded.	SM		2 3 6 8	9								
0	4	Medium dense, Very dark gray fine SAND with silt, trace organic fines, poorly graded.	SP-SM		4 7 7 8	14								
0	5				8 11 16 13	27								
10		Dense, Very dark gray fine SAND with silt, few organic fines, poorly graded.	SP-SM											
15	6				21 29 37	66								
0		Very dense, Very dark gray fine SAND with silt, trace organic fines, poorly graded. (Hardpan)	SP-SM											
20	7				17 25 33	58								

Bottom of borehole at 20 feet.

**NOTES** Boring backfilled with soil cuttings.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 0 ft 6 in \*▽ END OF DAY ---

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**BORING B-9**

PAGE 1 OF 1

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station  
**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC  
**DATE STARTED** 4/29/2021 **COMPLETED** 4/29/2021 **LATITUDE** 29°54'56.37"N **LONGITUDE** 81°25'4.01"W  
**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Open Hole Bentonite Fluid Rotary Drilling  
**LOGGED BY** D.Hayward **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** Automatic

NEW MAE LOG LAT/LONG-EOD\_CUTTINGS - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:56 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0		Topsoil (5")			1									
1	1	Loose, Very dark gray silty fine SAND, few organic fines, trace root fragments, poorly graded.	SM		1	3								
2	2													
3	3													
4	2	Medium dense, Very dark gray fine SAND with silt, trace organic fines, poorly graded.	SP-SM		2	7								
5	3													
6	4													
7	5													
8	3	Medium dense, Dark gray to gray fine SAND with silt, poorly graded.	SP-SM		4	16	22	6						
9	4													
10	6													
11	4	Medium dense to dense, Very dark brown fine SAND with silt, trace organic fines, poorly graded.	SP-SM		6	16								
12	8													
13	8													
14	5	Medium dense to dense, Very dark brown fine SAND with silt, trace organic fines, poorly graded.	SP-SM		8	16								
15	8													
16	8													
17	6	Dense, Very dark brown fine SAND with silt, trace organic fines and cemented sand, poorly graded. (Hardpan)	SP-SM		12	35								
18	16													
19	19													
20	7	Dense, Very dark brown fine SAND with silt, trace organic fines and cemented sand, poorly graded. (Hardpan)	SP-SM		10	39								
21	15													
22	24													

Bottom of borehole at 20 feet.

**NOTES** Boring backfilled with soil cuttings.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 0 ft 7 in \*▽ END OF DAY ---

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**BORING B-10**

PAGE 1 OF 1

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 4/29/2021 **COMPLETED** 4/29/2021 **LATITUDE** 29°54'56.12"N **LONGITUDE** 81°25'3.87"W

**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Open Hole Bentonite Fluid Rotary Drilling

**LOGGED BY** D.Hayward **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** Automatic

NEW MAE LOG LAT/LONG-EOD\_CUTTINGS - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:56 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0		Topsoil (4")												
1	1	Loose, Very dark gray fine SAND with silt, few organic fines, trace root fragments, poorly graded.	A-3		1 1 2 2	3								
2	2	Medium dense, Very dark gray fine SAND with silt, poorly graded, trace organic fines, poorly graded.	A-3		4 5 7 8	12								
5	3	Medium dense, Very dark gray silty fine SAND, few organic fines, poorly graded.	A-2-4		6 6 7 6	13								
		Bottom of borehole at 6 feet.												

**NOTES** Boring backfilled with soil cuttings.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 0 ft 7 in \*▽ END OF DAY ---

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**BORING B-11**

PAGE 1 OF 1

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 4/29/2021 **COMPLETED** 4/29/2021 **LATITUDE** 29°54'56.31"N **LONGITUDE** 81°25'3.14"W

**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Open Hole Bentonite Fluid Rotary Drilling

**LOGGED BY** D.Hayward **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** Automatic

NEW MAE LOG LAT/LONG-EOD\_CUTTINGS - NEW TEMPLATE 7-30-12\_GDT - 5/18/21 14:56 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	USCS	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0		Topsoil (4")			1									
1	1	Loose, Very dark gray to gray fine SAND with silt, trace root fragments, poorly graded.	A-3		1 2 2	3								
2	2	Loose, Very dark gray fine SAND with silt, few organic fines, poorly graded.	A-3		3 4 3 3	7								
5	3	Loose, Very dark gray fine SAND with silt, few organic fines, trace cemented sand, poorly graded.	A-3		2 2 3 2	5								
		Bottom of borehole at 6 feet.												

**NOTES** Boring backfilled with soil cuttings.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 0 ft 6 in \*▽ END OF DAY ---

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**BORING HA-1**

PAGE 1 OF 1

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 4/15/2021 **COMPLETED** 4/15/2021 **LATITUDE** 29°54'57.66"N **LONGITUDE** 81°25'6.69"W

**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Hand Auger

**LOGGED BY** D.Hayward **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** —

NEW MAE LOG AASHTO LAT\_LONG\_HA - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:57 - F:\GINT\GINT FILES\PROJECTS\103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	AASHTO	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0.0		Topsoil (5")												
	1	Very dark gray fine SAND with silt, few organic fines, poorly graded.	A-3											
	2	Very dark gray fine SAND with silt, trace root fragments, poorly graded.	A-3											
2.5	3													
	4	Very dark brown fine SAND with silt, poorly graded.	A-3											
		Bottom of borehole at 4 feet.												

**NOTES** Boring backfilled with soil cuttings.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 2 ft 4 in \*▽ END OF DAY ---



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**BORING HA-4**

PAGE 1 OF 1

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD 208-CR Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 4/15/2021 **COMPLETED** 4/15/2021 **LATITUDE** 29°54'56.82"N **LONGITUDE** 81°25'5.18"W

**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Hand Auger

**LOGGED BY** D.Hayward **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** —

NEW MAE LOG AASTHO LAT\_LONG\_HA - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:57 - F:\GINT\GINT FILES\PROJECTS\103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	AASHTO	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0.0		Topsoil (6")												
	1	Dark gray fine SAND with silt, trace root fragments, poorly graded.	A-3											
	2	Very dark gray fine SAND with silt, trace to few organic fines, trace root fragments, poorly graded.	A-3											
	3													
2.5	4													
		Bottom of borehole at 4 feet.												

**NOTES** Boring backfilled with soil cuttings.

**GROUND WATER LEVELS**

∇ AT TIME OF DRILLING 1 ft 10 in \*∇ END OF DAY ---

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**BORING HA-9**

PAGE 1 OF 1

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD 208-CR Potable Water Storage Tank & Booster Pump Station

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 4/15/2021 **COMPLETED** 4/15/2021 **LATITUDE** 29°54'56.37"N **LONGITUDE** 81°25'4.01"W

**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Hand Auger

**LOGGED BY** D.Hayward **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** —

NEW MAE LOG AASTHO LAT\_LONG\_HA - NEW TEMPLATE 7-30-12.GDT - 5/18/21 14:57 - F:\GINT\GINT FILES\PROJECTS\103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	AASHTO	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0.0		Topsoil (6")												
	1	Very dark gray fine SAND with silt, trace root fragments, poorly graded.	A-3											
	2													
2.5	3													
	4	Very dark grayish brown fine SAND with silt, poorly graded.	A-3											
		Bottom of borehole at 4 feet.												

**NOTES** Boring backfilled with soil cuttings.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 2 ft 6 in \*▽ END OF DAY ---

**Meskel & Associates Engineering, PLLC**

FL. Registry No. 28142  
 3728 Philips Highway, Suite 208  
 Jacksonville, FL 32207  
 P: (904)519-6990 F: (904)519-6992



**BORING B-12**

PAGE 1 OF 1

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Proposed Water Main and Reclaimed Water Main

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 7/12/2022 **COMPLETED** 7/12/2022 **LATITUDE** 29°55'8.06"N **LONGITUDE** 81°25'4.08"W

**DRILLING CONTRACTOR** Suncoast Drilling-JAX, LLC **DRILLING METHOD** Open Hole Bentonite Fluid Rotary Drilling

**LOGGED BY** Brandon H. **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** Safety

NEW MAE LOG AASHTO LAT\_LONG - NEW TEMPLATE 7-30-12.GDT - 7/14/22 11:27 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	AASHTO	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0		Topsoil (4")			2									
1	1	Loose to medium dense, Dark gray fine SAND with silt, poorly graded.	A-3		4	9								
2	5													
3	7													
5	3	Medium dense to very dense, Very dark gray fine SAND with silt, trace organic fines, poorly graded. ▽ (Hardpan)	A-3		7	21								
4	11													
5	15													
6	21													
7	4				9	33								
8	12													
9	21													
10	26													
10	5				36	79								
9	39													
8	40													
7	46													
		Bottom of borehole at 10 feet.												

**NOTES** Boring backfilled with soil cuttings.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 7 ft 6 in \*▽ END OF DAY ---

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 Jacksonville, FL 32207  
 P: (904)519-6990 F: (904)519-6992



**BORING B-13**

PAGE 1 OF 1

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Proposed Water Main and Reclaimed Water Main

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 6/24/2022 **COMPLETED** 6/24/2022 **LATITUDE** 29°55'4.52"N **LONGITUDE** 81°25'5.28"W

**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Hand Auger

**LOGGED BY** S.Sykes **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** —

NEW MAE LOG AASTHO LAT\_LONG\_HA - NEW TEMPLATE 7-30-12.GDT - 7/6/22 09:47 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GS& AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	AASHTO	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0.0		Topsoil (2")												
	1	Gray fine SAND, poorly graded.	A-3											
	2	Very dark brown fine SAND with silt, few organic fines, poorly graded.	A-3											
2.5	3	Dark gray fine SAND with silt, poorly graded.	A-3											
	4	Very dark brown fine SAND with silt, few organic fines, poorly graded.	A-3											
5.0	5	Very dark gray fine SAND with silt, trace organic fines.	A-3											
	6													
		Bottom of borehole at 6 feet.												

**NOTES** Boring backfilled with soil cuttings.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 5 ft 2 in \*▽ END OF DAY ---

**Meskel & Associates Engineering, PLLC**

FL. Registry No. 28142  
 3728 Philips Highway, Suite 208  
 Jacksonville, FL 32207  
 P: (904)519-6990 F: (904)519-6992



**BORING B-14**

PAGE 1 OF 1

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Proposed Water Main and Reclaimed Water Main

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 6/24/2022 **COMPLETED** 6/24/2022 **LATITUDE** 29°55'0.97"N **LONGITUDE** 81°25'6.37"W

**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Hand Auger

**LOGGED BY** S.Sykes **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** —

NEW MAE LOG AASTHO LAT\_LONG\_HA - NEW TEMPLATE 7-30-12.GDT - 7/6/22 09:47 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	AASHTO	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0.0		Topsoil (1")												
	1	Gray fine SAND, poorly graded.	A-3											
	2	Dark gray fine SAND with silt, poorly graded.	A-3											
	3													
2.5	4													
	5	Very dark gray fine SAND with silt, trace organic fines, poorly graded.	A-3											
	6													
5.0		Bottom of borehole at 6 feet.												

**NOTES** Boring backfilled with soil cuttings.

**GROUND WATER LEVELS**

▽ AT TIME OF DRILLING 5 ft 0 in \*▽ END OF DAY ---

**Meskel & Associates Engineering, PLLC**

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 3728 Philips Highway, Suite 208  
 Jacksonville, FL 32207  
 P: (904)519-6990 F: (904)519-6992



**BORING B-15**

PAGE 1 OF 1

PROJECT NO. 0103-0026

**PROJECT NAME** SJCUD-CR 208 Proposed Water Main and Reclaimed Water Main

**PROJECT LOCATION** St. Johns County, Florida **CLIENT** Mott MacDonald Florida, LLC

**DATE STARTED** 6/24/2022 **COMPLETED** 6/24/2022 **LATITUDE** 29°54'57.41"N **LONGITUDE** 81°25'7.52"W

**DRILLING CONTRACTOR** MAE, PLLC **DRILLING METHOD** Hand Auger

**LOGGED BY** S.Sykes **CHECKED BY** C.Purvis **GROUND ELEVATION** — **HAMMER TYPE** —

NEW MAE LOG AASTHO LAT\_LONG\_HA - NEW TEMPLATE 7-30-12.GDT - 7/6/22 09:47 - F:\GINT\GINT FILES\PROJECTS\0103-0026\GST AND BOOSTER PUMP STATION.GPJ

DEPTH (ft)	SAMPLE DEPTH NUMBER	MATERIAL DESCRIPTION	AASHTO	GRAPHIC LOG	BLOW COUNTS	N-VALUE	MOISTURE CONTENT (%)	FINES CONTENT (%)	ORGANIC CONTENT (%)	LIQUID LIMIT	PLASTICITY INDEX	POCKET PEN. (tsf)	RECOVERY % (RQD)	REMARKS
0.0		Topsoil (1")												
	1	Gray fine SAND, poorly graded.	A-3											
	2	Dark gray fine SAND with silt, poorly graded.	A-3											
	3													
2.5	4													
	5	Dark grayish brown fine SAND with silt, poorly graded.	A-3											
	6													
5.0		Very dark gray fine SAND with silt, trace organic fines, poorly graded.	A-3											
		Bottom of borehole at 6 feet.												

**NOTES** Boring backfilled with soil cuttings.

**GROUND WATER LEVELS**

∇ AT TIME OF DRILLING 5 ft 1 in \* ∇ END OF DAY ---

## **FIELD EXPLORATION PROCEDURES**

### **Standard Penetration Test (SPT) Borings**

The Standard Penetration Test (SPT) boring(s) were performed in general accordance with the latest revision of ASTM D 1586, "Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils." The borings were advanced by rotary drilling techniques. A split-barrel sampler was inserted to the borehole bottom and driven 18 to 24 inches into the soil using a 140-pound hammer falling an average of 30 inches per hammer blow. The number of hammer blows for the final 12 inches of penetration (18" sample) or for the sum of the middle 12 inches of penetration (24" sample) is termed the "penetration resistance, blow count, or N-value." This value is an index to several in-situ geotechnical properties of the material tested, such as relative density and Young's Modulus.

After driving the sampler, it was retrieved from the borehole and representative samples of the material within the split-barrel were containerized and sealed. After completing the drilling operations, the samples for each boring were transported to the laboratory where they were examined by a geotechnical engineer to verify the field descriptions and classify the soil, and to select samples for laboratory testing.

Once the boring is complete and the groundwater level is measured, the borehole is backfilled with soil, or it is backfilled from bottom to top with a lean cementitious grout.

# KEY TO BORING LOGS – USCS/AASHTO

## Soil Classification

Soil classification of samples obtained at the boring locations is based on both the Unified Soil Classification System (USCS) and the American Association of State Highway and Transportation Officials (AASHTO) Classification System. Coarse grained soils have more than 50% of their dry weight retained on a #200 sieve. Their principal descriptors are: sand, cobbles and boulders. Fine grained soils have less than 50% of their dry weight retained on a #200 sieve. They are principally described as clays if they are plastic and silts if they are slightly to non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

BORING LOG LEGEND	
Symbol	Description
N	Standard Penetration Resistance, the number of blows required to advance a standard spoon sampler 12" when driven by a 140-lb hammer dropping 30".
WOR	Split Spoon sampler advanced under the weight of the drill rods
WOH	Split Spoon sampler advanced under the weight of the SPT hammer
50/2"	Indicates 50 hammer blows drove the split spoon 2 inches; 50 Hammer blows for less than 6-inches of split spoon driving is considered "Refusal".
(SP)	Unified Soil Classification System
-200	Fines content, % Passing No. 200 U.S. Standard Sieve
w	Natural Moisture Content (%)
OC	Organic Content (%)
LL	Liquid Limit
PI	Plasticity Index
NP	Non-Plastic
PP	Pocket Penetrometer in tons per square foot (tsf)

MODIFIERS	
<b>SECONDARY CONSTITUENTS</b> (Sand, Silt or Clay)	
Trace	Less than 5%
With	5% to 12%
Sandy, Silty or Clayey	12% to 35%
Very Sandy, Very Silty or Very Clayey	35% to 50%
<b>ORGANIC CONTENT</b>	
Trace	2% or less
Few	3% to 5%
Little	5% to 10%
With	Greater than 10%
<b>MINOR COMPONENTS</b> (Shell, Rock, Debris, Roots, etc.)	
Trace	Less than 5%
Few	5% to 10%
Little	15% to 25%
Some	30% to 45%

RELATIVE DENSITY (Coarse-Grained Soils)	
Relative Density	N-Value *
Very Loose	Less than 3
Loose	3 to 8
Medium Dense	8 to 24
Dense	24 to 40
Very Dense	Greater than 40
CONSISTENCY (Fine-Grained Soils)	
Consistency	N-Value *
Very Soft	Less than 1
Soft	1 to 3
Firm	3 to 6
Stiff	6 to 12
Very Stiff	12 to 24
Hard	Greater than 24
RELATIVE HARDNESS (Limestone)	
Relative Hardness	N-Value *
Soft	Less than 50
Hard	Greater than 50

\* Using Automatic Hammer



# Unified Soil Classification System (USCS)

## (from ASTM D 2487)

Major Divisions		Group Symbol	Typical Names
<b>Coarse-Grained Soils</b> More than 50% retained on the 0.075 mm (No. 200) sieve	<b>Gravels</b> 50% or more of coarse fraction retained on the 4.75 mm (No. 4) sieve	Clean Gravels	GW Well-graded gravels and gravel-sand mixtures, little or no fines
			GP Poorly graded gravels and gravel-sand mixtures, little or no fines
		Gravels with Fines	GM Silty gravels, gravel-sand-silt mixtures
			GC Clayey gravels, gravel-sand-clay mixtures
	<b>Sands</b> 50% or more of coarse fraction passes the 4.75 (No. 4) sieve	Clean Sands	SW Well-graded sands and gravelly sands, little or no fines
			SP Poorly graded sands and gravelly sands, little or no fines
		Sands with Fines	SM Silty sands, sand-silt mixtures
			SC Clayey sands, sand-clay mixtures
<b>Fine-Grained Soils</b> More than 50% passes the 0.075 mm (No. 200) sieve	<b>Silts and Clays</b> Liquid Limit 50% or less	ML Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	
		CL Inorganic clays of low to medium plasticity, gravelly/sandy/silty/lean clays	
		OL Organic silts and organic silty clays of low plasticity	
	<b>Silts and Clays</b> Liquid Limit greater than 50%	MH Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts	
		CH Inorganic clays or high plasticity, fat clays	
		OH Organic clays of medium to high plasticity	
<b>Highly Organic Soils</b>		PT Peat, muck, and other highly organic soils	

Prefix: G = Gravel, S = Sand, M = Silt, C = Clay, O = Organic

Suffix: W = Well Graded, P = Poorly Graded, M = Silty, L = Clay, LL < 50%, H = Clay, LL > 50%

# AASHTO Soil Classification System

(from AASHTO M 145 or ASTM D 3282)

General Classification	Granular Materials (35% or less passing the 0.075 mm sieve)							Silt-Clay Materials (>35% passing the 0.075 mm sieve)			
	A-1		A-3	A-2				A-4	A-5	A-6	A-7
Group Classification	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5*
<b>Sieve Analysis, % passing:</b>											
2.00 mm (No. 10)	50 max	...	...	...	...	...	...	...	...	...	...
0.425 (No. 40)	30 max	50 max	51 min	...	...	...	...	...	...	...	...
0.075 (No. 200)	15 max	25 max	10 max	35 max	35 max	35 max	35 max	36 min	36 min	36 min	36 min
<b>Characteristics of fraction passing 0.425 mm (No. 40):</b>											
Liquid Limit	...	...	40 max	41 min	40 max	41 min	40 max	41 min	40 max	41 min	41 min
Plasticity Index	6 max	N.P.	10 max	10 max	11 min	11 min	10 max	10 max	11 min	11 min	11 min
Usual types of significant constituent materials	stone fragments, gravel and sand		fine sand	silty or clayey gravel and sand				silty soils		clayey soils	
General <i>local</i> ** rating as a subgrade	excellent to good			fair to poor							

\* Plasticity index of A-7-5 subgroup is equal to or less than the LL - 30. Plasticity index of A-7-6 subgroup is greater than LL - 30

\*\* Northeast Florida

*Appendix B*

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**Summary of Laboratory Index Test Results**  
**SJCUD - 208 Ground Storage Tank and Booster Pump Station**  
**MAE Project No.: 0103-0026**

Boring No.	Sample No.	Approximate Test Depth <sup>(1)</sup> (ft)	Coordinates		Gradation Test, % Passing							Natural Moisture Content, %	Organic Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	AASHTO <sup>(3)</sup> USCS <sup>(4)</sup> Classification
			Latitude	Longitude	No. 4	No. 10	No. 20	No. 40	No. 60	No. 100	No. 200						
			B-1	2	2 to 4	29°54'57.66"N	81°25'6.69"W	---	---	---	---						
B-1	3	4 to 6	29°54'57.66"N	81°25'6.69"W	---	---	---	---	---	---	5	24	---	---	---	---	A-3
B-1	5	8 to 10	29°54'57.66"N	81°25'6.69"W	---	---	---	---	---	---	3	18	---	---	---	---	A-3
B-2	3	4 to 6	29°54'56.75"N	81°25'6.98"W	---	---	---	---	---	---	9	23	9.4	---	---	---	A-3
B-2	4	6 to 8	29°54'56.75"N	81°25'6.98"W	---	---	---	---	---	---	9	18	---	---	---	---	A-3
B-3	1	0 to 2	29°54'57.00"N	81°25'5.92"W	---	---	---	---	---	---	7	32	5.6	---	---	---	SP-SM
B-3	8	23.5 to 25	29°54'57.00"N	81°25'5.92"W	---	---	---	---	---	---	2	26	---	---	---	---	SP
B-4	Bulk <sup>(2)</sup>	2 to 4	29°54'56.82"N	81°25'5.18"W	---	---	---	---	---	---	3	31	---	---	---	---	SP
B-4	6	13.5 to 15	29°54'56.82"N	81°25'5.18"W	---	---	---	---	---	---	5	27	---	---	---	---	SP-SM
B-4	19	78.5 to 80	29°54'56.82"N	81°25'5.18"W	94	79	58	49	42	19	10	37	---	---	---	---	SP-SM
B-4	20	83.5 to 85	29°54'56.82"N	81°25'5.18"W	88	69	47	35	29	13	8	36	---	---	---	---	SP-SM
B-5	3	4 to 6	29°54'57.29"N	81°25'4.63"W	---	---	---	---	---	---	5	27	2.4	---	---	---	SP-SM
B-6	5	8 to 10	29°54'56.17"N	81°25'4.99"W	---	---	---	---	---	---	8	21	---	---	---	---	SP-SM
B-7	3	4 to 6	29°54'56.91"N	81°25'3.83"W	---	---	---	---	---	---	11	24	5.4	---	---	---	SP-SM
B-8	2	2 to 4	29°54'56.70"N	81°25'4.09"W	---	---	---	---	---	---	16	28	4.5	---	---	---	SM
B-9	4	6 to 8	29°54'56.37"N	81°25'4.01"W	---	---	---	---	---	---	6	22	---	---	---	---	SP-SM

<sup>(1)</sup> Feet below existing ground surface.

<sup>(2)</sup> Sample obtained in bulk specifically for corrosion series testing

<sup>(3)</sup> American Association of State Highway and Transportation Officials

<sup>(4)</sup> Unified Soil Classification System

## **LABORATORY TEST PROCEDURES**

### **Percent Fines Content**

The percent fines or material passing the No. 200 mesh sieve of the sample tested was determined in general accordance with the latest revision of ASTM D 1140. The percent fines are the soil particles in the silt and clay size range.

### **Natural Moisture Content**

The water content of the tested sample was determined in general accordance with the latest revision of ASTM D 2216. The water content is defined as the ratio of “pore” or “free” water in a given mass of material to the mass of solid material particles.

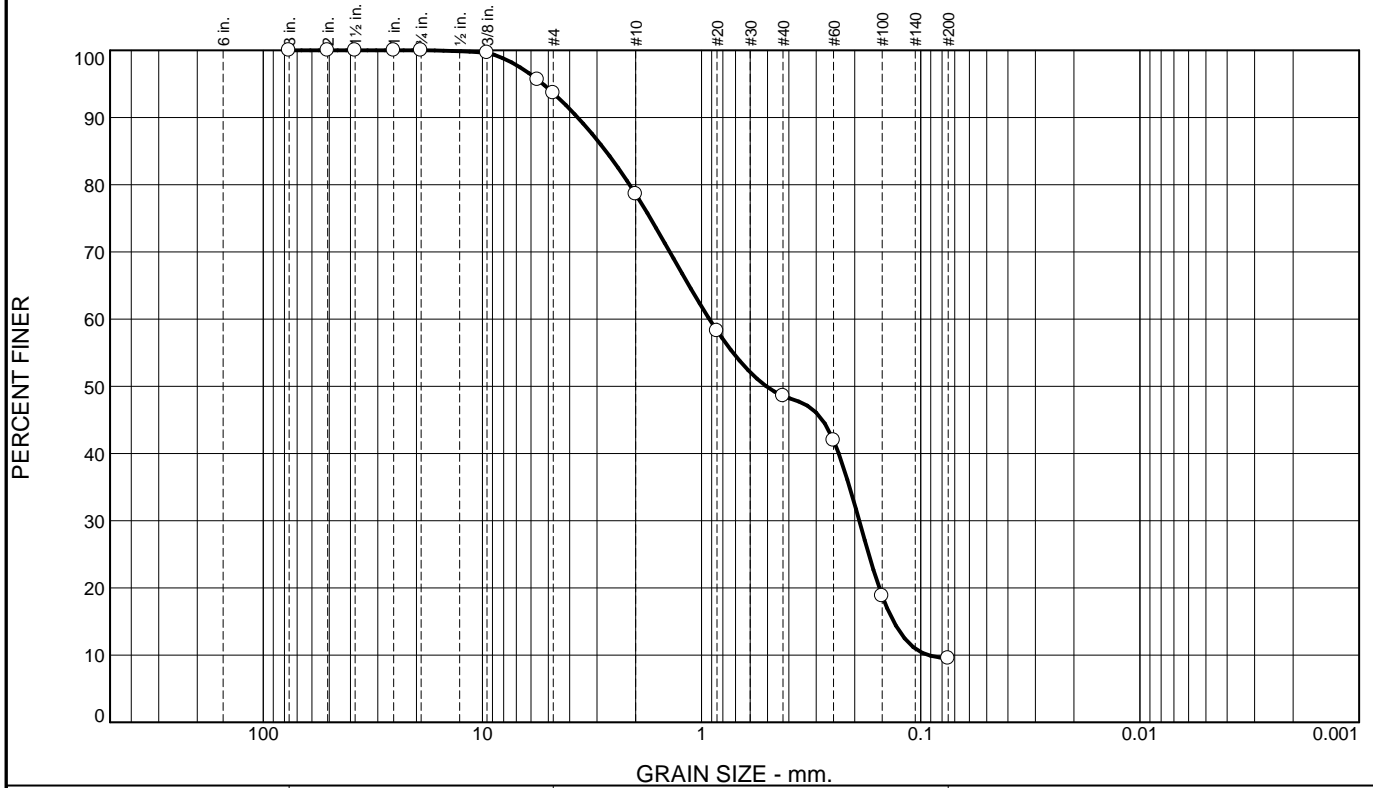
### **Organic Loss on Ignition (Percent Organics)**

The organic loss on ignition or percent organic material in the sample tested was determined in general accordance with ASTM D 2974. The percent organics is the material, expressed as a percentage, which is burned off in a muffle furnace at  $455\pm 10$  degrees Celsius.

### **Gradation**

The particle size analysis or gradation of the sample tested was determined in general accordance with latest revision of ASTM D 422. This test procedure determines the grain size distribution of the tested sample by passing the sample through a standard set of nested sieves.

# Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.4	15.0	30.0	39.1	9.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3	100.0		
2	100.0		
1.5	100.0		
1	100.0		
.75	100.0		
.375	99.6		
#3.5	95.6		
#4	93.6		
#10	78.6		
#20	58.3		
#40	48.6		
#60	42.0		
#100	18.8		
#200	9.5		

**Soil Description**

Greenish gray sand with silt, some sand to gravel-sized shell fragments.

**Atterberg Limits**

PL= \_\_\_\_\_ LL= \_\_\_\_\_ PI= \_\_\_\_\_

**Coefficients**

D<sub>90</sub>= 3.6752      D<sub>85</sub>= 2.7344      D<sub>60</sub>= 0.9214  
 D<sub>50</sub>= 0.5067      D<sub>30</sub>= 0.1908      D<sub>15</sub>= 0.1331  
 D<sub>10</sub>= 0.0925      C<sub>u</sub>= 9.96      C<sub>c</sub>= 0.43

**Classification**

USCS= SW-SM      AASHTO= \_\_\_\_\_

**Remarks**

WC=36.96%

\* (no specification provided)

Source of Sample: B-4      Depth: 78.5 to 80 ft  
 Sample Number: 19

Date: 5/26/21

<b>Meskel &amp; Associates Engineering Jacksonville, Florida</b>	Client: Mott MacDonald Project: 208 Ground Storage Tank and Booster Pump Station Project No: 0103-0026
Figure 1	

Tested By: WC      Checked By: GCP

## GRAIN SIZE DISTRIBUTION TEST DATA

5/27/2021

**Client:** Mott MacDonald

**Project:** 208 Ground Storage Tank and Booster Pump Station

**Project Number:** 0103-0026

**Location:** B-4

**Depth:** 78.5 to 80 ft

**Sample Number:** 19

**Material Description:** Greenish gray sand with silt, some sand to gravel-sized shell fragments.

**Date:** 5/26/21

**USCS Classification:** SW-SM

**Testing Remarks:** WC=36.96%

**Tested by:** WC

**Checked by:** GCP

### Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
244.17	118.77	0.00	3	0.00	100.0
			2	0.00	100.0
			1.5	0.00	100.0
			1	0.00	100.0
			.75	0.00	100.0
			.375	0.45	99.6
			#3.5	5.48	95.6
			#4	7.99	93.6
			#10	26.82	78.6
			#20	52.34	58.3
			#40	64.50	48.6
			#60	72.78	42.0
			#100	101.80	18.8
			#200	113.44	9.5

### Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	6.4	6.4	15.0	30.0	39.1	84.1			9.5

D <sub>5</sub>	D <sub>10</sub>	D <sub>15</sub>	D <sub>20</sub>	D <sub>30</sub>	D <sub>40</sub>	D <sub>50</sub>	D <sub>60</sub>	D <sub>80</sub>	D <sub>85</sub>	D <sub>90</sub>	D <sub>95</sub>
	0.0925	0.1331	0.1545	0.1908	0.2367	0.5067	0.9214	2.1303	2.7344	3.6752	5.3028

Fineness Modulus	C <sub>u</sub>	C <sub>c</sub>
2.42	9.96	0.43





**GRAIN SIZE DISTRIBUTION TEST DATA**

5/27/2021

**Client:** Mott MacDonald

**Project:** 208 Ground Storage Tank and Booster Pump Station

**Project Number:** 0103-0026

**Location:** B-4

**Depth:** 83.5 to 85 ft

**Sample Number:** 20

**Material Description:** Greenish gray sand with silt, some sand to gravel-sized shell fragments.

**Date:** 5/26/21

**USCS Classification:** SW-SM

**Testing Remarks:** WC=35.62

**Tested by:** WC

**Checked by:** GCP

**Sieve Test Data**

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
263.86	122.16	0.00	3	0.00	100.0
			2	0.00	100.0
			1.5	0.00	100.0
			1	0.00	100.0
			.75	0.00	100.0
			.375	4.18	97.1
			#3.5	12.13	91.4
			#4	16.43	88.4
			#10	43.47	69.3
			#20	75.72	46.6
			#40	91.49	35.4
			#60	100.00	29.4
			#100	123.50	12.8
			#200	131.09	7.5

**Fractional Components**

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	11.6	11.6	19.1	33.9	27.9	80.9			7.5

D <sub>5</sub>	D <sub>10</sub>	D <sub>15</sub>	D <sub>20</sub>	D <sub>30</sub>	D <sub>40</sub>	D <sub>50</sub>	D <sub>60</sub>	D <sub>80</sub>	D <sub>85</sub>	D <sub>90</sub>	D <sub>95</sub>
	0.1038	0.1616	0.1870	0.2562	0.6122	0.9792	1.4190	3.1463	3.9993	5.1627	7.3813

Fineness Modulus	C <sub>u</sub>	C <sub>c</sub>
3.01	13.67	0.45

*Appendix C*

---

**Summary of Corrosion Series Test Results**  
**SJCUD 208 Potable Water Storage Tank & Booster Pump Station**  
**St. Johns County, Florida**  
**MAE Project No.: 0103-0026**

Approximate Sample Location	GPS Coordinates Latitude and Longitude		Approximate Test Depth (ft) <sup>(1)</sup>	pH	Resistivity (ohm-cm)	Chlorides (ppm)	Sulfates (ppm)	Environmental Classification	
								Steel Substructure	Concrete Substructure
B-4 <sup>(2)</sup>	29°54'56.82"N	81°25'5.18"W	2 to 4	5.7	23,000	15	138	Extremely Aggressive	Moderately Aggressive

1. Feet below existing ground surface

2. Environmental Classification as Extremely Aggressive for Steel Substructures (PH<6) and Moderately Aggressive for Concrete Substructures (5<PH<6)

# Appendix C

---

Table A-1: Related Reports and Data

## SJCUD CR-208 GST and BPS Pre-Purchasing Quantities

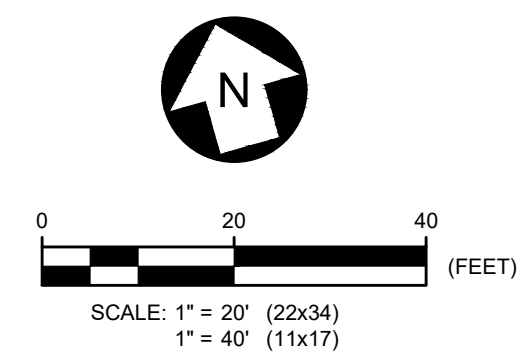
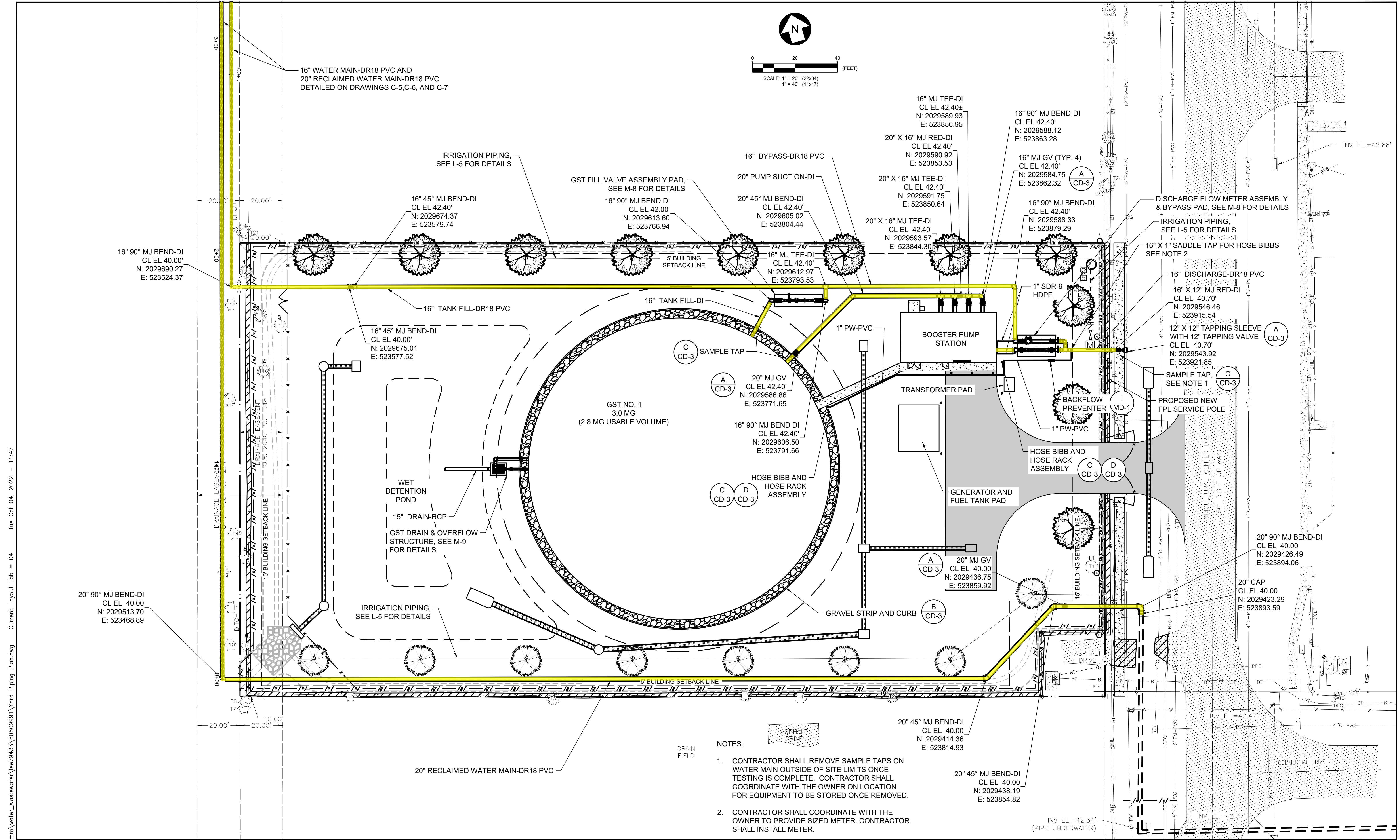
Pipe, Fittings, and Appurtenances	Unit	Total
16" MJ DR18 PVC WM	LF	1500
16" DR 18 PVC Bell Joint Restraint	EA	70
20" MJ DI WM (Min. Pressure Class 250)	LF	120
20" DI Joint Restraint	EA	4
20" MJ DR18 PVC RWM	LF	1700
20" DR 18 PVC Bell Joint Restraint	EA	81
16" MJ DI WM (Min. Pressure Class 250)	LF	140
16" DI Joint Restraint	EA	3
10" MJ DI WM (Min. Pressure Class 250)	LF	20
12" MJ DI WM (Min. Pressure Class 250)	LF	40
8" MJ DI WM (Min. Pressure Class 250)	LF	40
16" 90 MJ Bend w/ Megalugs	EA	22
16" 45 MJ Bend w/ Megalugs	EA	2
16" MJ Tee w/ Megalugs	EA	3
20" 45 MJ Bend w/ Megalugs	EA	3
20" x 16" MJ Tee w/ Megalugs	EA	2
20" x 16" MJ Reducer w/ Megalugs	EA	1
16" x 12" MJ Reducer w/ Megalugs	EA	1
20" 90 MJ Bend w/ Megalugs	EA	4
20" Cap w/ Megalugs	EA	2
10" 90 MJ Bend w/ Megalugs	EA	1
16" x 10" MJ Reducer w/ Megalugs	EA	1
16" x 10" MJ Tee w/ Megalugs	EA	2
12" 90 MJ Bend w/ Megalugs	EA	2
8" 90 MJ Bend w/ Megalugs	EA	2
2" Waterstop Ring	EA	4
16" DI WM FLG x PE Spool Piece	LF	5
12" DI WM FLG x PE Spool Piece	LF	5
20" DI WM FLG x PE Spool Piece	LF	5
8" DI WM FLG x PE Spool Piece	LF	5

\* All pipe, fittings, and valves shall be restrained

LF - Linear Foot

EA - Each





- NOTES:**
- CONTRACTOR SHALL REMOVE SAMPLE TAPS ON WATER MAIN OUTSIDE OF SITE LIMITS ONCE TESTING IS COMPLETE. CONTRACTOR SHALL COORDINATE WITH THE OWNER ON LOCATION FOR EQUIPMENT TO BE STORED ONCE REMOVED.
  - CONTRACTOR SHALL COORDINATE WITH THE OWNER TO PROVIDE SIZED METER. CONTRACTOR SHALL INSTALL METER.

C:\pwworking\hmm\water\_wastewater\lee79433\0609991\Yard Piping Plan.dwg Tue Oct 04, 2022 11:47 Current Layout Tab = 04

NO.	BY	DATE	SYMBOL	REVISIONS

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 AA - C0000035 EB - 0000155 LB - 0006783  
 10245 Centurion Pkwy, N., Suite 320  
 Jacksonville, Florida 32256  
 Telephone: (904) 203-1090

DESIGNER: L. TRACEY  
 DRAWN BY: S. HANKE  
 DATE: SEPT 2022  
 CHECKED BY: L. SAMEL  
 DATE: SEPT 2022

DESIGN ENGINEER  
**LESLIE S. SAMEL, P.E.**  
 FLORIDA REGISTRATION NO.  
 68763



**St. Johns County Utility Department**  
 1205 STATE ROAD 16  
 ST. AUGUSTINE, FL 32084  
 PHONE: (904) 209-2626 FAX: (904) 209-2627

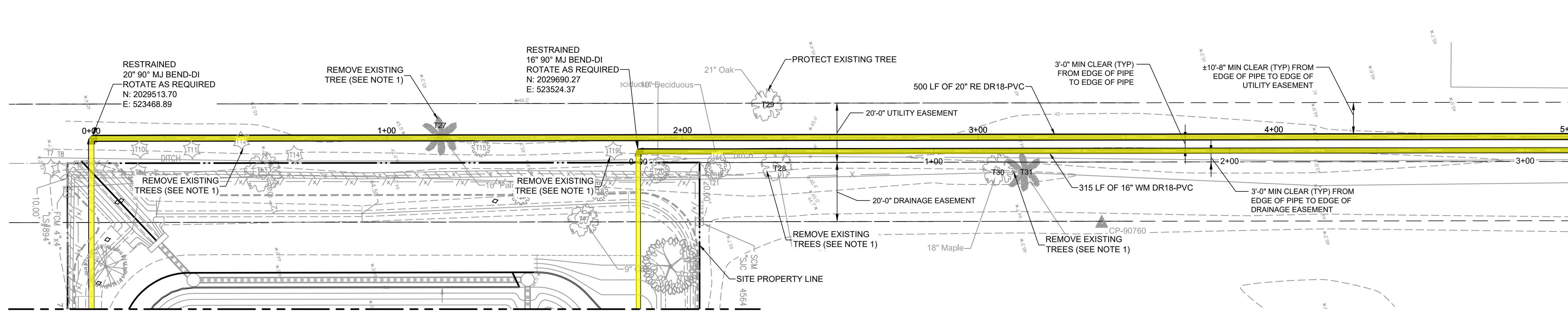
**CR-208 GROUND STORAGE TANK AND BOOSTER PUMP STATION**

**YARD PIPING PLAN**

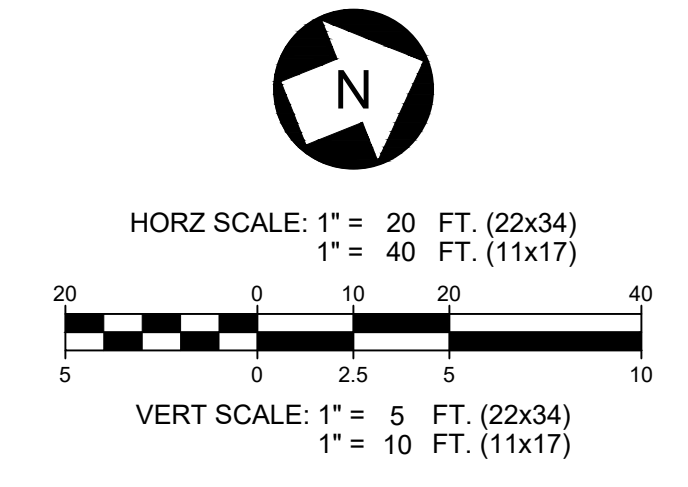
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 DWG NO. C-4



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MATCH LINE STA. 5+00 (RE), SEE C-6



NOTES:  
 1) ADDITIONAL PROTECTED AND NON-PROTECTED TREES WERE IDENTIFIED IN THE SUPPLEMENTAL SURVEY. COORDINATION IS OCCURRING WITH THE LANDSCAPE ARCHITECT TO REVISE THE TREE TABLE PROVIDED ON DRAWING NO. C-1.

NO.	BY	DATE	SYMBOL	REVISIONS

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 Mott MacDonald Florida, LLC

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 AA - C0000035 EB - 0000155 LB - 0006783  
 10245 Centurion Pkwy, N., Suite 320  
 Jacksonville, Florida 32256  
 Telephone: (904) 203-1090

DESIGNER: D. JACOBS  
 DRAWN BY: B. LEE  
 DATE: SEPT 2022  
 CHECKED BY: L. SAMEL  
 DATE: SEPT 2022

DESIGN ENGINEER  
**LESLIE S. SAMEL, P.E.**  
 FLORIDA REGISTRATION NO.  
 68763



St. Johns County  
 Utility Department  
 1205 STATE ROAD 16  
 ST. AUGUSTINE, FL 32084  
 PHONE: (904) 209-2626 FAX: (904) 209-2627

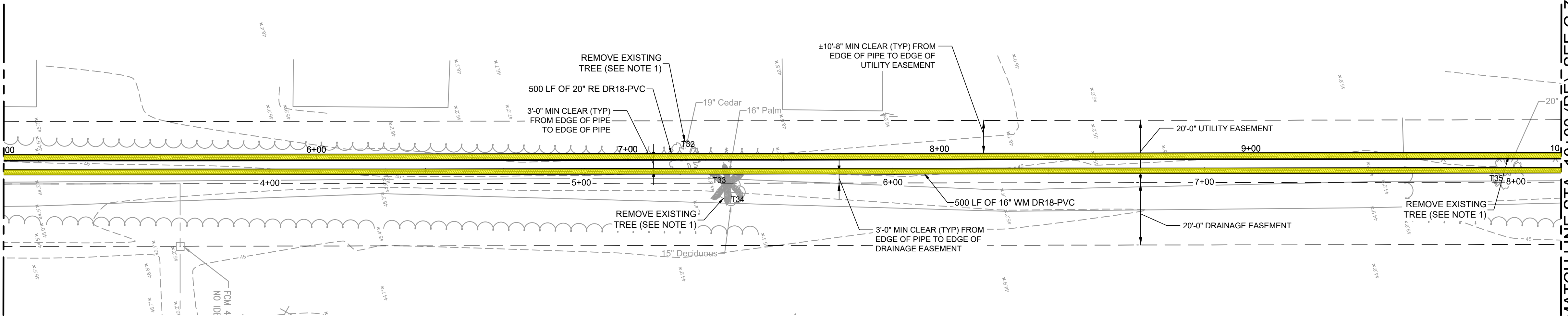
CR-208 GROUND STORAGE TANK  
 AND BOOSTER PUMP STATION

WATER MAIN AND  
 RECLAIMED WATER MAIN  
 PLAN AND PROFILE

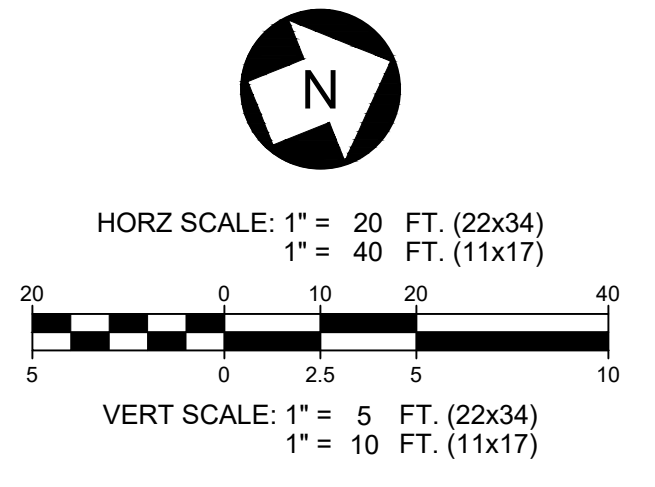
SHEET NO.  
 7  
 DWG NO.  
 C-5

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MATCH LINE STA. 5+00 (RE), SEE C-5



MATCH LINE STA. 10+00 (RE), SEE C-7



NOTES:  
 1) ADDITIONAL PROTECTED AND NON-PROTECTED TREES WERE IDENTIFIED IN THE SUPPLEMENTAL SURVEY. COORDINATION IS OCCURRING WITH THE LANDSCAPE ARCHITECT TO REVISE THE TREE TABLE PROVIDED ON DRAWING NO. C-1.

NO.	BY	DATE	SYMBOL	REVISIONS

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 AA - C0000035 EB - 0000155 LB - 0006783  
 10245 Centurion Pkwy, N., Suite 320  
 Jacksonville, Florida 32256  
 Telephone: (904) 203-1090

DESIGNER: D. JACOBS  
 DRAWN BY: B. LEE  
 DATE: SEPT 2022  
 CHECKED BY: L. SAMEL  
 DATE: SEPT 2022

DESIGN ENGINEER  
**LESLIE S. SAMEL, P.E.**  
 FLORIDA REGISTRATION NO.  
 68763



St. Johns County  
 Utility Department  
 1205 STATE ROAD 16  
 ST. AUGUSTINE, FL 32084  
 PHONE: (904) 209-2626 FAX: (904) 209-2627

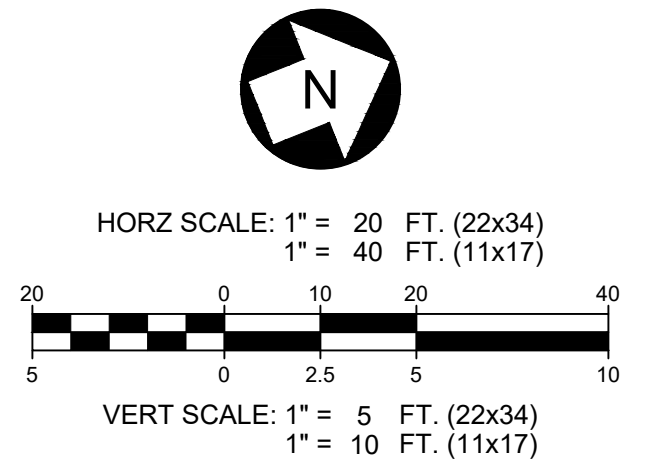
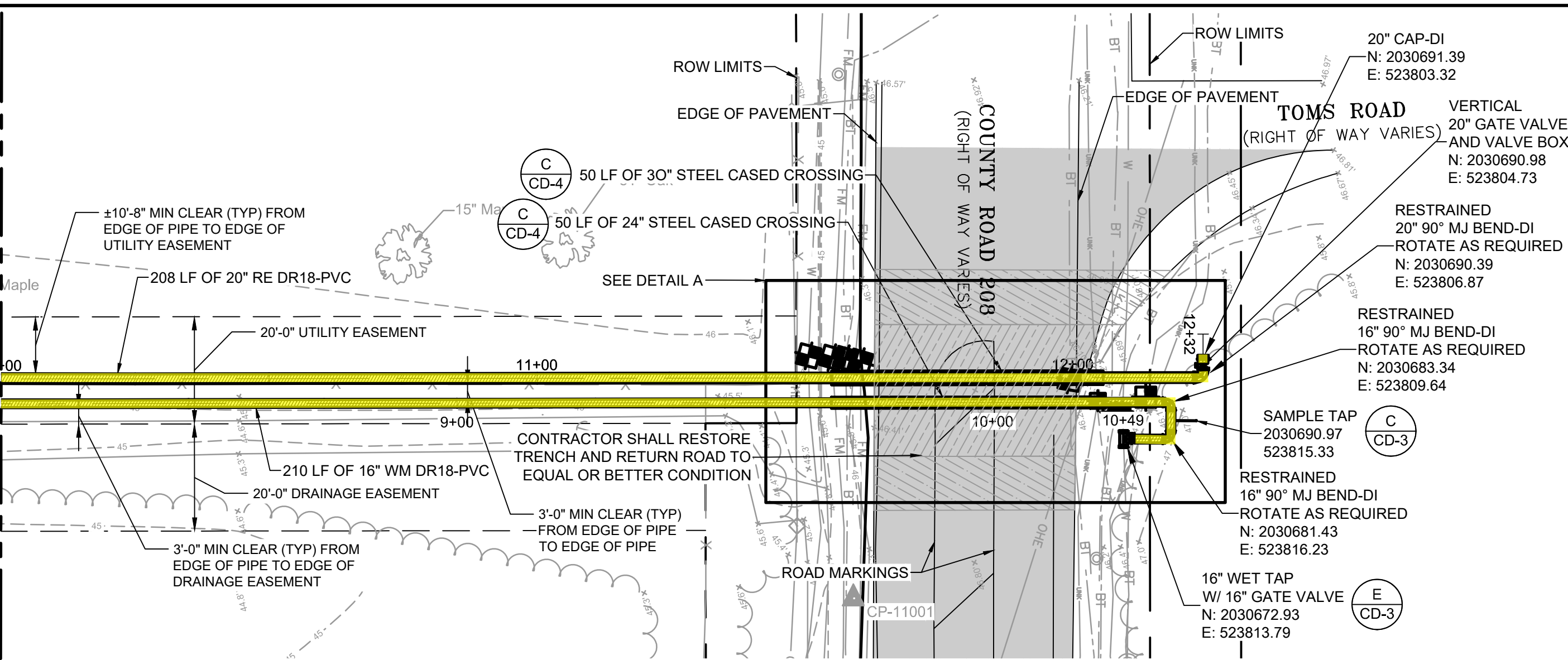
CR-208 GROUND STORAGE TANK  
 AND BOOSTER PUMP STATION

WATER MAIN AND  
 RECLAIMED WATER MAIN  
 PLAN AND PROFILE

SHEET NO.  
 8  
 DWG NO.  
 C-6



MATCH LINE STA. 10+00 (RE), SEE C-6



NOTES:  
 1) ADDITIONAL PROTECTED AND NON-PROTECTED TREES WERE IDENTIFIED IN THE SUPPLEMENTAL SURVEY. COORDINATION IS OCCURRING WITH THE LANDSCAPE ARCHITECT TO REVISE THE TREE TABLE PROVIDED ON DRAWING NO. C-1.

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 AA - C0000035 EB - 0000155 LB - 0006783  
 10245 Centurion Pkwy. N., Suite 320  
 Jacksonville, Florida 32256  
 Telephone: (904) 203-1090

DESIGNER: D. JACOBS  
 DRAWN BY: B. LEE  
 DATE: SEPT 2022  
 CHECKED BY: L. SAMEL  
 DATE: SEPT 2022

DESIGN ENGINEER  
**LESLIE S. SAMEL, P.E.**  
 FLORIDA REGISTRATION NO.  
 68763

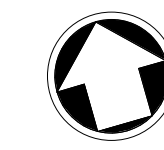


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 Utility Department  
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 ST. AUGUSTINE, FL 32084  
 PHONE: (904) 209-2626 FAX: (904) 209-2627

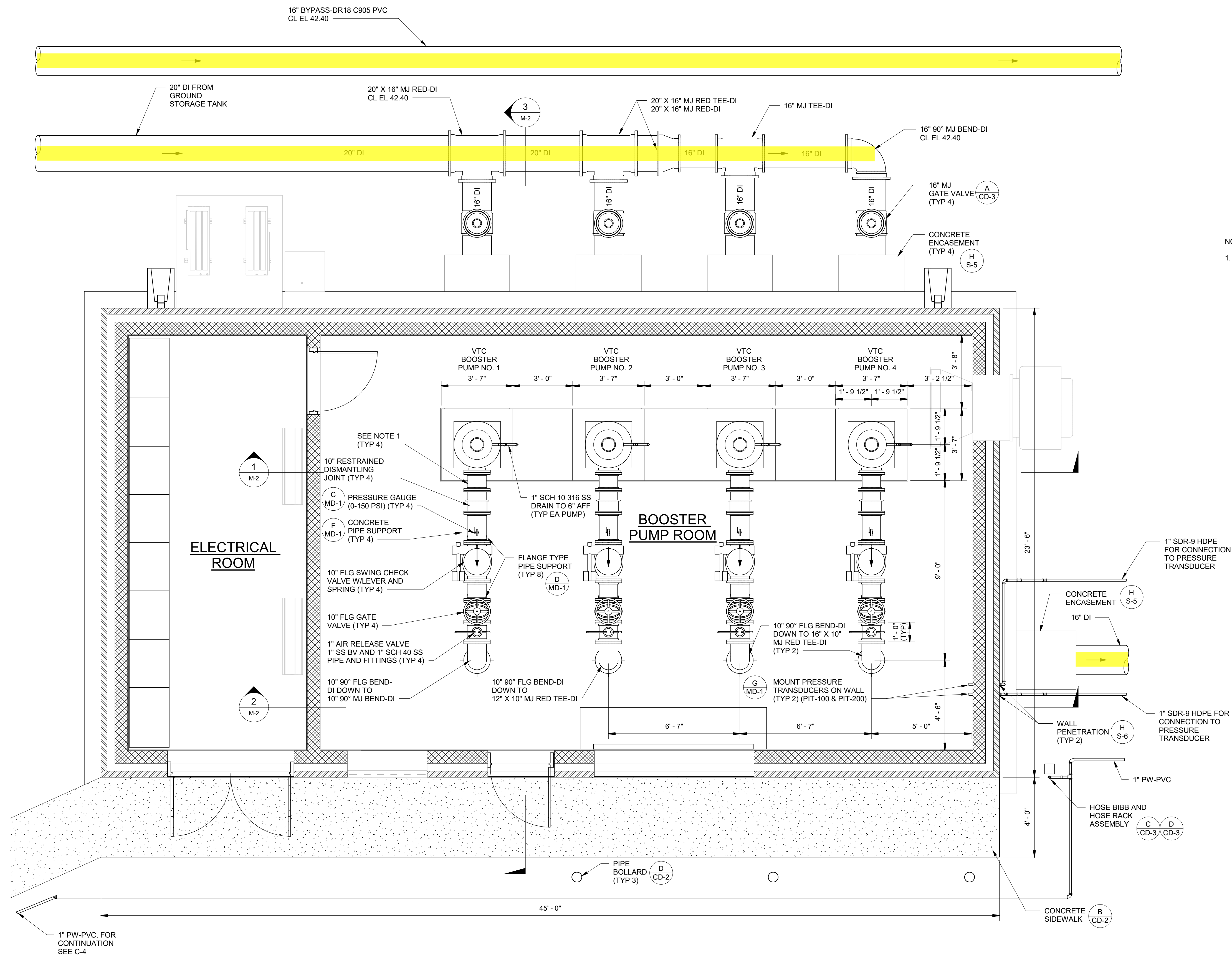
CR-208 GROUND STORAGE TANK  
 AND BOOSTER PUMP STATION

WATER MAIN AND  
 RECLAIMED WATER MAIN  
 PLAN AND PROFILE

SHEET NO.  
 9  
 DWG NO.  
 C-7



0 2 4 6  
SCALE: 3/8" = 1'-0"



NOTES:

- CONTRACTOR SHALL NOTE THAT THE DESIGN IS BASED ON GOULD'S PUMP MODEL 12FDLC. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MODIFY THE ECCENTRIC REDUCER AT THE PUMP SUCTION AND PROVIDE A REDUCER AT THE DISCHARGE OF THE PUMP AS NEEDED BASED ON CONTRACTOR'S PUMP SELECTION AT NO COST TO THE OWNER.

**PLAN**  
SCALE: 3/8" = 1'-0"

10/4/2022 11:41:13 AM

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NO.	BY	DATE	SYMBOL	REVISIONS
1.				
2.				
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AA - C0000035 EB - 0000155 LB - 0006783  
10245 Centurion Pkwy, N., Suite 320  
Jacksonville, Florida 32256  
Telephone: (904) 203-1090

DESIGNER: L. TRACY  
DRAWN BY: B. LEE  
DATE: SEPT 2022  
CHECKED BY: L. SAMEL  
DATE: SEPT 2022

DESIGN ENGINEER  
**LESLIE S. SAMEL, P.E.**  
FLORIDA REGISTRATION NO.  
68763



St. Johns County  
Utility Department  
1205 STATE ROAD 16  
ST. AUGUSTINE, FL 32084  
PHONE: (904) 209-2626 FAX: (904) 209-2627

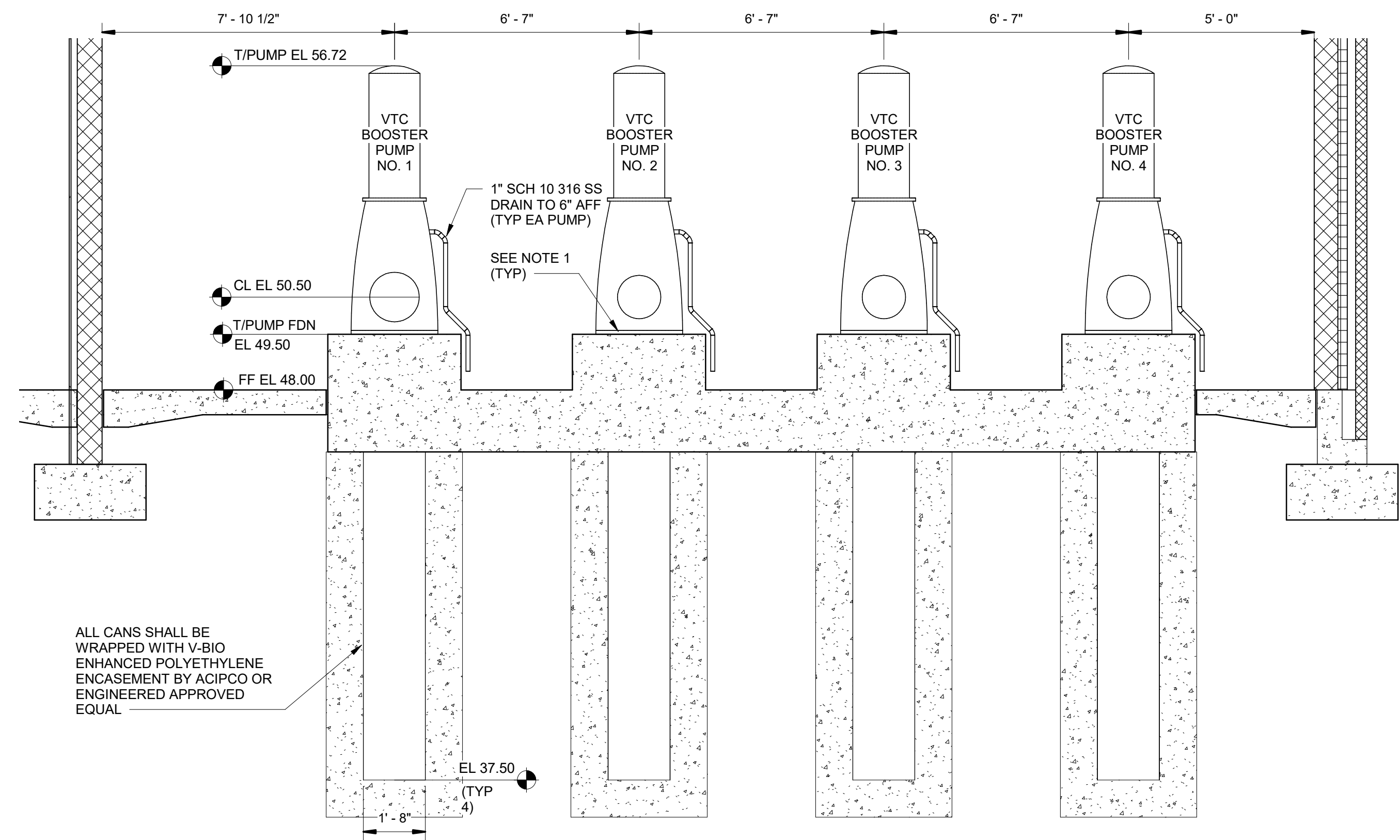
**CR-208 GROUND STORAGE TANK  
AND BOOSTER PUMP STATION**

**BOOSTER PUMP ROOM  
PLAN**

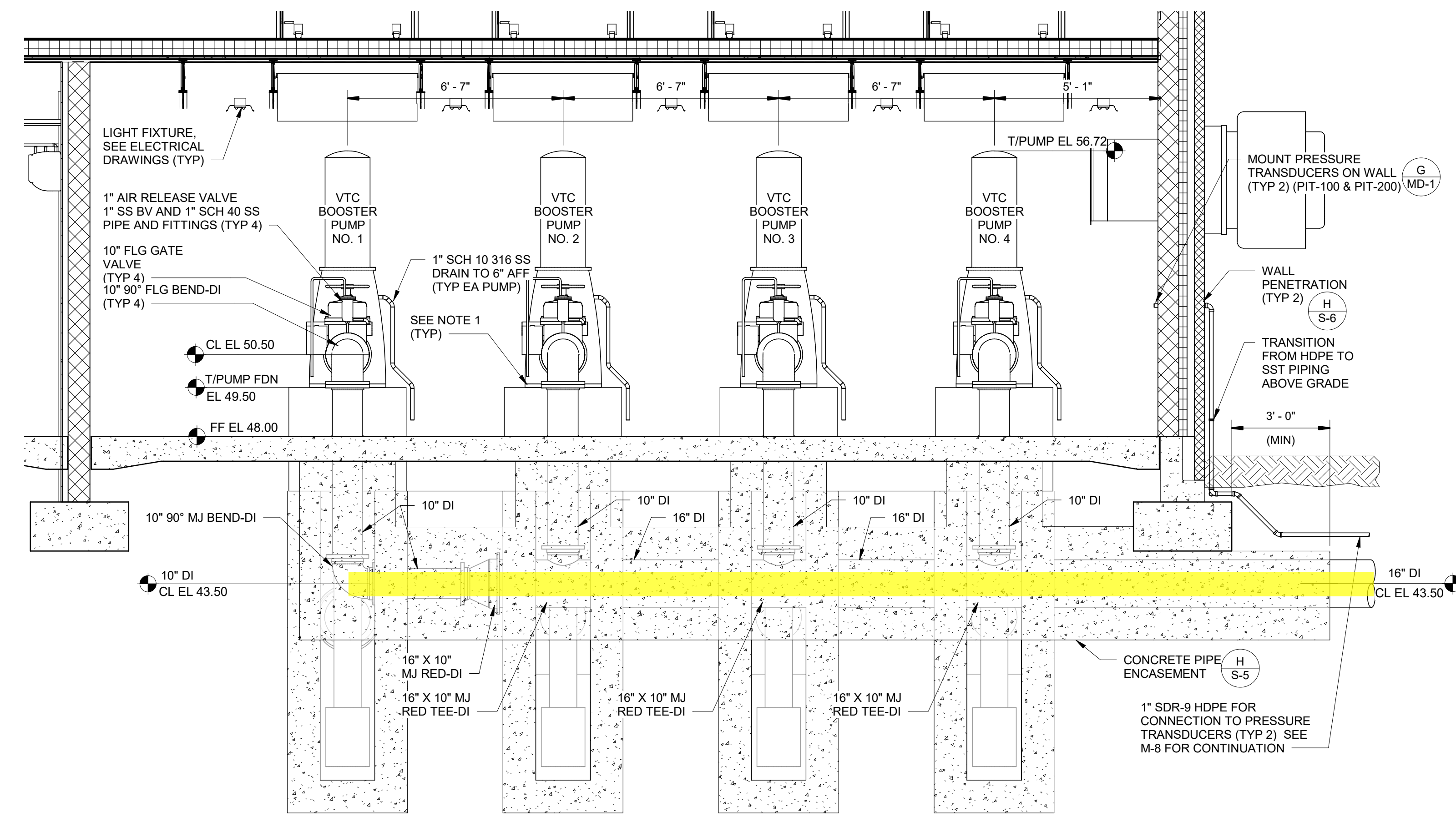
SHEET NO.  
36  
DWG NO.  
M-1



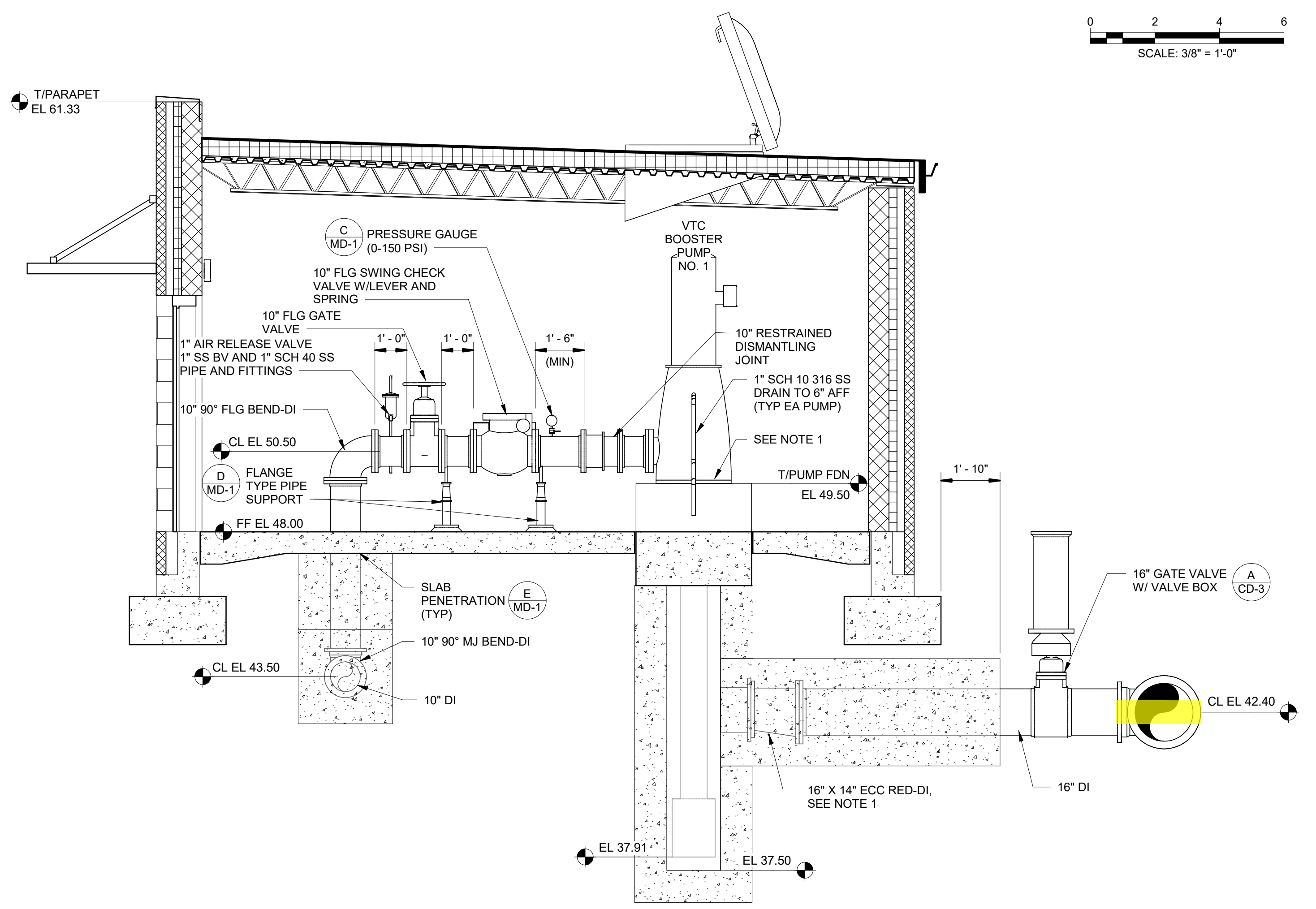
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1 SECTION  
M-1  
3/8" = 1'-0"



2 SECTION  
M-1  
3/8" = 1'-0"



3 SECTION  
M-1  
3/8" = 1'-0"

- NOTES:
- CONTRACTOR SHALL NOTE THAT THE DESIGN IS BASED ON GOULD'S PUMP MODEL 12FDLC. IT IS THE CONTRACTOR'S RESPONSIBILITY TO MODIFY THE ECCENTRIC REDUCER AT THE PUMP SUCTION AND PROVIDE A REDUCER AT THE DISCHARGE OF THE PUMP AS NEEDED BASED ON CONTRACTOR'S PUMP SELECTION AT NO COST TO THE OWNER.

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NO.	BY	DATE	SYMBOL	REVISIONS
1.				

**M**  
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Architects Engineers Surveyors  
AA - C0000035 EB - 0000155 LB - 0006783  
10245 Centurion Pkwy, N., Suite 320  
Jacksonville, Florida 32256  
Telephone: (904) 203-1090

DESIGNER: L. TRACEY  
DRAWN BY: B. LEE  
DATE: SEPT 2022  
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DATE: SEPT 2022

DESIGN ENGINEER  
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FLORIDA REGISTRATION NO.  
68763

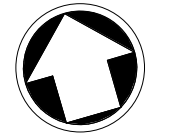


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Utility Department  
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ST. AUGUSTINE, FL 32084  
PHONE: (904) 209-2626 FAX: (904) 209-2627

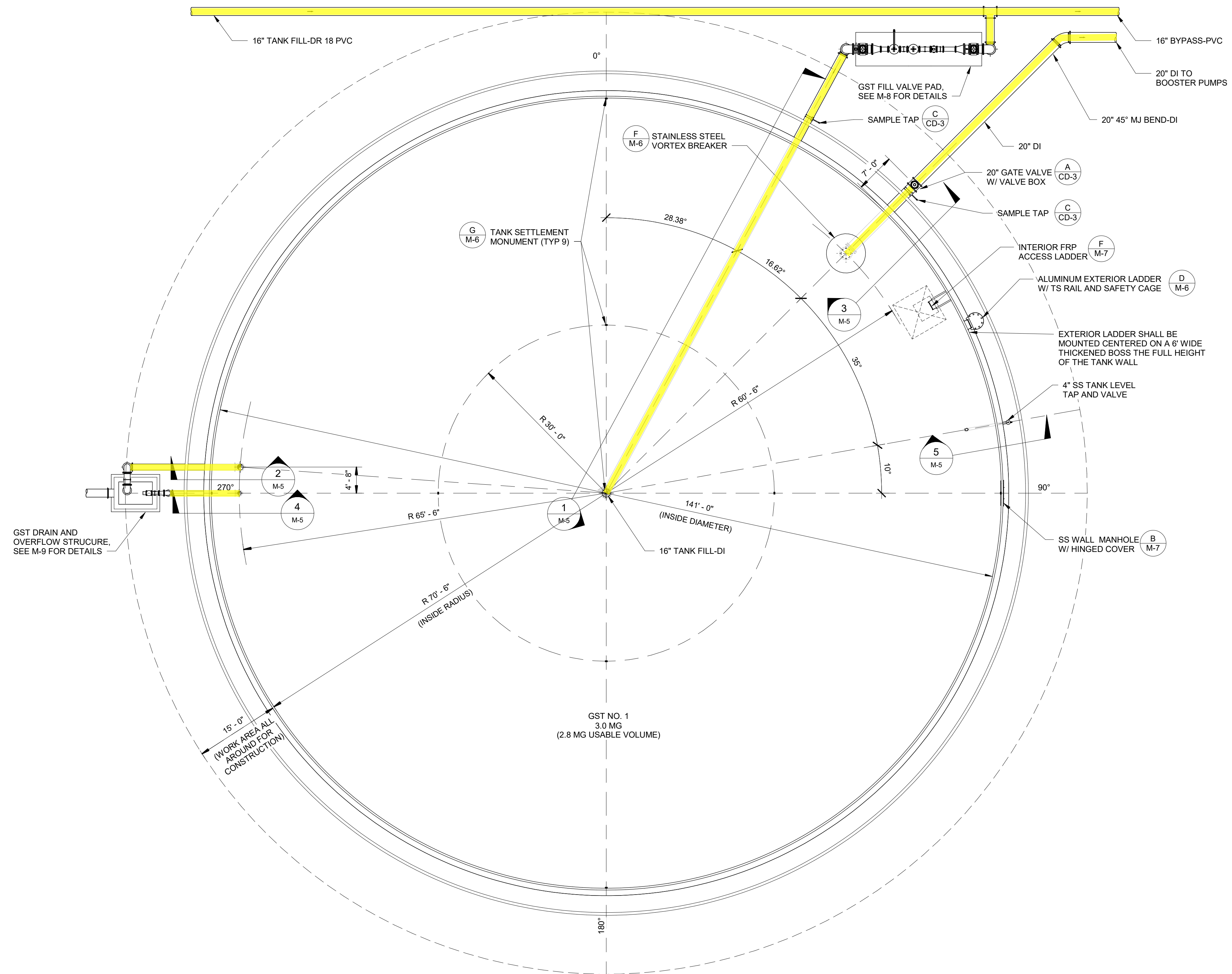
CR-208 GROUND STORAGE TANK  
AND BOOSTER PUMP STATION

BOOSTER PUMP ROOM  
SECTIONS

SHEET NO.  
37  
DWG NO.  
M-2



0 8 16 24  
SCALE: 3/32" = 1'-0"



**GST SLAB PLAN**  
SCALE: 3/32" = 1'-0"

10/4/2022 11:41:17 AM

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NO.	BY	DATE	SYMBOL	REVISIONS
1.				
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Mott MacDonald Florida, LLC

Architects Engineers Surveyors  
AA - C0000035 EB - 0000155 LB - 0006783  
10245 Centurion Pkwy, N., Suite 320  
Jacksonville, Florida 32256  
Telephone: (904) 203-1090

DESIGNER: L. TRACEY  
DRAWN BY: B. LEE  
DATE: SEPT 2022  
CHECKED BY: L. SAMEL  
DATE: SEPT 2022

DESIGN ENGINEER  
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FLORIDA REGISTRATION NO.  
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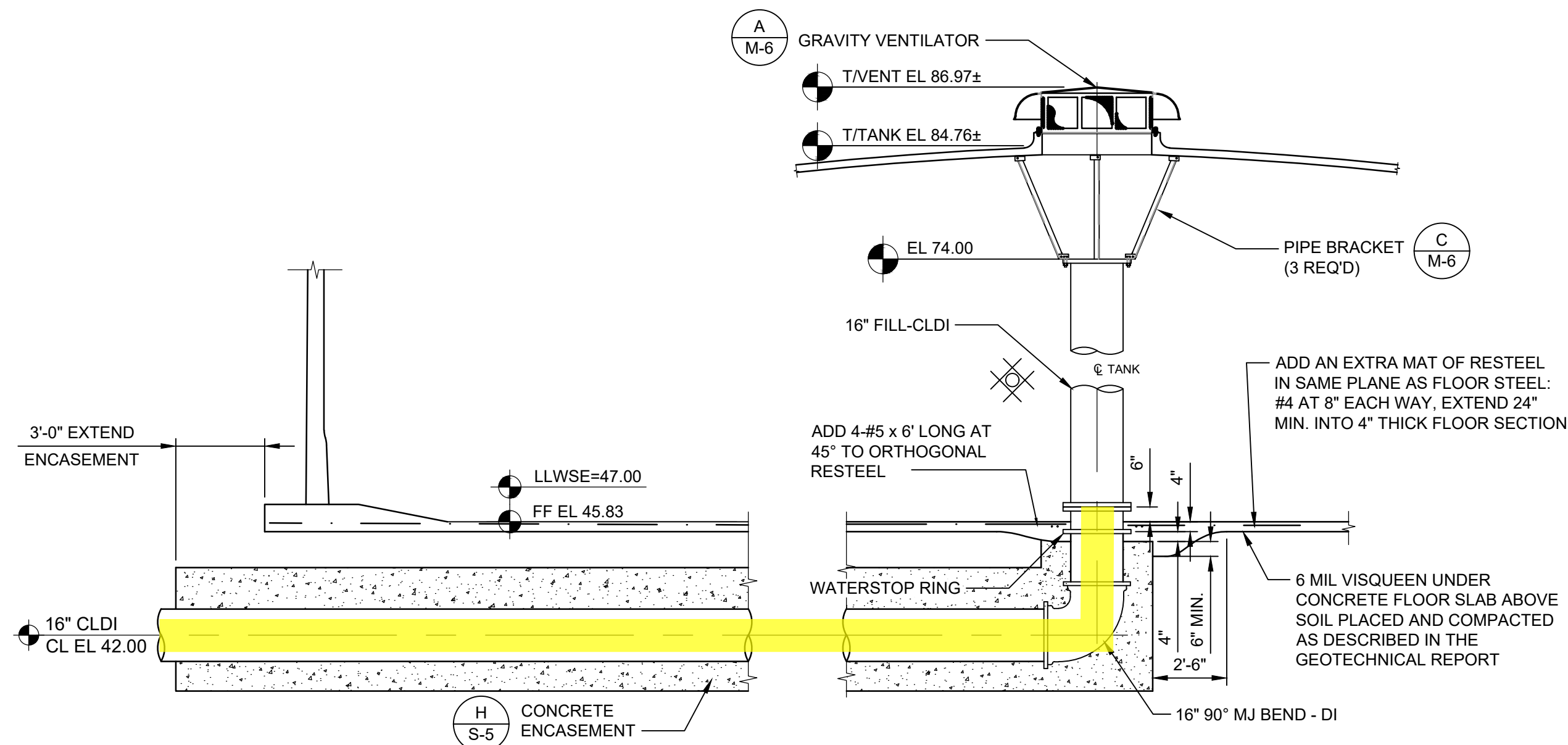
St. Johns County  
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CR-208 GROUND STORAGE TANK  
AND BOOSTER PUMP STATION

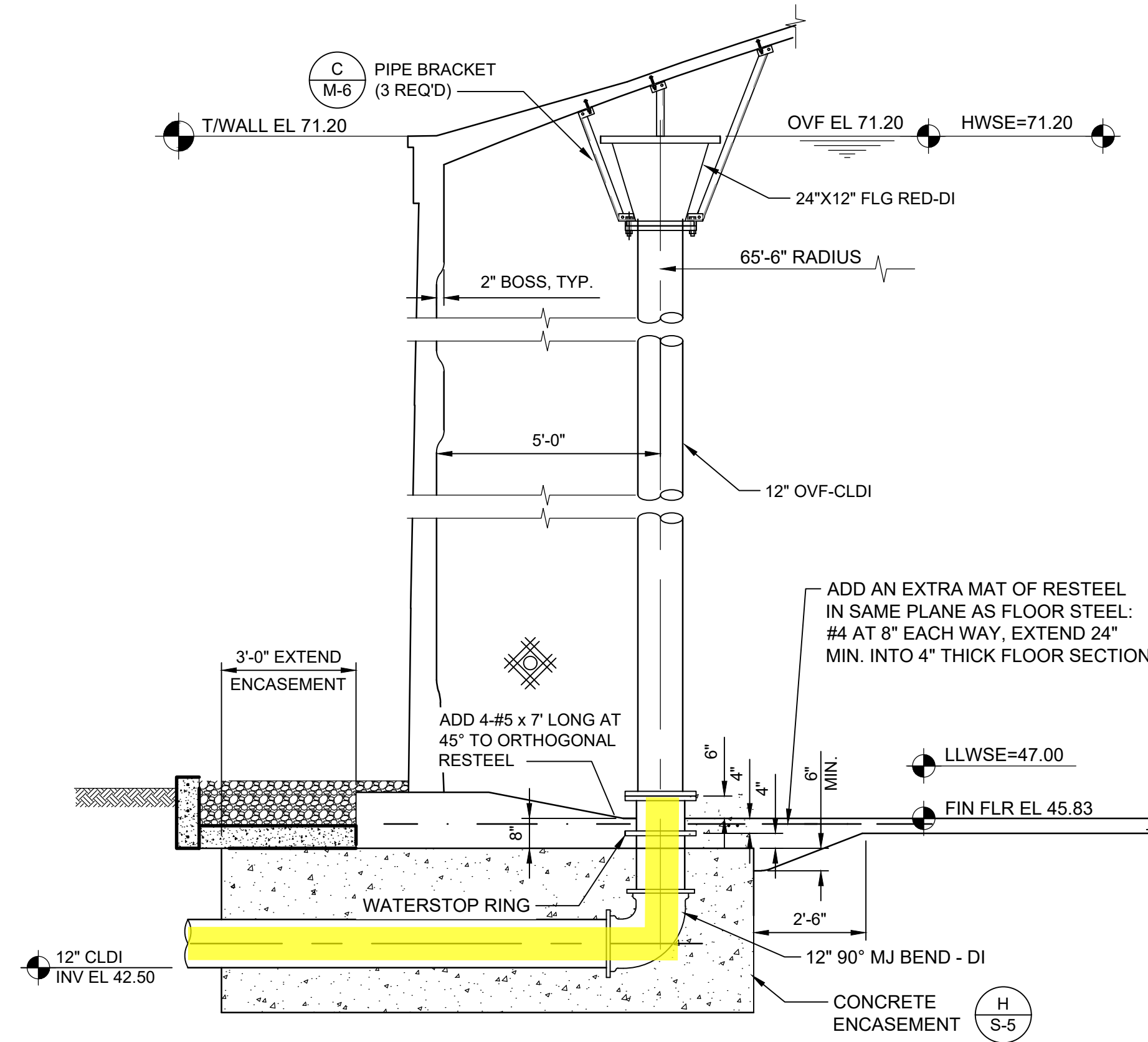
GROUND STORAGE TANK  
SLAB PLAN

SHEET NO.  
38  
DWG NO.  
M-3

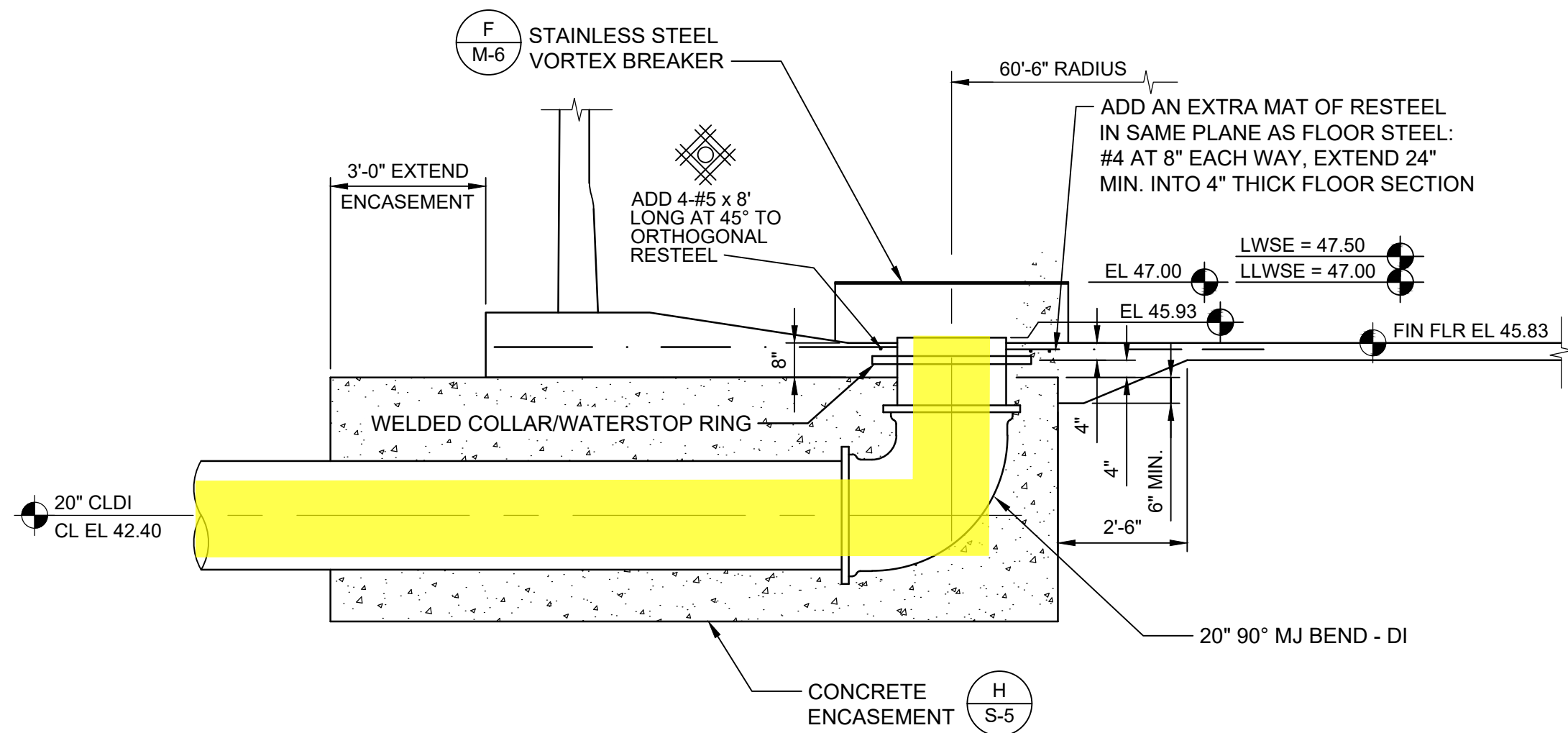




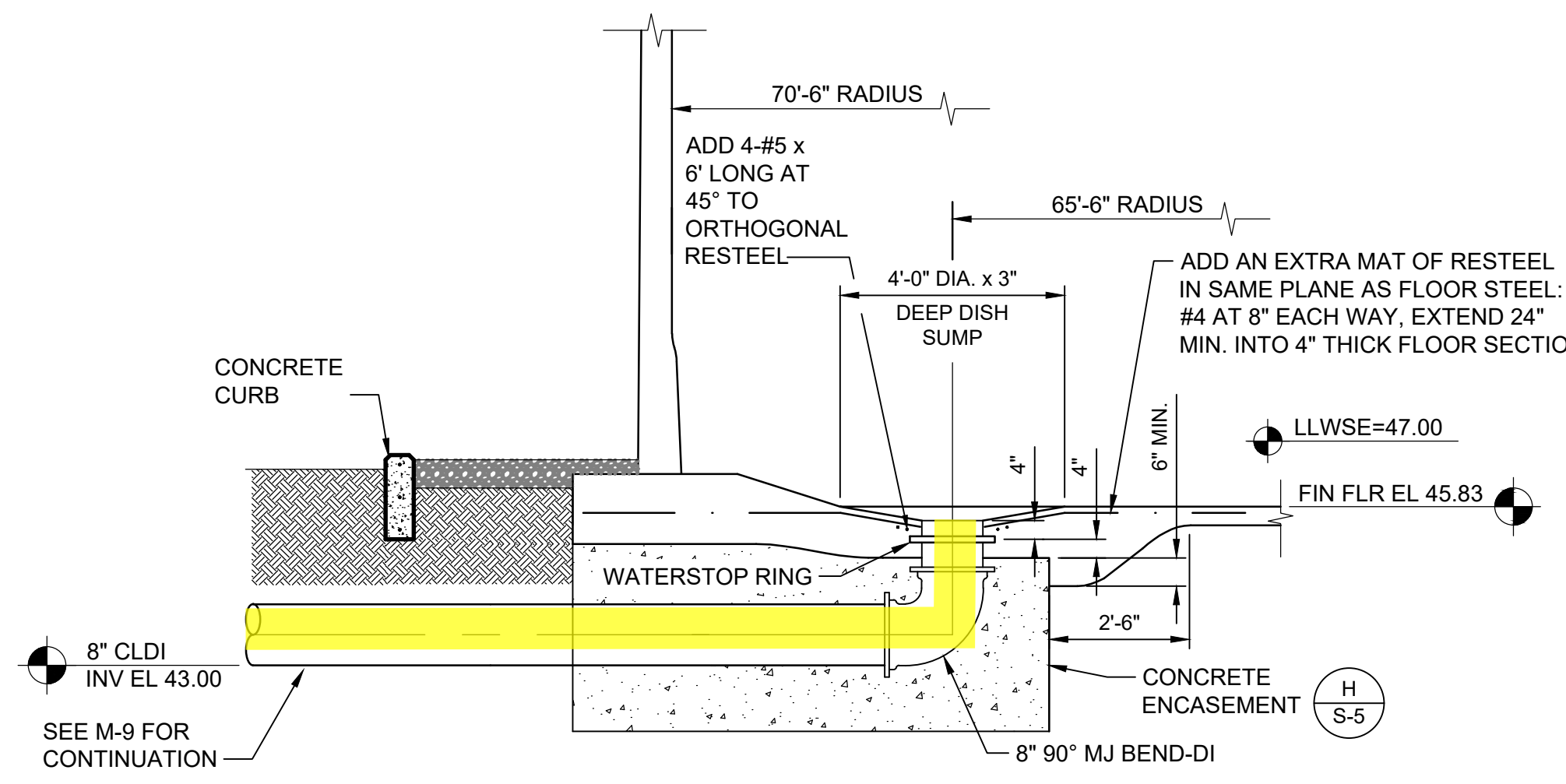
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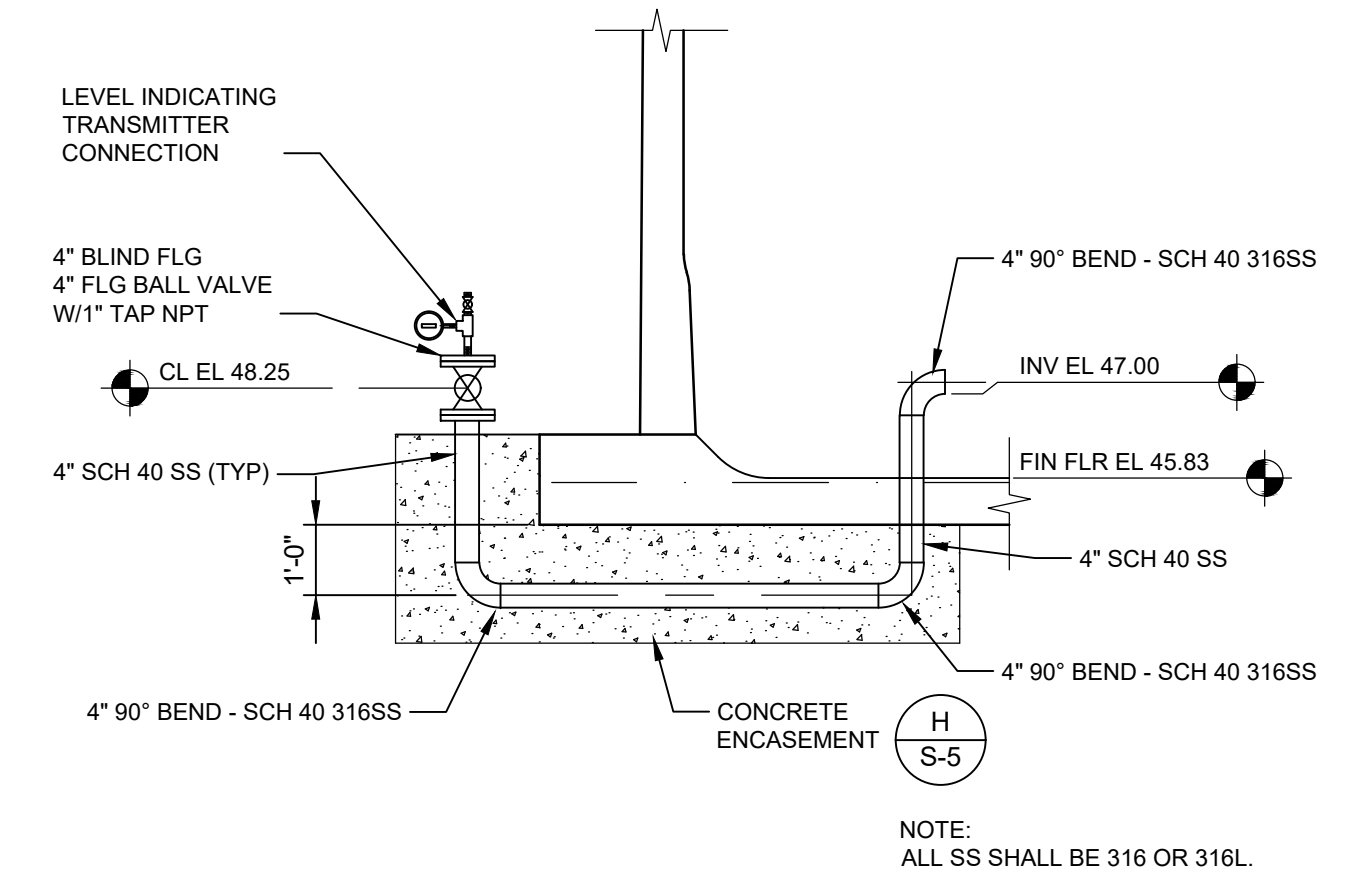
2 12" OVERFLOW SECTION  
- NTS



3 20" TANK EFFLUENT WITH ANTI-VORTEX PLATE  
- NTS



4 8" DRAIN SECTION  
- NTS

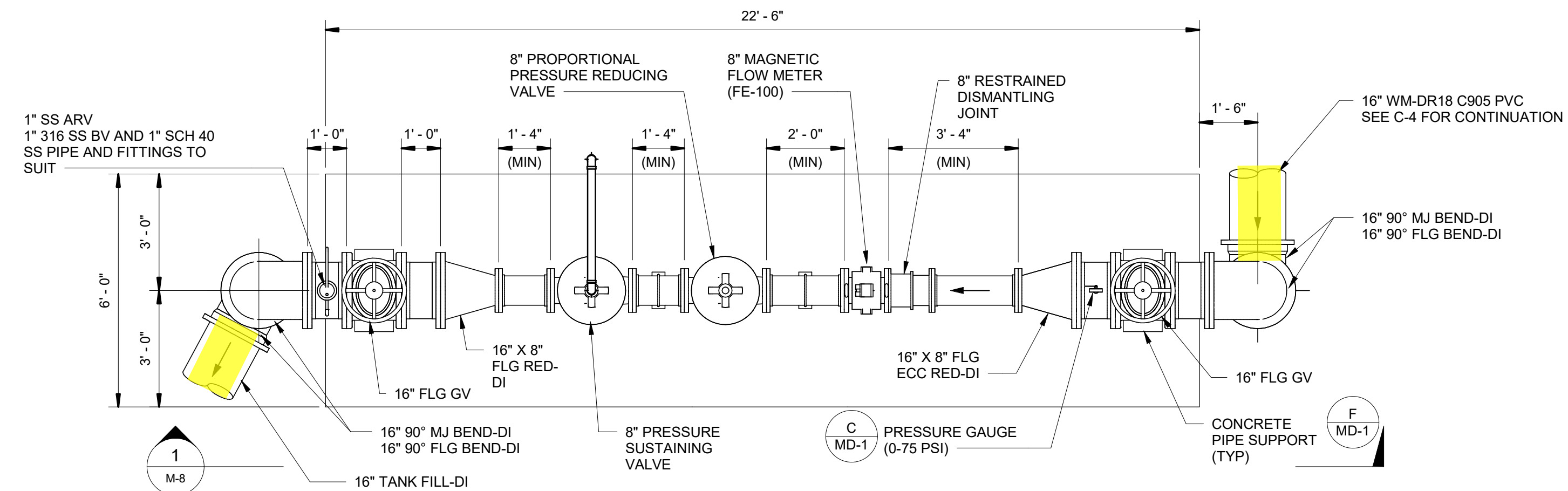
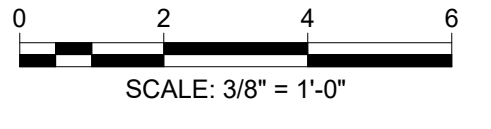


5 GROUND STORAGE TANK LEVEL TAP AND VALVE  
- NTS

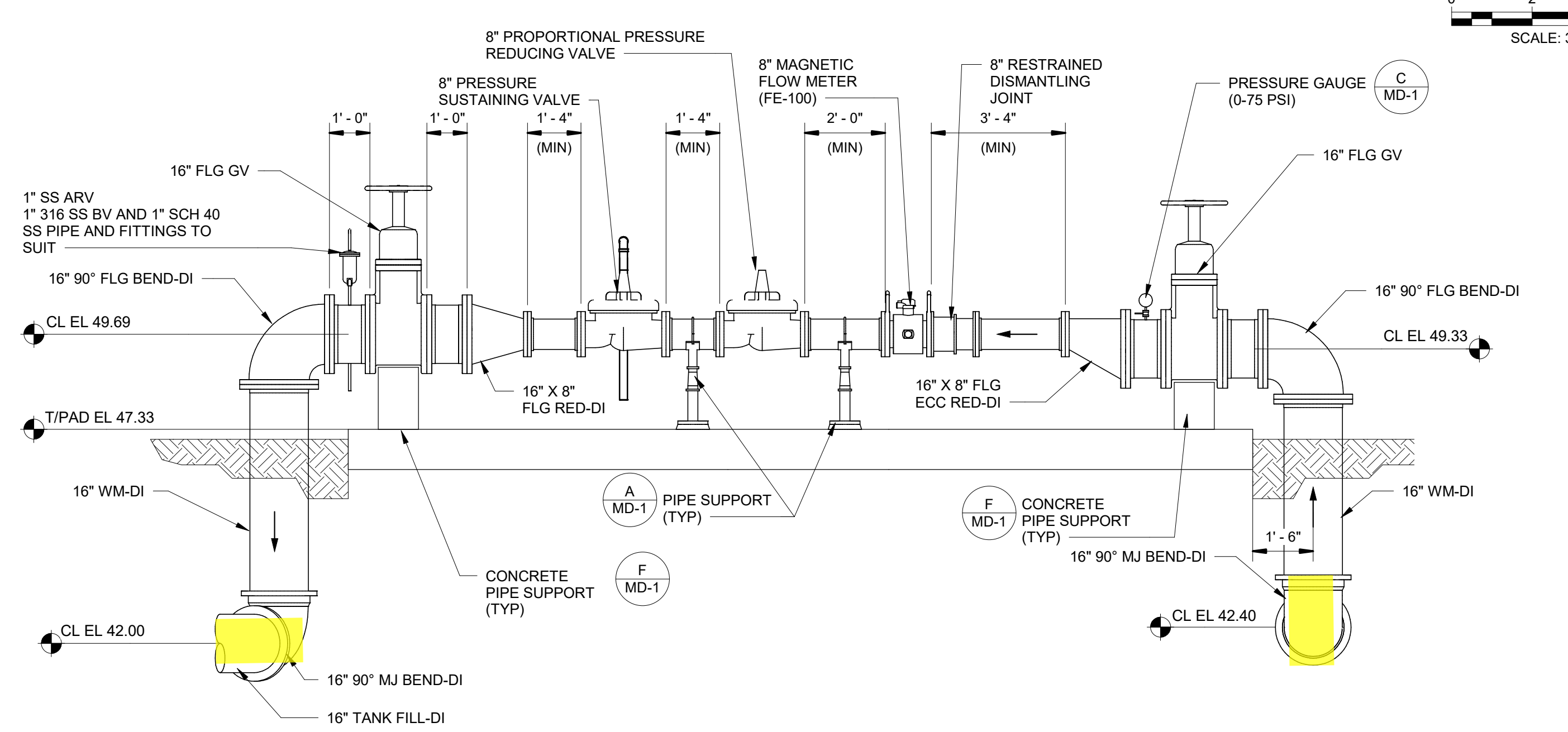
NO.	BY	DATE	SYMBOL	REVISIONS
6.				
5.				
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1.				

<b>M</b> <b>MOTT MACDONALD</b> Mott MacDonald Florida, LLC	Architects Engineers Surveyors AA - C0000035 EB - 0000155 LB - 0006783 10245 Centurion Pkwy. N., Suite 320 Jacksonville, Florida 32256 Telephone: (904) 203-1090	DESIGNER: L. TRACEY DRAWN BY: B. LEE DATE: SEPT 2022 CHECKED BY: L. SAMEL DATE: SEPT 2022	DESIGN ENGINEER LESLIE S. SAMEL, P.E. FLORIDA REGISTRATION NO. 68763	St. Johns County Utility Department 1205 STATE ROAD 16 ST. AUGUSTINE, FL 32084 PHONE: (904) 209-2626 FAX: (904) 209-2627	CR-208 GROUND STORAGE TANK AND BOOSTER PUMP STATION	GROUND STORAGE TANK SECTIONS	SHEET NO. 40 DWG NO. M-5
--	--	---	---	--	--	---------------------------------	-----------------------------------

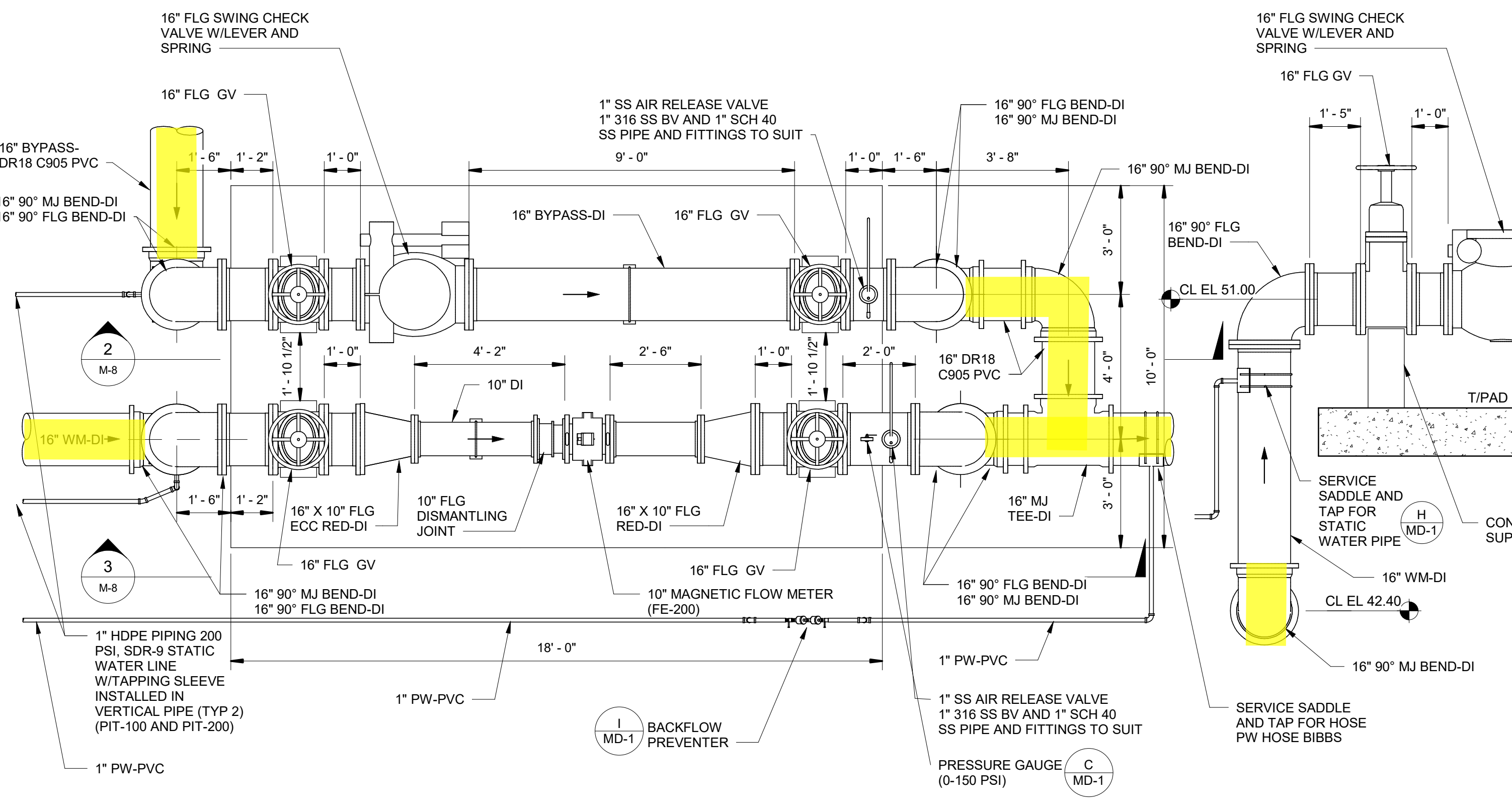




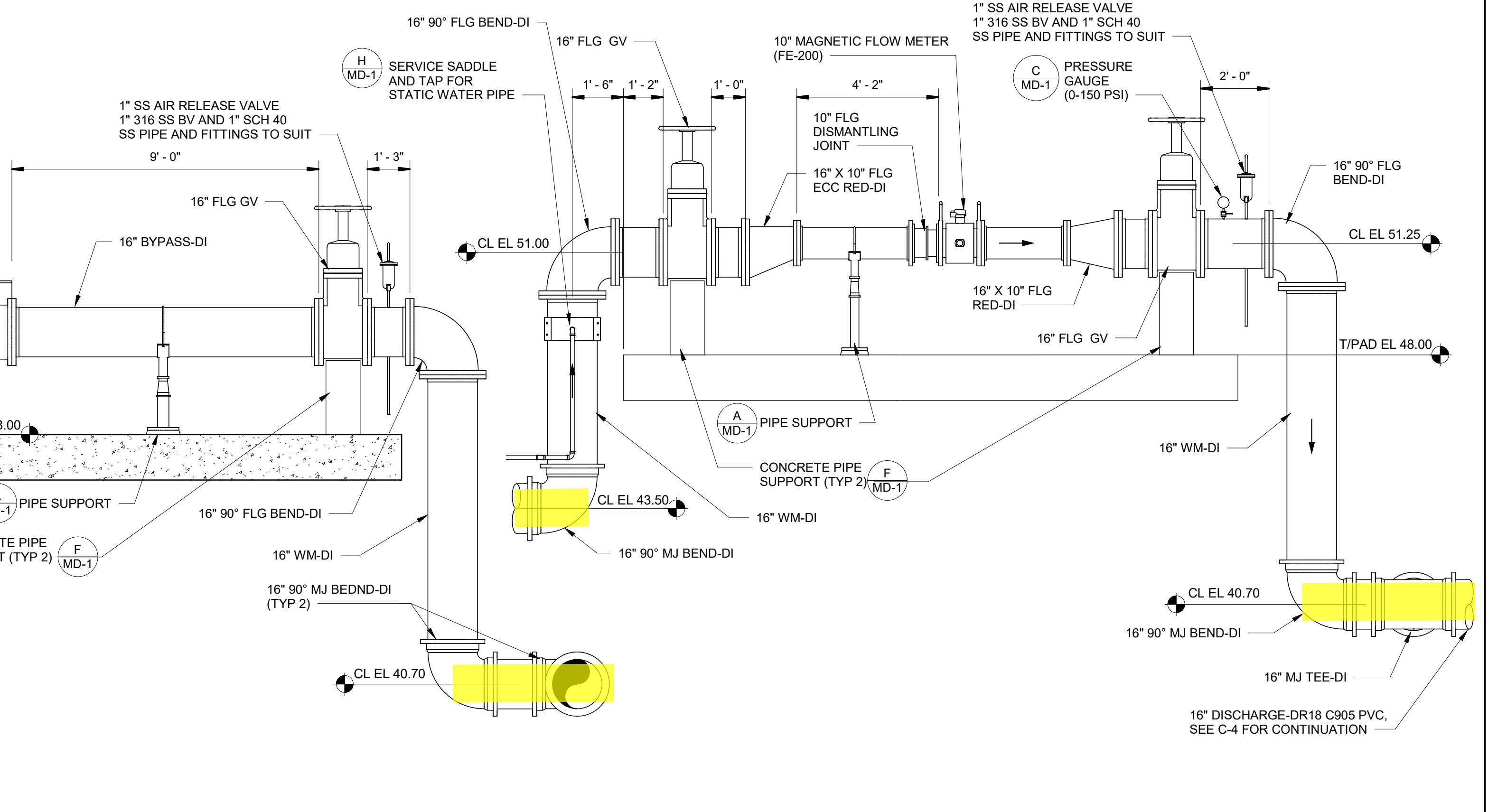
**GST FILL VALVE PLAN**  
SCALE: 3/8" = 1'-0"



**1 SECTION**  
SCALE: 3/8" = 1'-0"



**DISCHARGE FLOW METER AND BYPASS PLAN**  
SCALE: 3/8" = 1'-0"



**2 SECTION**  
SCALE: 3/8" = 1'-0"

**3 SECTION**  
SCALE: 3/8" = 1'-0"

10/4/2022 11:41:19 AM

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Architects Engineers Surveyors  
AA - C0000035 EB - 0000155 LB - 0006783  
10245 Centurion Pkwy, N., Suite 320  
Jacksonville, Florida 32256  
Telephone: (904) 203-1090

DESIGNER: L. TRACEY  
DRAWN BY: B. LEE  
DATE: SEPT 2022  
CHECKED BY: L. SAMEL  
DATE: SEPT 2022

DESIGN ENGINEER  
**LESLIE S. SAMEL, P.E.**  
FLORIDA REGISTRATION NO.  
68763



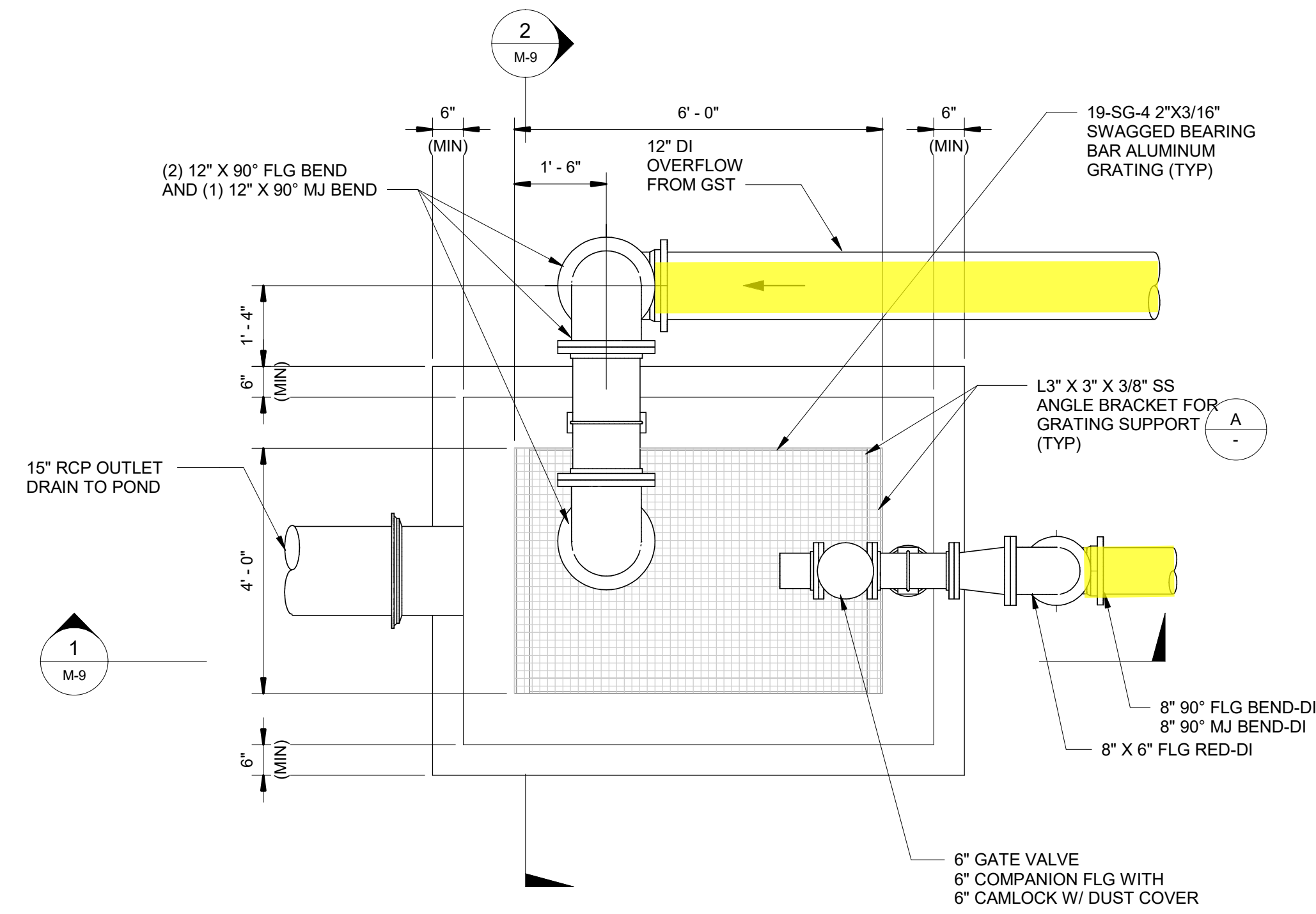
St. Johns County  
Utility Department  
1205 STATE ROAD 16  
ST. AUGUSTINE, FL 32084  
PHONE: (904) 209-2626 FAX: (904) 209-2627

**CR-208 GROUND STORAGE TANK  
AND BOOSTER PUMP STATION**

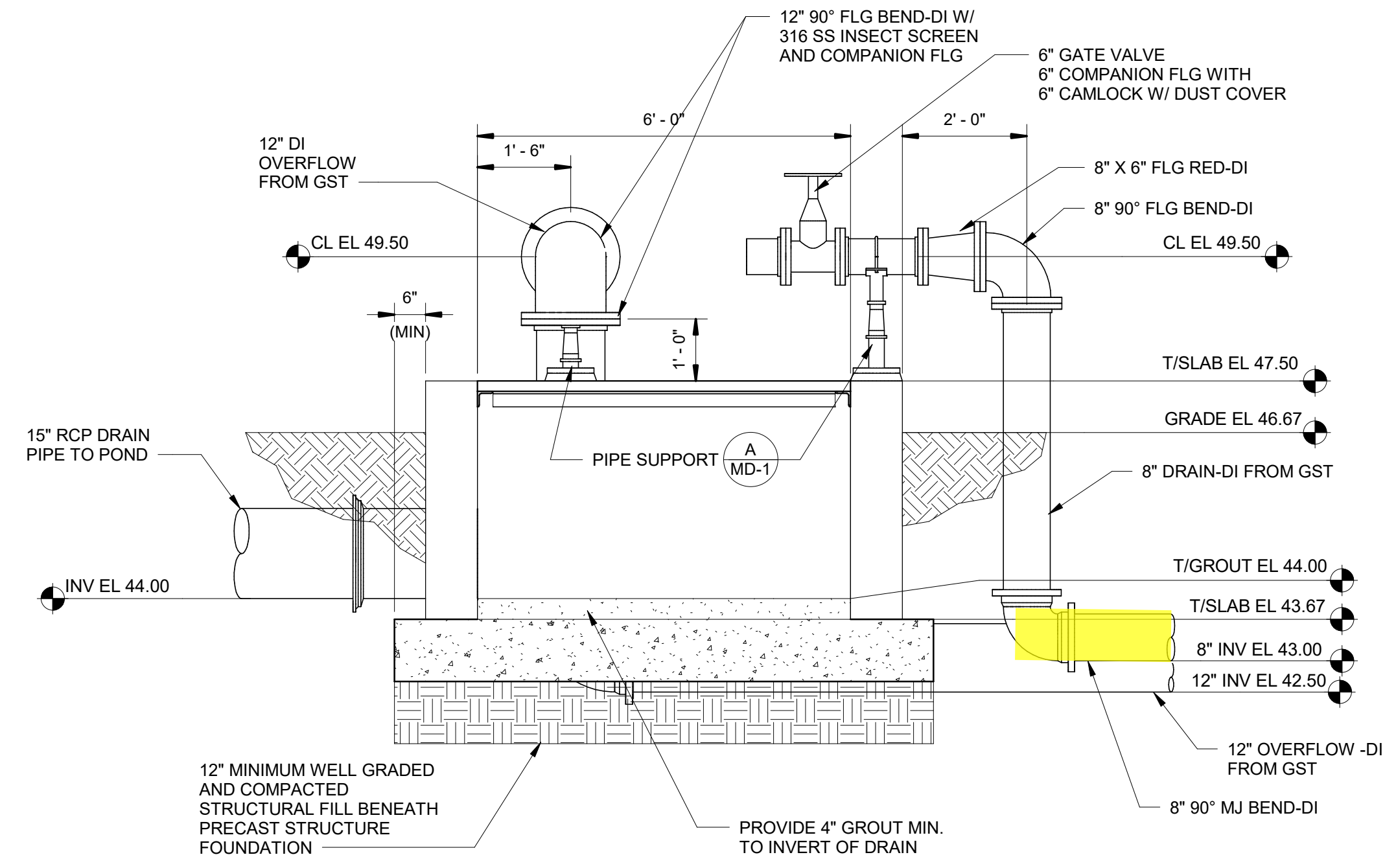
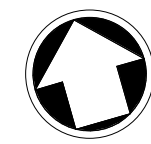
**FILL VALVE, DISCHARGE FLOW  
METER, AND BYPASS  
PLANS AND SECTIONS**

SHEET NO.  
43  
DWG NO.  
M-8

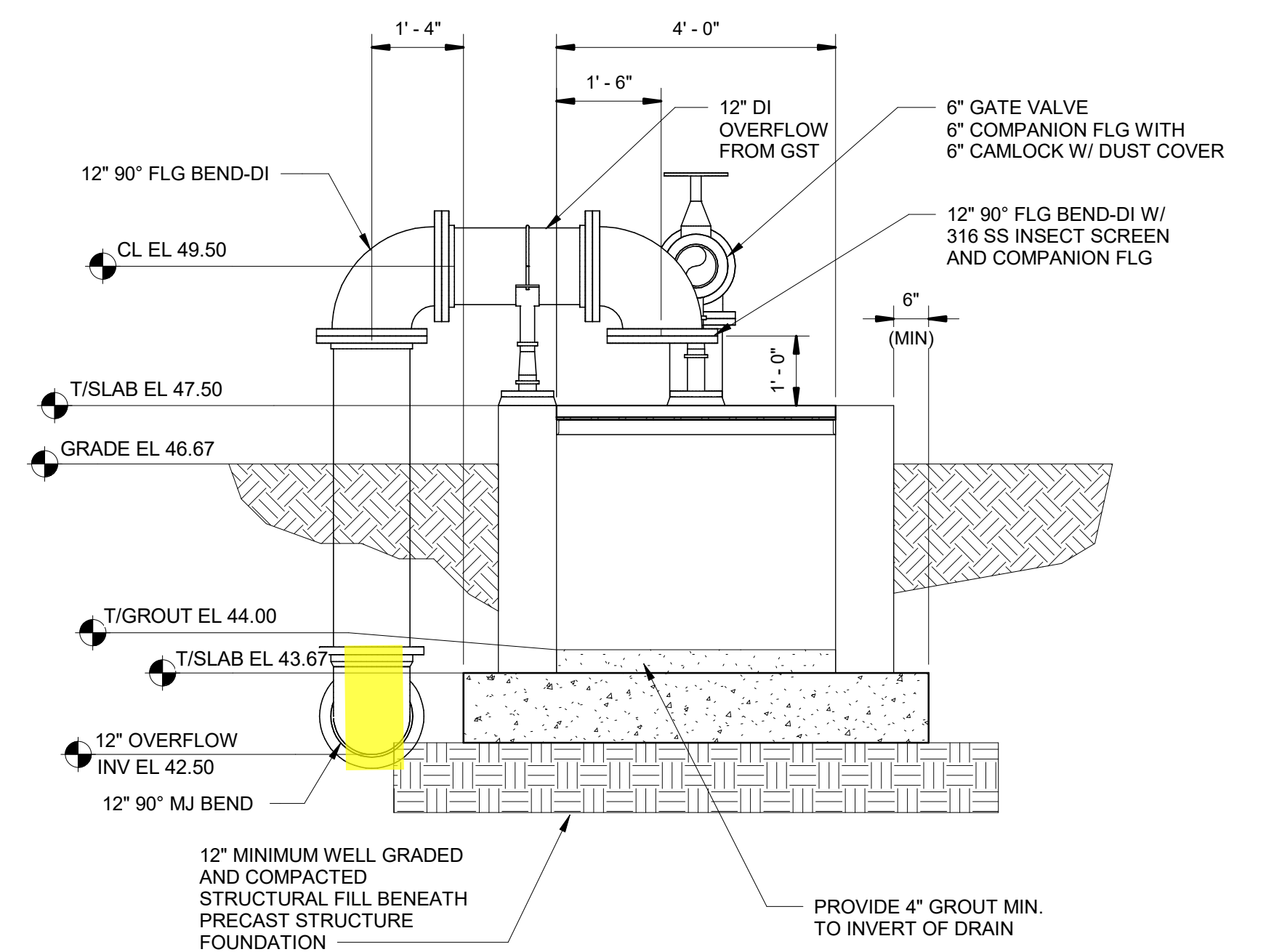
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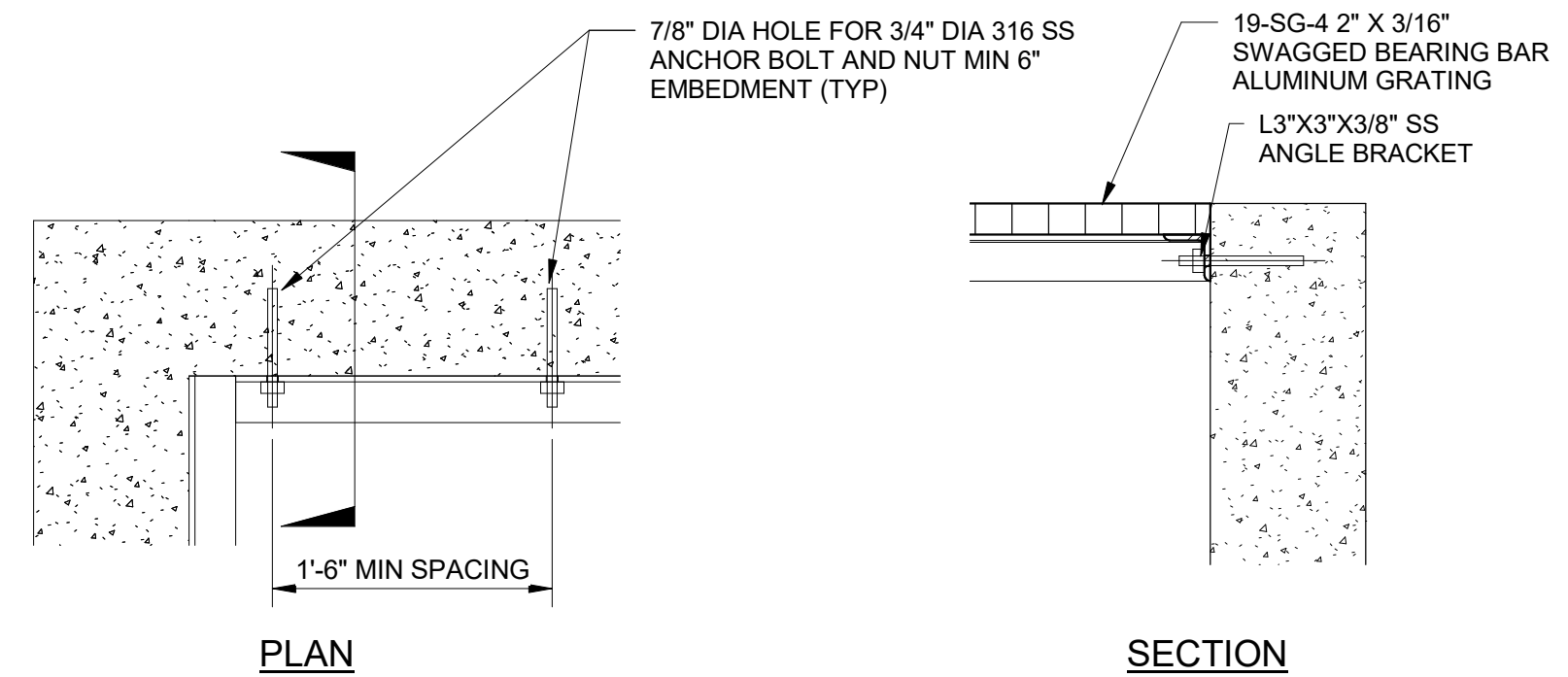
**TANK DRAIN AND OVERFLOW STRUCTURE**  
SCALE: 1/2" = 1'-0"



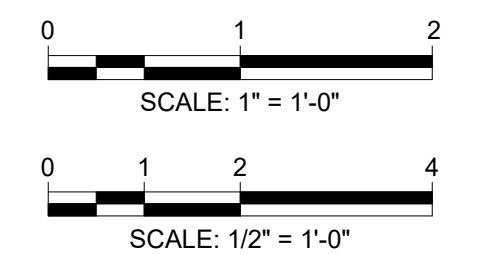
**1 SECTION**  
SCALE: 1/2" = 1'-0"



**2 SECTION**  
SCALE: 1/2" = 1'-0"



**A GRATING SUPPORT ANGLE BRACKET**  
SCALE: 1" = 1'-0"



NO.	BY	DATE	SYMBOL	REVISIONS
1.				

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**MACDONALD**  
Mott MacDonald Florida, LLC

Architects Engineers Surveyors  
AA - C0000035 EB - 0000155 LB - 0006783  
10245 Centurion Pkwy, N., Suite 320  
Jacksonville, Florida 32256  
Telephone: (904) 203-1090

DESIGNER: L. TRACEY  
DRAWN BY: B. LEE  
DATE: SEPT 2022  
CHECKED BY: L. SAMEL  
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DESIGN ENGINEER  
**LESLIE S. SAMEL, P.E.**  
FLORIDA REGISTRATION NO.  
68763



St. Johns County  
Utility Department  
1205 STATE ROAD 16  
ST. AUGUSTINE, FL 32084  
PHONE: (904) 209-2626 FAX: (904) 209-2627

**CR-208 GROUND STORAGE TANK  
AND BOOSTER PUMP STATION**

**GROUND STORAGE TANK  
DRAIN AND OVERFLOW  
STRUCTURE PLAN AND  
SECTIONS**

SHEET NO.  
44  
DWG NO.  
M-9

B:\0561248\CR-208 BPS Process.mxd



## SECTION 15064

### PLASTIC PIPE AND FITTINGS

#### PART 1 – GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install in the locations as shown on the drawings, the plastic piping, fittings and appurtenances as specified herein and installed in the locations as shown on the Drawings.
- B. All buried piping on the project with a diameter 4-inches and greater shall be restrained joint type. Locate wire shall be installed for all buried pipe with nominal diameter of 6-inches and greater.
- C. The OWNER will pre-purchase the plastic pipe and fittings specified in Appendix C. The MANUFACTURER shall include shop drawing submittals to the OWNER per this Section.
- D. The OWNER will provide the pre-purchased plastic pipe and fittings to the CONTRACTOR for installation. The CONTRACTOR will also be required to unload and store the pre-purchased pipe and fittings for the OWNER.

##### 1.02 RELATED WORK

- A. Excavation and backfill for yard piping is included in Section 02221.
- B. Painting is included in Section 09900.
- C. Pipe supports systems are included in Section 15090.
- D. Valves and appurtenances are included in Section 15100.

##### 1.03 DESCRIPTION OF SYSTEM

- A. Piping shall be installed in the locations as shown on the Drawings.

##### 1.04 QUALITY ASSURANCE

- A. All plastic pipe, fittings and appurtenances shall be furnished by a single manufacturer who is fully experienced, reputable, and qualified in the manufacture of the items to be furnished. The equipment shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these specifications.
- B. All pipe shall be stored out of the sunlight. Temporary shading shall be provided. The pipe shall be stored at ambient outdoor temperatures. Gaskets shall be stored in a cool, dark location, and shall not come into contact with petroleum products.



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### PLASTIC PIPE AND FITTINGS

- C. Inspections of the pipe or storage methods may be made by the ENGINEER or OWNER and may be subject to rejection at any time on account of failure to meet the requirements. Rejected pipe shall be marked and removed from the site.

#### 1.05 SUBMITTALS

- A. Shop drawings shall be submitted to the ENGINEER for approval in accordance with Section 01300 Submittals and shall include dimensioning and technical specification for all piping to be furnished.
- B. Submit shop drawings and scaled piping layout drawings for all pipe and fittings supplied for each piping system. Layouts should include pipe type, fittings, and elevations.
- C. Submit procedures and certified test reports confirming that pipe has been manufactured in accordance with ASTM and AWWA standards specified herein.

#### 1.06 TOOLS

- A. Special tools, solvents, lubricants, and caulking compounds required for normal installation shall be furnished with the pipe.

### PART 2 – PRODUCTS

#### 2.01 GENERAL

- A. All pipe shall be bundled or packaged in such a manner as to provide adequate protection for the ends, threaded, or flanged, during transportation from the manufacturer.
- B. All piping for potable water shall be blue, all piping for drain or sewer shall be green, and all piping for reclaimed water shall be purple.

#### 2.02 POLYVINYL CHORIDE (PVC) PIPE

- A. All PVC pipe less than 4-inch in diameter shall be suitable for field cutting, welding, bending and coupling and shall be Schedule 80 unless otherwise shown on the Drawings and of the sizes as shown on the Drawings. Pipe supports shall be provided where shown on the drawings.
- B. All pressurize pipe 4 inches through 16-inch shall have a dimension ratio (DR) of 18 and all piping greater than 16-inch shall be DR 25. PVC pipe 4-inch through 12-inch shall conform to AWWA C900. PVC pipe 14-inch and larger shall conform to AWWA C905. PVC gravity sewer pipe larger than 4-inch in diameter shall have a SDR of 26. PVC gravity pipe 4-inch through 15-inch shall conform to ASTM D3034. PVC gravity pipe 18-inch and larger shall conform to ASTM F679. The pipe shall be made of PVC compounds Class 12454-A or 12454-B as defined in ASTM D1784. Each pipe shall

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### PLASTIC PIPE AND FITTINGS

be marked with the manufacturers name, trademark, size, material code, pressure class, AWWA designation number. When used for potable water service, a seal of the testing agency confirming compliance with all applicable standards.

- C. Fittings for pipe less than 4 inches shall be the socket type for solvent welded joints as designated in ASTM D-2467, except where threaded as shown on the Drawings, and as designated in ASTM D-2464, or flanged as shown on the Drawings, and shall be compatible with the pipe material where installed. Flanges shall be furnished with 1/8-inch thick full-faced Teflon, Viton, or ENGINEER approved equal gaskets. Flange bolts and nuts shall be ASTM A276, Type 316 stainless steel.
- D. Fittings for pipe 4 inches and larger shall be ductile iron with restrained push-on or mechanically restrained configurations compatible with the type PVC utilized.
- E. Caulking for plastic pipe in wall sleeve shall be by a mechanical, modular, rubber sealing element placed in between the sleeve and pipe and expanded to make a tight fit or other method approved by the ENGINEER.
- F. Expansion joints shall have integral duck and rubber flanges. They shall have individual solid steel ring reinforcement with a carcass of highest grade woven cotton or acceptable synthetic fiber. Joints shall be constructed of pipeline size and to meet working pressure and corrosive conditions similar to the line where installed. They shall be of a filled arch-type construction with a minimum of three arches per joint. All joints must be finish-coated with Hypalon paint to prevent ozone attack. They shall be Style 500 as manufactured by Mercer Rubber Co. of Trenton, New Jersey, or equal.
- G. All PVC pipe and materials coming into contact with for raw or potable water service shall be certified NSF 14 and 61 approved.

#### 2.03 HIGH DENSITY POLYETHYLENE (HDPE)

- A. All HDPE pipe shall conform to AWWA C906 and ASTM D2447, and all fittings shall conform to ASTM D3261.
- B. Pipe shall be manufactured from HDPE base resin conforming to grade 34 (PPI PE 3406) or better in accordance with ASTM D2447. The pipe shall have a minimum hydrostatic design stress of 630 psi at 73 degrees F and be suitable for field cutting and heat fusion joining.
- C. Joints for HDPE shall be butt heat fusion made in accordance with D2657.
- D. Mechanical connections to valves and piping shall be made in accordance with the manufacturer's recommendations. Flanged connections shall consist of the following:
  - 1. Stainless steel backup, polyethylene flange shall be thermally butt fused to the stub end of the pipe.
  - 2. A type 316 SS backup ring on both sides of the connection shall be used as approved by the ENGINEER.
  - 3. Flange connections shall be provided with a full-face neoprene gasket.

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### PLASTIC PIPE AND FITTINGS

#### 2.04 PLASTIC TUBING

- A. Plastic tubing shall be clear, flexible, non-cracking with a wall thickness that is adequate for the pressures involved and of the sizes as shown on the Drawings.
- B. All plastic tubing shall be chemically inert, resistant, and compatible for the chemical intended for its use.

#### 2.05 LOCATE WIRE

- A. Utility marking tape shall be 3-inch wide and 4-mil thick per ASTM D2103 with a 2,750-psi tensile strength per ASTM D882.
- B. Tape shall have adhesive backing and industrial standard repeatable message.
- C. External color of locate wire shall be blue for potable water, green for sewer, and pantone purple 522C for reuse.
- D. Locate wire shall be 10-gauge, single strand, UF rated for direct bury, copper wire with 30 mil insulation.

### PART 3 – EXECUTION

#### 3.01 INSTALLATION

- A. The installation of plastic pipe shall be strictly in accordance with the manufacturer's technical data and printed instructions.
- B. Joints for plastic pipe shall be solvent welded except flanged or threaded where required. In making solvent welded connections, clean dirt and moisture from pipe and fittings, bevel pipe ends slightly with emery cloth, if necessary, and apply solvent cement of the proper grade. Expansion joints shall be installed every 50 feet on long runs and in every straight run longer than 15 feet.
- C. Installation of valves and fittings shall be strictly in accordance with manufacturer's instructions. Particular care shall be taken not to overstress threaded connections at sleeves. In making solvent weld connections the solvent shall not be spilled on valves or allowed to run from joints.
- D. All piping have a sufficient number of unions to allow convenient removal of piping and shall be as approved by the ENGINEER.
- E. Where plastic pipe passes through wall sleeves, joints shall be sealed with a mechanical sealing element as shown on the drawings.

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- F. All plastic pipe to metal pipe connections shall be made using flanged connections. Metal piping shall not be threaded into plastic fittings, valves, or couplings, nor shall plastic piping be threaded into metal valves, fittings or couplings.
- G. Concrete inserts for hangers and supports shall be furnished and installed in the concrete as it is placed. The inserts shall be set in accordance with the requirements of the piping layout and the CONTRACTOR shall verify their locations from approved piping layout drawings and the structural drawings. Pipe hangers and supports are specified in Section 15090 and as detailed on the drawings.

#### 3.02 FIELD PAINTING

- A. Pipe normally exposed to view shall be painted and marked as specified in the Painting Section 09900. The CONTRACTOR shall coordinate with their elected pipe MANUFACTURER to ensure they have no issues with the specified painting. ENGINEER will assist in identifying pipe contents, direction of flow and all else required for proper marking of pipe.

#### 3.03 INSPECTION AND TESTING

- A. All piping shall be tested as per Paragraph 3.9 of the SJCUD Standard Specifications, latest version.
- B. The test pressures and temperatures for the various pipe lines shall be as follows:
  - 1. Drain and gravity sewer piping: 20 psi at ambient temperature
  - 2. All other piping: 150 psi for water mains or reclaimed water mains, 100 psi for force mains
- C. All pipelines shall remain undisturbed for 24 hours to develop complete strength at all joints. All pipelines shall be subjected to a hydrostatic pressure test for 4 hours at full working pressure. All leaks shall be repaired and lines retested as approved by the ENGINEER. Prior to testing, the pipelines shall be supported in an approved manner to prevent movement during tests.

#### 3.04 LOCATE WIRE TESTING

- A. Locate wire shall be brought to grade within a valve box or locating station box at 200 foot intervals or less. Locate wire shall be installed in a box along the pipeline in either the 5:00 o'clock or 8:00 o'clock position relative to the pipe. Connection or splices underground which are not inside a locate box or valve box is not allowed.
- B. Testing shall be performed by a person or company that has been certified by the manufacturer of the approved testing equipment as proficient in the use of the equipment. The certified tester shall be approved by SJCUD and the ENGINEER. A SJCUD representative may elect to be present during the testing period.

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### PLASTIC PIPE AND FITTINGS

- C. The CONTRACTOR shall provide the tester with a copy of the yard piping plan that has been marked up by the CONTRACTOR to identify pipes where locate wiring has been installed. The tester shall trace the entire length of pipe and mark any piping location variations from the marked-up plans. The depth to top of pipe shall be recorded at 50 foot intervals.
  
- D. A final locate wire report shall be submitted to SJCUD and the ENGINEER for review and approval. The report shall include a signed and sealed statement from the tester that certifies all installed wire was successfully sounded and traced with no open breaks. The report shall include all field notes, breaks found/repaired, depths, and other applicable field remarks by the tester. The report shall be furnished prior to substantial completion of the project.

END OF SECTION 15064

## SECTION 15072

### DUCTILE IRON PIPE AND FITTINGS

#### PART 1 – GENERAL

##### 1.01 SCOPE

- A. The work under this Section of the specifications shall include all materials, equipment, and labor for furnishing, laying, installing, testing, and disinfecting the piping work and appurtenances herein under described and as shown on the Contract Drawings.
- B. The CONTRACTOR shall furnish ductile iron pipe, fittings, accessories, and appurtenances necessary for installation, including but not limited to gaskets, nuts, and bolts for flanged joints; pipe supports; tie rods; and flexible couplings. The OWNER has pre-purchased buried ductile iron piping and fittings and will provide that to the CONTRACTOR for installation. All remaining ductile iron piping required for the project shall be purchased, unloaded, stored and installed by the CONTRACTOR. The CONTRACTOR will also be required to unload and store the pre-purchased pipe and fittings for the OWNER.
- C. All buried piping on the project shall be restrained joint type. Locate wire shall be installed for all buried pipe with nominal diameter of 6-inches and greater.
- D. The OWNER will pre-purchase the ductile iron pipe and fittings specified in Appendix C. The MANUFACTURER shall include shop drawing submittals to the OWNER per this Section.

##### 1.02 RELATED WORK

- A. Mechanical equipment, pipe supports, sleeves, couplings, valves and appurtenances are included in respective sections of Division 11.
- B. Painting, except as specified herein, is included in Division 9.

##### 1.03 QUALITY ASSURANCE

- A. Dimensions shown on Contract Drawings are approximate only. CONTRACTOR shall verify all piping geometry in the field and shall be responsible for ensuring proper alignment and fit of all piping consistent with the intent of the Contract Drawings.

##### 1.04 SUBMITTALS

- A. Shop drawings and manufacturer's literature shall be promptly submitted to the ENGINEER for approval in accordance with Section 01300.
- B. The following items shall be submitted before delivery of pipe or fittings:
  - 1. Certification by the manufacturer or supplier that the pipe furnished for this project meets all pertinent AWWA and, if coming into contact with potable water, NSF 61 Standards, latest editions.
  - 2. Certifications of compliance with applicable standards for all piping.

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### DUCTILE IRON PIPE AND FITTINGS

3. Pipe laying schedule or assembly drawings which indicate overall dimensions, lengths of restrained joint pipe, the specific number of each pipe and fitting and the location and direction of lay of each pipe identified by mark number. Pipe laying schedules shall be submitted for all piping systems and shall include elevations of proposed piping.
4. Catalog cuts and installation instructions for all restrained joints including boltless restrained joint pipe and grooved end joint pipe for ductile iron pipe.
5. Certification that all bolts to be furnished conform to the referenced standards and are manufactured in the United States of America.
6. Shop drawings and schedules completely detailing and locating wall pipes shall be submitted for approval prior to their fabrication and well in advance of the concrete work.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. The Manufacturer shall legibly mark all pipe and specials in accordance with the approved laying schedules and marking diagram. Each pipe shall be numbered in sequence and said number shall appear on the laying schedule and marking diagram in its proper location for installation.
- B. The CONTRACTOR shall carefully examine all material for defects. Material which is known, or thought, to be defective shall not be installed.
- C. The ENGINEER reserves the right to inspect all material and to reject all defective material shipped to the job site or stored on the site. Failure of the ENGINEER to detect damaged material shall not relieve the CONTRACTOR from his total responsibility for the completed work if it leaks or breaks after installation. Lay all defective material aside for final inspection by the ENGINEER to determine if corrective repairs may be made, or if the material is to be rejected. The ENGINEER shall determine the extent of the repairs.
- D. CONTRACTOR shall classify defective pipe prior to ENGINEER's inspection as follows:
  1. Damage to interior and/or exterior paint seal coats.
  2. Damage to interior cement-mortar lining.
  3. Insufficient cement-mortar lining thickness.
  4. Poor quality interior paint seal coat.
  5. Pipe out of round.
  6. Damaged pipe barrel area to a point where pipe class thickness is reduced.
  7. Denting or gouges in plain end of pipe.
- E. The CONTRACTOR shall be solely responsible for the safe storage of all material until it has been incorporated in the completed project and accepted by the ENGINEER. The CONTRACTOR will inspect and note any defects to the OWNER and ENGINEER immediately for any pipe pre-purchased by the OWNER.
- F. Pipe fittings and accessories shall be loaded and unloaded by lifting with hoists or skidding to avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against another pipe. Handling of this material is to be in accordance with AWWA C600.

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### DUCTILE IRON PIPE AND FITTINGS

- G. The CONTRACTOR is cautioned to exercise care in handling, loading, unloading, and storing ductile iron pipe and fittings. All ductile iron pipe and fittings shall be stored under cover before use and shall be transported in a vehicle with a bed long enough to allow the length of pipe to lay flat so as not to be subject to undue bending or concentrated external load at any point.

## PART 2 – PRODUCTS

### 2.01 DUCTILE IRON PIPE

#### A. General

1. Ductile iron pipe and fittings 3-inch and larger shall be manufactured by U.S. Pipe and Foundry, American Ductile Iron Pipe Company, McWane Pipe Company, or ENGINEER approved equal.
2. Ductile iron pipe shall conform to the latest specifications as adopted by the American National Standards Institute, Inc., (ANSI) and the American Water Works Association (AWWA). Specifically, ductile iron pipe shall conform to ANSI/AWWA C151/A21.51, AWWA C150, and AWWA C111.
3. All buried pipe shall be coated outside with a bituminous coating in accordance with ANSI/AWWA C151/A21.51. Bituminous coating on any exposed piping is not acceptable.
4. Potable water and reclaimed water ductile iron pipe interior shall be cement mortar lined and seal coated in compliance with the latest revision of ANSI/AWWA C104/A21.4. High-speed cement lining (offered by American Pipe) is acceptable with no seal coat. All coatings shall be applied at the place of manufacture prior to shipment to the construction site. The coatings shall be protected throughout construction and shall maintain an approved factory condition free of defect.
5. Wastewater ductile iron pipe shall be coated inside with an approved amine cured novalac epoxy coating. Acceptable coatings include Protecto 401 ceramic epoxy, SP 2000 ceramic epoxy, poly bond plus, or approved equal.
6. Each length of pipe shall be subjected to a hydrostatic proof test by the manufacturer as required by ANSI/AWWA C151/A21.51.

#### B. Mechanical Joint Pipe

1. Push-on and mechanical joints shall conform to ANSI/AWWA C111/A21.11. All pipe installed on this project shall be furnished with restrained joints.
2. The pipe class of non-flanged pipe shall be as a minimum pressure Class 250. Where indicated on the Drawings, thicker classes shall be furnished.

#### C. Flanged Pipe

1. Flanged joints for piping shall conform to ANSI/AWWA C110/A21.10 for fittings and ANSI/AWWA C115/A21.15 for pipe. Flanged joints shall not be used in underground installations except where specifically shown on the Drawings.
2. All flanged pipe shall be a minimum of thickness Class 125, unless otherwise indicated on the Contract Drawings or SJCUD Standards Manual.



## SECTION 15072

### DUCTILE IRON PIPE AND FITTINGS

#### 2.02 DUCTILE IRON FITTINGS

##### A. General

1. Fittings shall be ductile iron conforming to ANSI/AWWA C110/A21.10, C111/A21.11, C115/A21.15, and/or C153/A21.53. Fittings shall also be certified by ISO 9000 by an accredited ENGINEER.
2. Fittings shall have a minimum working pressure of 250 psi.
3. Fittings shall be coated on the outside and inside to match the connecting pipes.
4. Fittings shall be manufactured by American Cast Iron Pipe Company, Clow, Tyler Union, U.S. Pipe and Foundry, Star Pipe Products, Sigma Corporation, and Pipe Components Inc.
5. All fittings shall be supplied by one manufacturer.

##### B. Mechanical Joint Ductile Iron Fittings

1. Mechanical and push-on joints including accessories shall conform to ANSI/AWWA C111/A21.11.
2. All buried steel lugs, rods, brackets and mechanical joint bolts and nuts shall be low alloy steel in accordance with ANSI C111 and shall be given one (1) coat of Koppers #50 coal tar coating prior to backfilling.

##### C. Flanged Ductile Iron Fittings

1. Flanges for fittings shall meet the requirements of ANSI/AWWA C110/A21.10 and C151/A21.51.
2. All above ground flanged piping shall be provided with 316 stainless steel bolts and nuts. Stainless steel nuts and bolts shall not be painted and should be properly protected to avoid painting.

##### D. Restrained Joint Fittings

1. Restrained joints may be restrained by utilizing a joint restraint gasket which includes a stainless-steel locking segments vulcanized into the rubber gasket. The gasket shall be rated for operating pressures up to 250 psi based on the performance requirements of ANSI/AWWA C111/A21.11.

#### 2.03 DUCTILE IRON PIPE MARKING

- A. All ductile iron pipe below ground shall be marked with a minimum 3-inch wide, non-detectable utility marking tape. The utility marking tape shall be installed on the pipe at the 12 o'clock position. Tape shall be 4 minimum millimeter ASTM D2103 thickness and constructed for prolonged use underground, meet industry standard (APWA) color code, tensile strength of 2750 psi (ASTM D882), and industrial standard repeatable message.
- B. All ductile iron piping above ground shall be color labeled "Water" stenciled in the center of each joint of pipe utilizing oil paint. Stenciled lettering shall be a minimum of 4-inches and be black in color.

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### DUCTILE IRON PIPE AND FITTINGS

#### 2.04 RETAINING RINGS

- A. The CONTRACTOR shall maintain, on-site, a suitable supply of field installed retaining rings for ductile iron boltless restrained joints for pipe installations which may require unavoidable field cutting, as approved by the ENGINEER. Field installed retaining rings shall be furnished by the same manufacturer as the pipe, and shall have the same pressure rating as factory installed rings.

#### 2.05 RETAINER GLANDS

- A. All mechanical joint fittings and valves shall be provided with ductile iron retainer glands. Retainer glands shall be "Megalug" Series 1100 as manufactured by EBAA Iron or equal. Retainer glands shall be supplied complete with torque limiting twist off nuts.

#### 2.06 LOCATE WIRE

- A. Utility marking tape shall be 3-inch wide and 4-mil thick per ASTM D2103 with a 2,750 psi tensile strength per ASTM D882.
- B. Tape shall have adhesive backing and industrial standard repeatable message.
- C. External color of locate wire shall be blue for potable water, green for sewer, and pantone purple 522C for reuse.
- D. Locate wire shall be 10 gauge, single strand, UF rated for direct bury, copper wire with 30 mil insulation.

### PART 3 – EXECUTION

#### 3.01 INSTALLATION - GENERAL REQUIREMENTS

- A. All pipe shall be laid and maintained to the required lines and depths. Fittings and valves shall be at the required locations with joints centered, spigots and all valve and hydrant stems plumb and otherwise in strict accordance with the Specifications.
- B. All buried steel lugs, rods, brackets and flanged joint bolts and nuts shall be 316 stainless steel and shall be given one (1) coat of Koppers #50 coal tar coating prior to backfilling.
- C. No deviation shall be made from the required alignment, depth or grade except with the written consent of the ENGINEER.
- D. All pipe shall be laid to the depth specified. The depth shall be measured from the final surface grade to the top of the pipe barrel. The minimum pipe cover shall be as shown on the Drawings or as specified in the Specifications.

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### DUCTILE IRON PIPE AND FITTINGS

- E. Do not lay pipe in a wet trench, on subgrade containing frost, and when trench conditions are unsuitable for such work. If all efforts fail to obtain a stable dry trench bottom and the ENGINEER determines that the trench bottom is unsuitable for trench foundation, he will order in writing the kind of stabilization to be constructed.
- F. Thoroughly clean the pipes and fittings before they are installed and this material shall be kept clean until the acceptance of the completed work. Lay pipe with the bell ends facing in the direction of laying, unless otherwise shown on the Drawings, or directed by the ENGINEER. Exercise care to ensure that each length abuts against the next in such manner that no shoulder or unevenness of any kind occurs in the pipe line.
- G. No wedging or blocking is permitted in laying pipe unless by written order of ENGINEER.
- H. Before joints are made, bed each section of pipe the full length of the barrel with recesses excavated so pipe invert forms continuous grade with invert of pipe previously laid. Do not bring succeeding pipe into position until the preceding length is embedded and securely in place.
- I. Dig bell holes sufficiently large to permit proper joint making and to ensure pipe is firmly bedded full length of its barrel.
- J. During "pushing home" of any style piping, timber shall be placed between the jacking device (backhoe, bucket, pipe jacket, etc.) and the pipe being driven home.
- K. Walking or working on completed pipeline, except as necessary in tamping and backfilling, is not permitted until trench is backfilled one-foot deep over top of pipes.
- L. Take up and relay pipe that is out of alignment or grade, or pipe having disturbed joints after laying.
- M. Take up and replace with new, such in-place pipe sections found to be defective. Replacement work at CONTRACTOR's expense.
- N. Take necessary precautions to prevent the floating of the pipeline by the accumulation of water in the trench, or the collapse of the pipeline from any cause. Should floating or collapse occur, restoration will be at the CONTRACTOR's expense.
- O. Bedding and backfilling materials for buried pipe shall be as specified previously in Division 2, as specified in subsequent paragraphs, and in accordance with the Contract Drawings.
- P. Take every precaution to prevent foreign material from entering the pipe while it is being placed. During laying operations, do not place debris, tools, clothing, or other materials in the pipe.

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### DUCTILE IRON PIPE AND FITTINGS

- Q. Close all openings in the pipeline with watertight plugs when pipe laying is stopped at the close of the day's work or for other reasons, such as rest breaks or meal periods.
- R. Place enough backfill over the center sections of the pipe to prevent floating.
- S. Carry out the cutting of pipe only with equipment specifically designed for that purpose such as an abrasive wheel, rotary wheel cutter, a guillotine pipe saw or a milling wheel saw. The use of chisels will not be permitted. Cut ends and rough edges should be ground smooth and for push-on connections, the cut end should be beveled slightly.
- T. In distributing material at the project site, each piece shall be unloaded opposite or near the place where it is to be laid in the trench. Each length of pipe shall be adequately blocked to prevent movement. Stockpiled pipe shall be adequately blocked to prevent movement. No pipe, material, or any other object shall be placed on private property, obstruct walkways or driveways, or in any manner interfere with the normal flow of traffic.
- U. In the case of ductile iron pipe, special care shall be exercised, during handling temporary storage or construction to avoid damage to the bells, spigots or flanged ends. If damaged pipe cannot be repaired to the ENGINEER's satisfaction, it shall be replaced at the CONTRACTOR's expense.
- V. The CONTRACTOR shall be responsible for maintaining the minimum required distance between the water main and other utility lines in strict accordance with all Federal, State and local requirements and all right-of-way limitations.
- W. The maximum allowable deflection at the joints for push-on joint pipe, regardless of pipe material shall be no more than 75 percent of the manufacturer's published recommendation.
- X. In case the curve is too sharp for the allowable deflection, short lengths of pipe may be used upon approval of the ENGINEER and at no additional cost to the OWNER.
- Y. Care shall be exercised such that no high points are established where air can accumulate in the pipelines.

#### 3.02 CONSTRUCTION METHODS TO AVOID CONTAMINATION

- A. Heavy particulates generally contain bacteria and prevent even very high chlorine concentrations from contacting and killing such organisms. It is essential that the procedures of this section be observed to assure that a water main and its appurtenances are thoroughly clean for the final disinfection by chlorination.
- B. Precautions shall be taken to protect the interiors of pipes, fittings, and valves against contamination. Pipe delivered for construction shall be strung to minimize entrance of foreign material. All openings in the pipeline shall be closed with watertight plugs when pipe laying is stopped at the close of the day's work or for

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### DUCTILE IRON PIPE AND FITTINGS

other reasons, such as rest breaks or meal periods. Rodent-proof plugs may be used where it is determined that watertight plugs are not practical and where thorough cleaning will be performed.

- C. Delay in placement of delivered pipe invites contamination. The more closely the rate of delivery is correlated to the rate of pipe laying, the less likelihood of contamination.
- D. Joints of all pipe in the trench shall be completed before work is stopped. If water accumulates in the trench, the plugs shall remain in place until the trench is dry.
- E. Yarning or packing material shall consist of molded or tubular rubber rings, or rope of treated paper or other approved materials. Materials such as jute, asbestos or hemp shall not be used. Packing material shall be handled in a manner that avoids contamination.
- F. No contaminated material or any material capable of supporting prolific growth of microorganisms shall be used for sealing joints. Sealing material or gaskets shall be handled in a manner that avoids contamination. The lubricant used in the installation of sealing gaskets shall be suitable for use in potable water. It shall be delivered to the job in closed containers and shall be kept clean.
- G. If dirt enters the pipe, and in the opinion of the ENGINEER the dirt will not be removed by the flushing operation, the interior of the pipe shall be cleaned by mechanical means and then shall be swabbed with a 1 percent hypochlorite disinfecting solution. Cleaning with the use of a pig, swab or "go-devil" should be undertaken only when the ENGINEER has specified such and has determined that such operation will not force mud or debris into pipe joint spaces.

#### 3.03 DUCTILE IRON PIPE INSTALLATION

- A. The installation of buried iron piping, except as otherwise shown or specified, shall conform to AWWA C-600, "Standard for Installation of Ductile Iron Water Mains and Appurtenances". Boltless restrained joint pipe shall also be installed in accordance with manufacturer's recommended instructions.
- B. Assembly of push-on pipe and mechanical joints valves shall be in accordance with the manufacturer's printed instructions and AWWA C-600. Installation of retainer glands shall be in accordance with the manufacturer's printed instructions. Torque wrenches shall be used for installation of mechanical and retainer glands.
- C. The bell, plain end, and gasket shall be thoroughly cleaned and lubricated immediately before assembling the joint. The gasket shall then be inserted into the groove in the bell. Before starting joint assembly, a liberal coating of special lubricant shall be applied to the gasket and spigot end. With the spigot end centered in the bell, the spigot end is pushed home. Bolts for mechanical joints shall be tightened in an alternating top-to-bottom and side-to-side sequence to bring the gland up to the bell face evenly. If effective sealing is not achieved at the

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### DUCTILE IRON PIPE AND FITTINGS

maximum torques listed AWWA C-600, the joint shall be disassembled, thoroughly cleaned, and reassembled. Over stressing of bolts to compensate for poor joint assembly will not be permitted.

- D. All flanges, unless otherwise required, shall have standard drillings. Flanges shall be firmly bolted with machine, stud, or bolts of the proper size bar steel, with good, true threads, and shall be so tightened as to evenly distribute the stress in the bolts and bring the pipe into uniform alignment.
- E. In general, no flanges shall be permitted underground except as directed by the ENGINEER, or as indicated on the Drawings.
- F. Where required, flanges shall be tapped for stud bolts.

#### 3.04 PRESSURE TESTS

- A. The CONTRACTOR shall provide all labor, materials, equipment, gauges, air, water and all else necessary to pressure test all ductile iron piping systems installed under this Contract.
- B. All piping shall be tested as per Paragraph 1.4.2.5 of the SJCUD Standard Specifications, latest version.
  - 1. The test pressures for process piping shall be as follows:
    - a. 50 percent above the normal operating pressure with a minimum of 150 psi.

#### 3.05 BACTERIOLOGICAL TESTING

- A. If pipe or fittings are intended for use or comes into contact with potable water, the requirements of this section shall be met.
- B. After final flushing and before the piping is placed in service, samples will be collected by the OWNER and tested by the OWNER for bacteriological quality in accordance with Standard Methods for the Examination of Water and Wastewater.
- C. Bacteriological tests must show complete absence of coliforms. If tests show presence of coliform CONTRACTOR will be required to perform additional flushing and disinfection of the pipeline until such time acceptable tests are obtained, all at no cost to the OWNER.

#### 3.06 DISINFECTION

- A. If pipe or fittings are intended for use or comes into contact with potable water, the requirements of this section shall be met.
- B. Upon completion of installation, the interior of all piping shall be thoroughly cleaned and flushed.
- C. After cleaning and flushing, and following pressure testing, all lines carrying water shall be disinfected in accordance with AWWA (C651) American Water Works

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Association Standard for Disinfection of Water Mains. Following chlorination and after the entire length is ready for service, all treated water shall be flushed thoroughly from the pipeline. The CONTRACTOR shall coordinate with the OWNER to take sample at the beginning and end of the new system and which will provide chemical and bacteriological tests on the samples. The tests shall prove that the entire piping system is free of pathogenic organisms.

- D. Should the initial treatment prove ineffective, the disinfection procedure shall be repeated until satisfactory results are obtained.

#### 3.07 DISPOSAL OF HEAVILY CHLORINATED WATER

- A. After the applicable retention period, heavily chlorinated water should not remain in contact with the pipe for more than 48 hours. To prevent damage to the pipe lining or corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the distribution system, or is acceptable for domestic use.
- B. The chlorine residual of water being disposed shall be neutralized by treating with one of the chemicals listed in Table 1. The proposed disposal site to which chlorinated water is to be discharged shall be approved by the OWNER. A reducing agent shall be applied to the chlorinated water to be wasted to completely neutralize the chlorine residual remaining in the water. Where necessary, federal, state and local regulatory agencies should be contacted to determine special provisions for the disposal of heavily chlorinated water.
- C. The amount of chemicals (in pounds) required to neutralize various residual chlorine concentrations in 100,000 gallons of water are as follows:

<b>Table 1</b>				
<b>Residual Chlorine Concentration (mg/L)</b>	<b>Sulfur Dioxide</b>	<b>Sodium Bisulfite</b>	<b>Sodium Sulfite</b>	<b>Sodium Thiosulfate</b>
1	0.8	1.2	1.4	1.2
2	1.7	2.5	2.9	2.4
10	8.3	12.5	14.6	12.0
50	41.7	62.6	73.0	60.0

#### 3.08 LOCATE WIRE TESTING

- A. Locate wire shall be brought to grade within a valve box or locating station box at 200 foot intervals or less. Locate wire shall be installed in a box along the pipeline in either the 5:00 o'clock or 8:00 o'clock position relative to the pipe. Connection or splices underground which are not inside a locate box or valve box is not allowed.
- B. Testing shall be performed by a person or company that has been certified by the manufacturer of the approved testing equipment as proficient in the use of the equipment. The certified tester shall be approved by SJCUD and the ENGINEER. An SJCUD representative may elect to be present during the testing period.

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- C. The CONTRACTOR shall provide the tester with a copy of the yard piping plan that has been marked up by the CONTRACTOR to identify pipes where locate wiring has been installed. The tester shall trace the entire length of pipe and mark any piping location variations from the marked-up plans. The depth to top of pipe shall be recorded at 50 foot intervals.
  
- D. A final locate wire report shall be submitted to SJCUD and the ENGINEER for review and approval. The report shall include a signed and sealed statement from the tester that certifies all installed wire was successfully sounded and traced with no open breaks. The report shall include all field notes, breaks found/repared, depths, and other applicable field remarks by the tester. The report shall be furnished prior to substantial completion of the project.

END OF SECTION 15072