PINELLAS COUNTY GOVERNMENT IS COMMITTED TO PROGRESSIVE PUBLIC POLICY, SUPERIOR PUBLIC SERVICE, COURTEOUS PUBLIC CONTACT, JUDICIOUS EXERCISE OF AUTHORITY AND SOUND MANAGEMENT OF PUBLIC RESOURCES, TO MEET THE NEEDS AND CONCERNS OF OUR CITIZENS TODAY AND TOMORROW.

DESIGN BUILD SERVICES AGREEMENT

RFP TITLE: Professional Design Build Services – North Redington Beach Fire Station and Lift Station Replacement

RFP CONTRACT NO. 189-0190-NC (SS)

DESIGN BUILD FIRM: Wharton-Smith, Inc.

AGREEMENT PREPARED BY
Real Estate Management Department

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DESIGN BUILD AGREEMENT

PINELLAS COUNTY, FLORIDA, (“Owner") by and through THE BOARD OF COUNTY COMMISSIONERS hereby contracts with Wharton-Smith, Inc. ("Design Builder") of Tampa, Florida, a Florida corporation authorized and licensed to do business in the State of Florida, to perform all work and services in connection with the design and construction of the Pinellas County North Redington Beach Fire Station and Lift Station Replacement Project"), as said work and services is set forth in this Agreement, the Plans and Specifications to be prepared by or for Design Builder as hereafter provided and all other Contract Documents hereafter specified (the "Work").

Owner and Design Builder, for the consideration herein set forth, agree as follows:

Section 1. Contract Documents.

A. The Contract Documents consist of this Agreement, the Design Criteria Package, the Exhibits described in Section 6 hereof, the Public Notice/Legal Advertisement, and any duly executed and issued addenda, Change Orders, Work Directive Changes, Field Orders and amendments relating thereto. Further, the term Contract Documents shall include all plans and specifications for the construction of the Project (“Construction Documents”) to be prepared by or for Design Builder, but only after said Construction Documents have been completed and approved in writing by Owner. All of the foregoing Contract Documents are incorporated by reference and made a part of this Agreement (all of said documents including the Agreement sometimes being referred to herein as the "Contract Documents" and sometimes as the "Agreement" and sometimes as the “Contract”). A copy of the Contract Documents shall be maintained by Design Builder at the Project site at all times during the performance of the Work.

B. Design Builder shall furnish Owner one (1) sealed copy, one (1) reproducible set, and one (1) CD of the Contract Documents. All copies of the Construction Documents required by Design Builder for execution of the Work shall be made by Design Builder at Design Builder’s sole cost and expense. Upon the completion or termination of this Agreement, as directed by Owner, Design Builder shall deliver to Owner copies or originals, as required by the Owner, of all records, documents, drawings, notes, tracings, plans, Auto CAD files, specifications, maps, evaluations, reports and other technical data, other than working papers, prepared or developed by or for Design Builder under this Agreement (“Project Documents”). Design Builder shall be solely responsible for all costs associated with delivering to Owner the Project Documents. Design Builder, at its own expense, may retain copies of the Project Documents for its files and internal use. Notwithstanding anything in this Agreement to the contrary and without requiring Owner to pay any additional fees, Design Builder hereby grants Owner a nonexclusive, irrevocable license in all of the Project Documents for Owner’s use on this Project. Design Builder warrants to Owner that it has full right and authority to grant this license to Owner. Further, Design Builder consents to Owner’s use of the Project Documents to complete the Project following Design Builder’s termination for any reason or to perform reconstruction, additions to or remodeling or renovations of the Project.

C. Nothing contained in the Contract Documents shall create a contractual relationship between Owner and any third party; however, it is agreed that Owner is an intended third party beneficiary of all contracts for design and engineering services, all subcontracts, purchase orders and other agreements relating to the Project between Design Builder and third parties. Design Builder shall incorporate the obligations of this Contract into its respective consultant agreements, subcontracts, supply agreements and purchase orders.

Section 2. Scope of Work.

The scope of the Work to be performed by Design Builder herein includes the design and construction as set out and described in the Contract Documents, including but not limited to all labor, services, materials and equipment as may be required to complete the Work in compliance with the Contract Documents.

This Project consists of the design and construction of a new fire station and sanitary sewer lift station relocation and replacement on property located at 190 173rd Avenue East, North Redington Beach, Florida.

The Project consists of two phases, referred to herein as Phase 1 and Phase 2A and 2B. Phase 1, described more specifically in the attached Exhibit O, will include the following sub-phases: Program Verification, Schematic Design, Design Development, preparation of 50% complete Construction Documents, and development of the Lump Sum Price proposal. Phase 2, described more specifically in the attached Exhibit P, if authorized, will include the preparation of 100% Complete Construction Documents, completion of the Building Permit Phase, and the construction of the Project. Identified within Exhibit S are key personnel of the Design Builder's subconsultants. Design Builder shall require all subconsultants to agree that any such key personnel who are assigned to the Project shall not be removed without Owner's prior written approval, and if so removed must be immediately replaced with a person acceptable to Owner.

Section 3. Contract Amount.

In consideration of the faithful performance by Design Builder of the covenants in this Agreement to the full satisfaction and acceptance of Owner, Owner agrees to pay, or cause to be paid, to Design Builder the following Phase 1 Fee and Lump Sum Price amounts (collectively herein "Contract Amount"), in accordance with the terms of this Agreement:

A. **Phase 1.** For all Phase 1 Services, including, but not limited to, causing the preparation of the 50% complete Construction Documents, providing value engineering services, reviewing Construction Documents for constructability, assisting and meeting with the Owner during the various design sub phases, and preparing cost estimates and schedules, Design Builder shall receive the fixed amount of $527,783.00 ("Phase 1 Fee") as the total lump sum compensation for all Phase 1 Services. Said lump sum amount shall be paid in accordance with the Phase 1 Compensation Schedule attached hereto as Exhibit Q.

B. **Phase 2.** With respect to Phase 2 Services to be provided by Design Builder hereunder, Owner shall pay Design Builder the fixed lump sum amount ("Lump Sum Price") to be established in the Lump Sum Contract Price Amendment to the Agreement (the "Lump Sum Amendment"). Design Builder agrees to provide Owner with the Lump Sum Price proposal within forty-five (45) days after the Construction Drawings are at 50% Completion. The Lump Sum Price proposal shall be based upon the previous cost estimates provided by Design Builder as required hereunder. Further, the Lump Sum Price proposal shall be broken down into the categories and level of detail required by Owner. Design Builder agrees that all of its books, records and files, with respect to its development of the Lump Sum Amendment proposal, shall be open to Owner for review, examination and copying. The Lump Sum Price proposal shall include general condition expenses specified in the Lump Sum Amendment, and a profit markup not to exceed 5%. The Lump Sum Price shall be mutually agreed upon by Owner and Design Builder and shall be set forth in the Lump Sum Amendment. The form for the Lump Sum Amendment is attached hereto as Exhibit N. Design Builder guarantees that in no event shall the Design Builder's total compensation exceed the Lump Sum Price, as the Lump Sum Price may be adjusted pursuant to the terms herein for Change Orders and Construction Change Directives. In the event Design Builder and Owner fail to reach an agreement on the Lump Sum Amendment, Owner may elect to terminate this Contract. In the event of any such termination, Design Builder shall be entitled to receive that portion of the Contract Amount attributable to the Phase 1 Services earned through the date of termination plus that portion of any earned compensation associated with any Phase 2 Services provided, to the extent such services were expressly approved in advance and in writing by Owner; but Design Builder shall not be entitled to any further or additional compensation from Owner, including but not limited to damages or lost profits on portions of the Work not approved or performed.

Section 4. Bonds.

A. Concurrent with its execution of the Lump Sum Amendment, Design Builder shall provide Performance and Payment Bonds, in the form prescribed in Exhibit A, in the amount of 100% of the Lump Sum Price, the costs of which are to be paid by Design Builder. The Performance and Payment Bonds shall be underwritten by a surety authorized to do business in the State of Florida and otherwise acceptable to Owner; provided, however, the surety shall meet the requirements of the Department of the Treasury Fiscal Service, "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsurance Companies" circular. This circular may be accessed via the web at www.fms.treas.gov/c570/c570.htm l. Should the Contract Amount be less than $500,000, the requirements of Section 287.0935, F.S. shall govern the rating and classification of the surety.

B. If the surety for any bond furnished by Design Builder is declared bankrupt, becomes insolvent, its right to do business is terminated in the State of Florida, or it ceases to meet the requirements imposed by the Contract Documents, the Design Builder shall, within five (5) calendar days thereafter, substitute at its cost and expense another bond and surety, both of which shall be subject to the Owner's approval.

C. At the time Design Builder executes this Agreement, Design Builder shall deliver to Owner proof, reasonably acceptable to Owner, of Design Builder's ability to deliver the Performance and Payment bonds required hereunder.

Section 5. Contract Time and Liquidated Damages.

A. Time of Performance. Services performed pursuant to this contract shall remain in effect for twenty-four (24) consecutive calendar months from the commencement date on the Notice to Proceed. This Agreement shall become effective on the date of execution of the Agreement. Duration of the contract shall be ten (10) months for Phase 1 Design and fourteen (14) months for Phase 2 Construction. Time is of the essence in the performance of the Work under this Agreement.

The "Phase 1 Commencement Date" shall be established in the written Notice to Proceed to be issued by the Project Manager, as hereinafter defined. Design Builder shall commence the Phase 1 Services portion of the Work within five (5) calendar days from the Phase 1 Commencement Date. Any Work performed by Design Builder prior to the Phase 1 Commencement Date shall be at the sole risk of Design Builder.

The "Phase 2 Commencement Date" shall be established in the Lump Sum Amendment, except to the extent otherwise agreed to in writing by Owner. Design Builder shall commence the Phase 2 Services portion of the Work within five (5) calendar days after the Phase 2 Commencement Date. No portion of the Work, with respect to the Phase 2 Services to be provided hereunder shall be performed prior to the Phase 2 Commencement Date, unless expressly approved in advance by Owner in writing. The total period of time beginning with the Phase 2 Commencement Date and ending on the date of Substantial Completion of the Work is referred to hereafter as the "Contract Time". The Contract Time is further discussed in Paragraph B below.

B. Because the Work is to be completed in two phases (i.e. Phase 1 and Phase 2), the timely completion of Phase 1 is critical to the timely completion of Phase 2 and, therefore, completion of the entire Project. Accordingly, Design Builder agrees to provide the Phase 1 Services in accordance with Exhibit L. With respect to the Phase 2 Services, the Lump Sum Amendment shall include the date that portion of the Work associated with the Phase 2 Services must be substantially completed by Design Builder. That Substantial Completion date shall be established in terms of calendar days after the Phase 2 Commencement Date. In the event Design Builder and Owner fail to reach an agreement on the Contract Time and the Substantial Completion date, Owner may elect to terminate this Contract. In the event of any such termination, Design Builder shall be entitled to receive that portion of the Contract Amount attributable to the Phase 1 Services earned to the date of termination plus that portion of any earned compensation associated with any Phase 2 Services provided, to the extent such services were expressly approved in advance and in writing by Owner; but Design Builder shall not be entitled to any further or additional compensation from Owner, including but not limited to damages or lost profits on portions of the Work not approved or performed. Substantial Completion of the Work shall be achieved when the Work has been completed to the point where Owner can occupy or utilize the Work for its intended purpose. The entire Work shall be fully completed and ready for final acceptance by Owner within sixty (60) calendar days after the Substantial Completion Date. Final Completion shall occur when the Agreement is completed in its entirety, is accepted by the Owner as complete and is so stated by the Owner as completed. As used herein and throughout the Contract Documents, the phrase "Project Manager" refers to the Owner's duly authorized representative and shall mean the Division Administrator or Department Director, as applicable, acting directly or through duly authorized representatives.

C. Liquidated Damages in General. Owner and Design Builder recognize that, since time is of the essence for this Agreement, Owner will suffer financial loss if the Work associated with the Phase 2 is not substantially completed within the Contract Time specified in the Lump Sum Amendment, as said time may be adjusted as provided for herein. In such event, the total amount of Owner's damages, will be difficult, if not impossible, to definitely ascertain and quantify. Should Design Builder fail to achieve Substantial Completion within the number of calendar days established herein, Owner shall be entitled to assess, as liquidated damages, but not as a penalty, **five-hundred dollars ($500.00)** for each calendar day thereafter until Substantial Completion is achieved. Further, after Substantial Completion has been achieved, but Design Builder fails thereafter to achieve Final Completion within the required time period, Owner shall be entitled to assess and Design Builder shall be liable for all actual damages incurred by Owner as a result of such failure. The Project shall be deemed to be substantially completed on the date the Design Professional issues a Certificate of Substantial Completion (after a Certificate of Occupancy has been issued by the local building official) pursuant to the terms hereof. Design Builder hereby expressly waives and relinquishes any right which it may have to seek to characterize the above noted liquidated damages as a penalty, which the parties agree represents a fair and reasonable estimate of the Owner's actual damages at the time of contracting if Design Builder fails to Substantially or Finally Complete the Work within the required time periods.

D. Computation of Time Periods. When any period of time is referenced by days herein, it shall be computed to exclude the first day and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day shall be omitted from the computation, and the last day shall become the next succeeding day which is not a Saturday, Sunday or legal holiday.

E. Determination of Number of Days of Default. For all contracts, regardless of whether the Contract Time is stipulated in calendar days or working days, the Owner will count default days in calendar days.

E. Right of Collection. The Owner has the right to apply any amounts due Design Builder under this Agreement or any other agreement between Owner and Design Builder, as payment on such liquidated damages due under this Agreement in Owner's sole discretion. Notwithstanding anything herein to the contrary, Owner retains its right to liquidated damages due under this Agreement even if Design Builder, at Owner's election and in its sole discretion, is allowed to continue and to finish the Work, or any part of it, after the expiration of the Contract Time including granted time extensions.

F. Completion of Work by Owner. In the event Design Builder defaults on any of its obligations under the Agreement and Owner elects to complete the Work, in whole or in part, through another Design Builder or its own forces, the Design Builder and its surety shall continue to be liable for the liquidated damages under the Agreement until Owner achieves Substantial and Final Completion of the Work. Owner will not charge liquidated damages for any delay in achieving Substantial or Final Completion as a result of any unreasonable action or delay on the part of the Owner.

G. Final Acceptance by Owner. The Owner shall consider the Agreement complete when the Design Builder has completed in its entirety all of the Work and the Owner has accepted all of the Work and notified the Design Builder in writing that the Work is complete. Once the Owner has approved and accepted the Work, Design Builder shall be entitled to final payment in accordance with the terms of the Contract Documents.

H. Recovery of Damages Suffered by Third Parties. Design Builder shall be liable to Owner to the extent Owner incurs damages from a third party as a result of Design Builder's failure to fulfill all of its obligations under the Contract Documents. Owner's recovery of any delay related damages under this Agreement through the liquidated damages does not preclude Owner from recovering from Design Builder any other non-delay related damages that may be owed to it arising out of or relating to this Agreement.

Section 6. Exhibits Incorporated.

The following documents are expressly agreed to be incorporated by reference and made a part of this Agreement.

Exhibit A:	Performance and Payment Bond Forms
Exhibit B:	Insurance Requirements
Exhibit C:	Release and Affidavit Form
Exhibit D:	Design Builder Application for Payment Form
Exhibit E:	Change Order Form
Exhibit F:	Certificate of Substantial Completion Form
Exhibit G:	Final Payment Checklist
Exhibit H:	General Terms and Conditions
Exhibit I:	Supplemental Terms and Conditions
Exhibit J:	Design Criteria Package
Exhibit K:	Permits
Exhibit L:	Phase 1 and Phase 2 Project Design Milestones and Deliverables
Exhibit M:	Design Professional, Engineers, & Contractor
Exhibit N:	Lump Sum Amendment Agreement Form
Exhibit O:	Scope of Phase 1 Services
Exhibit P:	Scope of Phase 2 Services
Exhibit Q:	Phase 1 Compensation Schedule
Exhibit R:	Truth-in-Negotiation Certificate
Exhibit S:	Design Builder's Key Personnel
Exhibit T:	Stored Materials Record
Exhibit U:	General Conditions Categories
Attachment A	Design Criteria Package

Section 7. Notices

A. All notices required or made pursuant to this Agreement by the Design Builder to the Owner shall be shall be deemed duly served if delivered by U.S. Mail or private delivery service, addressed to the following:

If to the Owner:
Andrew Pupke
Director, Pinellas County Real Estate Management
509 East Avenue South
Clearwater, Florida 33756

With a copy to:

Pinellas County Building Design & Construction Division
509 East Avenue South
Clearwater, Florida 33756

If to the Design Builder:

With a copy to:

B. Either party may change its above noted address by giving ten (10) days written notice to the other party in accordance with the requirements of this Section.

Section 8. Modification.

No modification or change to the Agreement shall be valid or binding upon the parties unless in writing and executed by the party or parties intended to be bound by it.

Section 9. Successors and Assigns.

Subject to other provisions hereof, the Agreement shall be binding upon and shall inure to the benefit of the successors and assigns of the parties to the Agreement.

Section 10. Governing Law and Venue.

The Agreement shall be interpreted under and its performance governed by the laws of the State of Florida. In the event of any dispute by and between the parties, the exclusive jurisdiction and venue for any such proceeding shall be Pinellas County, Florida.

Section 11. No Waiver.

The failure of the Owner to enforce at any time or for any period of time any one or more of the provisions of the Agreement shall not be construed to be and shall not be a waiver of any such provision or provisions or of its right thereafter to enforce each and every such provision.

Section 12. Entire Agreement.

Each of the parties hereto agrees and represents that the Agreement comprises the full and entire agreement between the parties affecting the Work contemplated, and no other agreement or understanding of any nature concerning the same has been entered into or will be recognized, and that all negotiations, acts, work performed, or payments made prior to the execution hereof shall be deemed merged in, integrated and superseded by the Agreement.

Section 13. Severability.

Should any provision of the Agreement be determined by a court to be unenforceable, such a determination shall not affect the validity or enforceability of any other section or part thereof.

Section 14. Change Order Authorization.

The Project Manager shall have the authority on behalf of the Owner to execute all Change Orders and Work Directive Changes to the Agreement to the extent provided for under the Owner's Purchasing Policy and accompanying administrative procedures and paragraph 10.6 and 33.2 of Exhibit H, General Terms and Conditions.

Section 15. Construction.

Any doubtful or ambiguous language contained in this Agreement shall not be construed against the party who physically prepared this Agreement. The rule sometimes referred to as "fortius contra proferentum" (pursuant to which ambiguities in a contractual term which appears on its face to have been inserted for the benefit of one of the parties shall be construed against the benefited party) shall not be applied to the construction of this Agreement.

Section 16. Order of Precedence

In the event of any conflict between or among the terms of any of the Contract Documents, the following order of precedence shall be followed:

- Change Orders
- Exhibit N, Lump Sum Amendment
- General Terms and Conditions except the terms of any Supplemental Conditions shall take precedence over the Construction Agreement and the General Terms and Conditions.
- The Specifications
- Large Scale Details and Schedules
- The Drawings

To the extent any conflict in the terms of the Contract Documents cannot be resolved by application of the Order of Precedence, Supplemental Conditions, if any, shall take precedence or the conflict shall be resolved by imposing the more strict or costly obligation under the Contract Documents upon the Design Builder at Owner's discretion.

IN WITNESS WHEREOF, the parties have executed this Agreement on the date(s) indicated below.

DESIGN BUILDER: Wharton-Smith, Inc.

By: _____

Print Name: Ronald F. Davoli

Title: President / CEO

Date: 9/1/20

PINELLAS COUNTY, by and through its Board of County Commissioners

By: _____
Chairman

Date: 10/20/2020

BOARD OF COUNTY COMMISSIONERS SEAL PINELLAS COUNTY, FLORIDA

ATTEST:
Ken Burke, Clerk of the Circuit Court

By: _____
Deputy Clerk

Date: 10/20/2020

APPROVED AS TO FORM

By: _____
Office of the County Attorney

EXHIBIT A

The exact language in Section I must be used when submitting bonds

BOND NO. _____

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS:
That _____ , as Principal,
and _____ , as Surety,
Located at:

_____
(Business Address) (Phone Number)
Are held and firmly bound unto Pinellas County, Florida, as Obligee in the sum of

_____

_____ DOLLARS $_____ For the payment whereof we bind ourselves, our heirs, executors, personal representatives, successors and assigns, jointly and severally.

WHEREAS, Principal has entered into an Agreement with Obligee for **Bid Title: Professional Design Build Services – North Redington Beach Fire Station and Lift Station Replacement, Bid No: 189-0190-NC (SS)** in accordance with Plans and Specifications, which Agreement is incorporated by reference and made a part hereof, and is referred to as the Agreement.

THE CONDITIONS OF THIS BOND is that if Principal:

1. Performs the Agreement at the times and in the manner prescribed in the Agreement; and
2. Pays Obligee any and all losses, damages, costs and attorneys' fees, including appellate proceedings, that Obligee sustains because of any default by Principal under the Agreement, including, but not limited to, all delay damages, whether liquidated or actual, incurred by Obligee; and
3. Performs the guarantee of all Work and materials furnished under the Agreement for the time specified in the Agreement; then this bond is void; otherwise it remains in full force.

Any changes in or under the Agreement and compliance or noncompliance with any formalities connected with the Agreement or the changes do not affect Surety's obligations under this bond.

The Surety, for value received, hereby stipulates and agrees that no changes, extensions of time, alterations or additions to the terms of the Agreement or other Work to be performed hereunder, or the Specifications referred to therein shall in anyway affect its obligation under this bond, and it does hereby waive notice of any such changes, extensions of time, alterations or additions to the terms of the Agreement or to Work or to the Specifications.

This instrument shall be construed in all respects as a statutory bond. It is expressly understood the time provisions and statute of limitation under Section 255.05 Florida Statutes, shall apply to this bond.

BOND NO. _____

By execution of this bond, the Surety acknowledges that is has read the Surety qualifications and obligations imposed by the construction Agreement and hereby satisfies those conditions.

IN WITNESS WHEREOF, the above bound parties have executed this instrument this day of _____ ,20_____ , the name of each party being affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

PRINCIPAL:

_____

_____
(Authorized Signature)

_____
(Print Name)

_____
(Title)

_____

_____

_____
(Business Address)

STATE OF FLORIDA
COUNTY OF _____

The foregoing instrument was acknowledged before me this day of _____

_____

by _____

of _____ a _____

Corporation, on behalf of the Corporation. He/She is personally known to me or has produced Florida Driver's License as identification and who did (did not) take an oath.

Notary: _____
Print Name: _____
Commission Number: _____
My Commission Expires: _____

BOND NO. _____
SURETY:

(Print)

(Business Address)

(Signature As Attorney In Fact)
(Attach Power of Attorney)

Witness as to Attorney In Fact

(Print Name)

(Title)

(Business Address)

(Telephone Number)

STATE OF FLORIDA
COUNTY OF _____

The foregoing instrument was acknowledged before me this day of

By
Of a
Corporation, on behalf of the Corporation. He/She is personally known to me or has produced Florida Driver's License as identification and who did (did not) take an oath.

Notary:
Print Name:
Commission Number:
My Commission Expires:

BOND NO. _____

PAYMENT BOND

BY THIS BOND, We _____
(hereinafter called the ("Principal" and _____
(hereinafter called the ("Surety"), located at _____

_____
A surety insurer chartered and existing under the laws of the state of _____
and authorized to do Business in the State of Florida, are held and firmly bound unto Pinellas County
(hereinafter called the "County") in the sum of _____

_____ DOLLARS $ _____
For payment of which we bond ourselves, our heirs, our personal representatives, our successors and our assignees, jointly and severally.

WHEREAS, Principal and County have reached a mutual agreement (hereinafter referred to as the "Agreement") for **Bid Title: Professional Design Build Services – North Redington Beach Fire Station and Lift Station Replacement, Bid No: 189-0190-NC (SS)** said Agreement being made a part of this Bond by this reference.

NOW, THEREFORE, THE CONDITION OF THIS BOND IS THAT IF THE PRINCIPAL:

1. Shall promptly make payments to all claimants as defined in section 255.05(l), Florida Statutes, Supplying the Principal with labor, materials or supplies, as used directly or indirectly by the Principal in the prosecution of the Work provided for in the Agreement and;

2. Shall pay the County for all losses, damages, expenses, costs and attorneys' fees, including appellate proceedings, that the County sustains because of a default by the Principal in contravention to the Agreement in regard to payment for such labor, materials, or supplies furnished to the Principal; then this bond is void; otherwise this Bond remains in full force and effect.

BE IT FURTHER KNOWN:

1. Any changes in or under the Agreement and compliance or noncompliance with any formalities Connected with the said Agreement or alterations, which may be made in the terms of said Agreement, or in the Work to be done under it, or the giving by the County of any extension of time for the performance of the said Agreement, or any other forbearance on the part of the County or Principal to the other, shall not in any way release the Principal and the Surety, or either of them, their heirs, personal representatives, successors or assigns from liability hereunder, notice to the Surety of any such changes, alterations, extensions or forbearance being hereby waived.

2. Certain claimants seeking the protection of this Bond must timely comply with the strict Requirements set forth in Section 255.05, Florida Statutes, and as otherwise provided by law.

3. The Provisions of this bond are subject to the limitation of Section 255.05(2).

BOND NO._____

By execution of this bond, the Surety acknowledges that it has read the Surety qualifications and obligations imposed by the construction Agreement and hereby satisfies those conditions.

THIS BOND DATE THE _____ DAY OF _____ ,20 _____
(the date of issue by the Surety or by the Surety's agent and the date of such agent's power-or-attorney)

PRINCIPAL:

_____

_____

_____
(Authorized Signature)

_____
(Print Name)

_____
(Title)

_____

_____

_____
(Business Address)

STATE OF FLORIDA
COUNTY OF _____

The foregoing instrument was acknowledged before me this day of

_____
By
Of _____ a _____
Corporation, on behalf of the Corporation. He/She is personally known to me or has produced Florida Driver's License as identification and who did (did not) take an oath.

Notary: _____
Print Name: _____
Commission Number: _____
My Commission Expires: _____

BOND NO. _____
SURETY:

(Print)

(Business Address)

(Signature As Attorney In Fact)
(Attach Power of Attorney)

(Print Name)

(Title)

(Business Address)

(Telephone Number)

STATE OF FLORIDA
COUNTY OF _____

The foregoing instrument was acknowledged before me this day of

By
Of _____ a _____
Corporation, on behalf of the Corporation. He/She is personally known to me or has produced Florida Driver's License as identification and who did (did not) take an oath.

Notary: _____
Print Name: _____
Commission Number: _____
My Commission Expires: _____

EXHIBIT B

INSURANCE REQUIREMENTS

PHASE 1 INSURANCE REQUIREMENTS – DESIGN SERVICES

The recommended Design Builder must provide a certificate of insurance and endorsement in accordance with the insurance requirements listed below, prior to award of contract. Failure to provide the required insurance within the requested timeframe may result in your submittal being deemed non-responsive.

The contracted Design Builder shall obtain and maintain, and require any sub-contractors to obtain and maintain, at all times during its performance of the Agreement, insurance of the types and in the amounts set forth. For projects with a Completed Operations exposure, Contractor shall maintain coverage and provide evidence of insurance for two (2) years beyond final acceptance. All insurance policies shall be from responsible companies duly authorized to do business in the State of Florida and have an AM Best rating of A- VIII or better.

a) Design Builder should include, the firms current Certificate(s) of Insurance in accordance with the insurance requirements listed below. If Design Builder does not currently meet insurance requirements, Design Builder shall also include verification from their broker or agent that any required insurance not provided at that time of submittal will be in place prior to the award of contract.

b) Design Builder shall email certificate that is compliant with the insurance requirements to ssteele@pinellascounty.org. If certificate received with bid was a compliant certificate no further action may be necessary. The Certificate(s) of Insurance shall be signed by authorized representatives of the insurance companies shown on the Certificate(s). A copy of the endorsement(s) referenced in paragraph d) for Additional Insured shall be attached to the certificate(s) referenced in this paragraph

c) No work shall commence at any project site unless and until the required Certificate(s) of Insurance are received and approved by the County. Approval by the County of any Certificate(s) of Insurance does not constitute verification by the County that the insurance requirements have been satisfied or that the insurance policy shown on the Certificate(s) of Insurance is in compliance with the requirements of the Agreement. County reserves the right to require a certified copy of the entire insurance policy, including endorsement(s), at any time during the RFP and/or contract period.

d) All policies providing liability coverage(s), other than professional liability and workers compensation policies, obtained by the Design Builder and any subcontractors to meet the requirements of the Agreement shall be endorsed to include **Pinellas County a Political subdivision of the State of Florida** as an Additional Insured.

e) If any insurance provided pursuant to the Agreement expires prior to the completion of the Work, renewal Certificate(s) of Insurance and endorsement(s) shall be furnished by the Design Builder to the County at least thirty (30) days prior to the expiration date.

(1) Design Builder shall also notify County within twenty-four (24) hours after receipt, of any notices of expiration, cancellation, nonrenewal or adverse material change in coverage received by said Design Builder from its insurer. Notice shall be given by certified mail to: **Pinellas County Risk Management 400 South Fort Harrison Ave Clearwater FL 33756**; be sure to include your organization's unique identifier, which will be provided upon notice of award. Nothing contained herein shall absolve Design Builder of this requirement to provide notice.

(2) Should the Design Builder, at any time, not maintain the insurance coverages required herein, the County may terminate the Agreement, or at its sole discretion may purchase such coverages necessary for the protection of the County and charge the Design Builder for such purchase or offset the cost against amounts due to Design Builder for services completed. The County shall be under no obligation to purchase such insurance, nor shall it be responsible for the coverages purchased or the insurance company or companies used. The decision of the County to purchase such insurance shall in no way be construed to be a waiver of any of its rights under the Agreement.

f) The County reserves the right, but not the duty, to review and request a copy of the Contractor's most recent annual report or audited financial statement when a self-insured retention (SIR) or deductible exceeds $50,000.

g) If subcontracting is allowed under this RFP, the Prime Design Builder shall obtain and maintain, at all times during its performance of the Agreement, insurance of the types and in the amounts set forth; and require any subcontractors to obtain and maintain, at all times during its performance of the Agreement, insurance limits as it may apply to the portion of the Work performed by the subcontractor; *but in no event will the insurance limits be less than $500,000 for Workers' Compensation/Employers' Liability, and $1,000,000 for General Liability and Auto Liability if required below.*

(1) All subcontracts between Design Builder and its subcontractors shall be in writing and are subject to the County's prior written approval. Further, all subcontracts shall (1) require each subcontractor to be bound to Design Builder to the same extent Design Builder is bound to the County by the terms of the Contract Documents, as those terms may apply to the portion of the Work to be performed by the subcontractor; (2) provide for the assignment of the subcontracts from Design Builder to the County at the election of Owner upon termination of the Contract; (3) provide that County will be an additional indemnified party of the subcontract; (4) provide that the County will be an additional insured on all insurance policies required to be provided by the subcontractor except workers compensation and professional liability; (5) provide waiver of subrogation in favor of the County and other insurance terms and/or conditions as outlined below; (6) assign all warranties directly to the County; and (7) identify the County as an intended third-party beneficiary of the subcontract. Design Builder shall make available to each proposed subcontractor, prior to the execution of the subcontract, copies of the Contract Documents to which the subcontractor will be bound by this Section C and identify to the subcontractor any terms and conditions of the proposed subcontract which may be at variance with the Contract Documents.

h) Each insurance policy and/or certificate shall include the following terms and/or conditions:

(1) The Named Insured on the Certificate of Insurance and insurance policy must match the entity's name that responded to the solicitation and/or is signing the agreement with the County. If Design Builder is a Joint Venture per Section A. titled Joint Venture of this RFP, Certificate of Insurance and Named Insured must show Joint Venture Legal Entity name and the Joint Venture must comply with the requirements of Section C with regard to limits, terms and conditions, including completed operations coverage.

(2) Companies issuing the insurance policy, or policies, shall have no recourse against County for payment of premiums or assessments for any deductibles which all are at the sole responsibility and risk of Contractor.

(3) The term "County" or "Pinellas County" shall include all Authorities, Boards, Bureaus, Commissions, Divisions, Departments and Constitutional offices of County and individual members, employees thereof in their official capacities, and/or while acting on behalf of Pinellas County.

(4) The policy clause "Other Insurance" shall not apply to any insurance coverage currently held by County or any such future coverage, or to County's Self-Insured Retentions of whatever nature.

(5) All policies shall be written on a primary, non-contributory basis.

(6) Any Certificate(s) of Insurance evidencing coverage provided by a leasing company for either workers compensation or commercial general liability shall have a list of covered employees certified by the leasing company attached to the Certificate(s) of Insurance. The County shall have the right, but not the obligation to determine that the Design Builder is only using employees named on such list to perform work for the County. Should employees not named be utilized by Design Builder, the County, at its option may stop work without penalty to the County until proof of coverage or removal of the employee by the contractor occurs, or alternatively find the Design Builder to be in default and take such other protective measures as necessary.

(7) Insurance policies, other than Professional Liability, shall include waivers of subrogation in favor of Pinellas County from both the Design Builder and subcontractor(s).

i) The minimum insurance requirements and limits for this Agreement, which shall remain in effect throughout its duration and for two (2) years beyond final acceptance for projects with a Completed Operations exposure, are as follows:

(1) Workers' Compensation Insurance

Limit	Florida Statutory
Employers' Liability Limits	
Per Employee	$ 500,000
Per Employee Disease	$ 500,000
Policy Limit Disease	$ 500,000

(2) Commercial General Liability Insurance including, but not limited to, Independent Contractor, Contractual Liability Premises/Operations, Products/Completed Operations, and Personal Injury.

Limits

Combined Single Limit Per Occurrence	$ 1,000,000
Products/Completed Operations Aggregate	$ 2,000,000
Personal Injury and Advertising Injury	$ 1,000,000
General Aggregate	$ 2,000,000

(3) Business Automobile or Trucker's/Garage Liability Insurance covering owned, hired, and non-owned vehicles. If the Proposer does not own any vehicles, then evidence of Hired and Non-owned coverage is sufficient. Coverage shall be on an "occurrence" basis, such insurance to include coverage for loading and unloading hazards, unless Proposer can show that this coverage exists under the Commercial General Liability policy.

Limit

Combined Single Limit Per Accident	$ 1,000,000

(4) Professional Liability (Errors and Omissions) Insurance with at least minimum limits as follows. If "claims made" coverage is provided, "tail coverage" extending three (3) years beyond completion and acceptance of the project with proof of "tail coverage" to be submitted with the invoice for final payment. In lieu of "tail coverage", Proposer may submit annually to the County, for a three (3) year period, a current certificate of insurance providing "claims made" insurance with prior acts coverage in force with a retroactive date no later than commencement date of this contract.

Limits

Each Occurrence or Claim	$ 2,000,000
General Aggregate	$ 2,000,000

For acceptance of Professional Liability coverage included within another policy required herein, a statement notifying the certificate holder must be included on the certificate of insurance and the total amount of said coverage per occurrence must be greater than or equal to the amount of Professional Liability and other coverage combined.

(5) Property Insurance Proposer will be responsible for all damage to its own property, equipment and/or materials.

PHASE 2 INSURANCE REQUIREMENTS – CONSTRUCTION SERVICES

The recommended Design Builder must provide a certificate of insurance and endorsement in accordance with the insurance requirements listed below, prior to award of contract. Failure to provide the required insurance within the requested timeframe may result in your submittal being deemed non-responsive.

The contracted Design Builder shall obtain and maintain, and require any sub-contractors to obtain and maintain, at all times during its performance of the Agreement, insurance of the types and in the amounts set forth. For projects with a Completed Operations exposure, Design Builder shall maintain coverage and provide evidence of insurance for two (2) years beyond final acceptance. All insurance policies shall be from responsible companies duly authorized to do business in the State of Florida and have an AM Best rating of A- VIII or better.

a) Design Builder should include, the firms current Certificate(s) of Insurance in accordance with the insurance requirements listed below. If Design Builder does not currently meet insurance requirements, Design Builder shall also include verification from their broker or agent that any required insurance not provided at that time of submittal will be in place prior to the award of contract.

b) Design Builder shall email certificate that is compliant with the insurance requirements to ssteele@pinellascounty.org. If certificate received with bid was a compliant certificate no further action may be necessary. The Certificate(s) of Insurance shall be signed by authorized representatives of the insurance companies shown on the Certificate(s). A copy of the endorsement(s) referenced in paragraph d) for Additional Insured shall be attached to the certificate(s) referenced in this paragraph

c) No work shall commence at any project site unless and until the required Certificate(s) of Insurance are received and approved by the County. Approval by the County of any Certificate(s) of Insurance does not constitute verification by the County that the insurance requirements have been satisfied or that the insurance policy shown on the Certificate(s) of Insurance is in compliance with the requirements of the Agreement. County reserves the right to require a certified copy of the entire insurance policy, including endorsement(s), at any time during the RFP and/or contract period.

d) All policies providing liability coverage(s), other than professional liability and workers compensation policies, obtained by the Design Builder and any subcontractors to meet the requirements of the Agreement shall be endorsed to include **Pinellas County a Political subdivision of the State of Florida** as an Additional Insured.

e) If any insurance provided pursuant to the Agreement expires prior to the completion of the Work, renewal Certificate(s) of Insurance and endorsement(s) shall be furnished by the Design Builder to the County at least thirty (30) days prior to the expiration date.

d) Design Builder shall also notify County within twenty-four (24) hours after receipt, of any notices of expiration, cancellation, nonrenewal or adverse material change in coverage received by said Design Builder from its insurer. Notice shall be given by certified mail to: **Pinellas County Risk Management 400 South Fort Harrison Ave Clearwater FL 33756**; be sure to include your organization's unique identifier, which will be provided upon notice of award. Nothing contained herein shall absolve Design Builder of this requirement to provide notice.

e) Should the Design Builder, at any time, not maintain the insurance coverages required herein, the County may terminate the Agreement, or at its sole discretion may purchase such coverages necessary for the protection of the County and charge the Design Builder for such purchase or offset the cost against amounts due to Design Builder for services completed. The County shall be under no obligation to purchase such insurance, nor shall it be responsible for the coverages purchased or the insurance company or companies used. The decision of the County to purchase such insurance shall in no way be construed to be a waiver of any of its rights under the Agreement.

f) The County reserves the right, but not the duty, to review and request a copy of the Contractor's most recent annual report or audited financial statement when a self-insured retention (SIR) or deductible exceeds $50,000.

g) If subcontracting is allowed under this RFP, the Prime Design Builder shall obtain and maintain, at all times during its performance of the Agreement, insurance of the types and in the amounts set forth; and require any subcontractors to obtain and maintain, at all times during its performance of the Agreement, insurance limits as it may apply to the portion of the Work performed by the subcontractor; *but in no event will the insurance limits be less than $500,000 for Workers' Compensation/Employers' Liability, and $1,000,000 for General Liability and Auto Liability if required below.*

(1) All subcontracts between Design Builder and its subcontractors shall be in writing and are subject to the County's prior written approval. Further, all subcontracts shall (1) require each subcontractor to be bound to Design Builder to the same extent Design Builder is bound to the County by the terms of the Contract Documents, as those terms may apply to the portion of the Work to be performed by the subcontractor; (2) provide for the assignment of the subcontracts from Design Builder to the County at the election of Owner upon termination of the Contract; (3) provide that County will be an additional indemnified party of the subcontract; (4) provide that the County will be an additional insured on all insurance policies required to be provided by the subcontractor except workers compensation and professional liability; (5) provide waiver of subrogation in favor of the County and other insurance terms and/or conditions as outlined below; (6) assign all warranties directly to the County; and (7) identify the County as an intended third-party beneficiary of the subcontract. Design Builder shall make available to each proposed subcontractor, prior to the execution of the subcontract, copies of the Contract Documents to which the subcontractor will be bound by this Section C and identify to the subcontractor any terms and conditions of the proposed subcontract which may be at variance with the Contract Documents.

h) Each insurance policy and/or certificate shall include the following terms and/or conditions:

(1) The Named Insured on the Certificate of Insurance and insurance policy must match the entity's name that responded to the solicitation and/or is signing the agreement with the County. If Design Builder is a Joint Venture per Section A. titled Joint Venture of this RFP, Certificate of Insurance and Named Insured must show Joint Venture Legal Entity name and the Joint Venture must comply with the requirements of Section C with regard to limits, terms and conditions, including completed operations coverage.

(2) Companies issuing the insurance policy, or policies, shall have no recourse against County for payment of premiums or assessments for any deductibles which all are at the sole responsibility and risk of Contractor.

(3) The term "County" or "Pinellas County" shall include all Authorities, Boards, Bureaus, Commissions, Divisions, Departments and Constitutional offices of County and individual members, employees thereof in their official capacities, and/or while acting on behalf of Pinellas County.

(4) The policy clause "Other Insurance" shall not apply to any insurance coverage currently held by County or any such future coverage, or to County's Self-Insured Retentions of whatever nature.

(5) All policies shall be written on a primary, non-contributory basis.

(6) Any Certificate(s) of Insurance evidencing coverage provided by a leasing company for either workers compensation or commercial general liability shall have a list of covered employees certified by the leasing company attached to the Certificate(s) of Insurance. The County shall have the right, but not the obligation to determine that the Design Builder is only using employees named on such list to perform work for the County. Should employees not named be utilized by Design Builder, the County, at its option may stop work without penalty to the County until proof of coverage or removal of the employee by the contractor occurs, or alternatively find the Design Builder to be in default and take such other protective measures as necessary.

(7) Insurance policies, other than Professional Liability, shall include waivers of subrogation in favor of Pinellas County from both the Design Builder and subcontractor(s).

i) The minimum insurance requirements and limits for this Agreement, which shall remain in effect throughout its duration and for two (2) years beyond final acceptance for projects with a Completed Operations exposure, are as follows:

(1) Workers' Compensation Insurance

Limit	Florida Statutory
Employers' Liability Limits	
Per Employee	$ 500,000
Per Employee Disease	$ 500,000
Policy Limit Disease	$ 500,000

(2) Commercial General Liability Insurance including, but not limited to, Independent Contractor, Contractual Liability Premises/Operations, Products/Completed Operations, and Personal Injury. No explosion, collapse, underground damage, crane, or boom weight exclusions

Limits

Combined Single Limit Per Occurrence	$ 1,000,000
Products/Completed Operations Aggregate	$ 2,000,000
Personal Injury and Advertising Injury	$ 1,000,000
General Aggregate	$ 2,000,000

(3) Business Automobile or Trucker's/Garage Liability Insurance covering owned, hired, and non-owned vehicles. If the Proposer does not own any vehicles, then evidence of Hired and Non-owned coverage is sufficient. Coverage shall be on an "occurrence" basis, such insurance to include coverage for loading and unloading hazards, unless Proposer can show that this coverage exists under the Commercial General Liability policy.

Limit

Combined Single Limit Per Accident	$ 1,000,000

(4) Excess or Umbrella Liability Insurance excess of the primary coverage required, in paragraphs (1), (2), and (3) above, No explosion collapse, underground damage, crane or boom weight exclusions.

Limits

Each Occurrence	$ 2,000,000
General Aggregate	$ 2,000,000

(5) Professional Liability (Errors and Omissions) Insurance with at least minimum limits as follows. If "claims made" coverage is provided, "tail coverage" extending three (3) years beyond completion and acceptance of the project with proof of "tail coverage" to be submitted with the invoice for final payment. In lieu of "tail coverage", Proposer may submit annually to the County, for a three (3) year period, a current certificate of insurance providing "claims made" insurance with prior acts coverage in force with a retroactive date no later than commencement date of this contract.

Limits

Each Occurrence or Claim	$ 2,000,000
General Aggregate	$ 2,000,000

For acceptance of Professional Liability coverage included within another policy required herein, a statement notifying the certificate holder must be included on the certificate of insurance and the total amount of said coverage per occurrence must be greater than or equal to the amount of Professional Liability and other coverage combined.

(6) Pollution Legal/Environmental Legal Liability Insurance for pollution losses arising from all services performed to comply with this contract. Coverage shall apply to sudden and gradual pollution conditions including the discharge, dispersal, release or escape of smoke, vapors, soot, fumes, acids, alkalis, toxic chemicals, liquids or gases, waste materials or other irritants, contaminants or pollutants into or upon land, the atmosphere or any watercourse or body of water, which results in Bodily Injury or Property Damage. If policy is written on a Claims Made form, a retroactive date is required, and coverage must be maintained for 3 years after completion of contract or "tail coverage must be purchased. Coverage should include and be for the at least the minimum limits listed below:

1) Bodily injury, sickness, disease, mental anguish or shock sustained by any person, including death; property damage including physical injury to or destruction of tangible property including the resulting loss of use thereof, clean up costs, and the loss of use of tangible property that has not been physically injured or destroyed;

2) Defense including costs, charges and expenses incurred in the investigation, adjustment or defense of claims for such compensation damages.

3) Cost of Cleanup/Remediation.

Limits

Per Claim or Occurrence	$ 2,000,000
General Aggregate	$ 2,000,000

For acceptance of Pollution Legal/Environmental Legal Liability coverage included within another policy coverage required herein, a statement notifying the certificate holder must be included on the certificate of insurance and the total amount of said coverage per occurrence must be greater than or equal to the amount of Pollution Legal/Environmental Legal Liability and other coverage combined.

(7) Property Insurance Proposer will be responsible for all damage to its own property, equipment and/or materials.

(8) Builders Risk/Installation Floater Insurance County property shall be covered by proof of a Builders Risk policy and/or Installation Floater policy covering the interests of Pinellas County property until final acceptance of building or of installed equipment is granted and coverage period shall include testing. Coverage shall be maintained for the entire time the property and/or equipment is in the Proposer's care, custody, and/or control, including onsite and offsite storage and transit. Limit and valuation shall be replacement cost. If the Proposer delivers materials and/or equipment and loads same using a crane, then no crane, boom, jig, or weight exclusion shall apply. Proposer's property, installation floater, builders risk, if required, and/or equipment policy shall contain a waiver of subrogation in favor of the County. All deductibles will be the responsibility of the Proposer unless County agrees in writing. Builders Risk policies shall be written in the name of the County, the contractor and all subcontractors as their interests may appear. Installation and/or Equipment policies must name the County as a Loss Payee.

Limits:

100% of replacement cost of firehouse structure and pump station.

EXHIBIT C

RELEASE AND AFFIDAVIT FORM

COUNTY OF _____)
STATE OF FLORIDA)

Before me, the undersigned authority, personally appeared _____ _____who after being duly sworn, deposes and says:

(1) In accordance with the Contract Documents and in consideration of $_____ paid, _____ ("Design Builder") releases and waives for itself and it's subcontractors, material-men, successors and assigns, all claims demands, damages, costs and expenses, whether in contract or in tort, against the Board of County Commissioners of Pinellas County, Florida, relating in any way to the performance of the Agreement between Design Builder and Owner dated _____, 20___ for the period from _____ to _____, excluding all retainage withheld and any pending claims or disputes as expressly specified as follows: _____.

(2) Design Builder certifies for itself and its subcontractors, material-men, successors and assigns, that all charges for labor, materials, supplies, lands, licenses and other expenses for which Owner might be sued or for which a lien or a demand against any payment bond might be filed, have been fully satisfied and paid.

(3) To the maximum extent permitted by law, Design Builder agrees to indemnify, defend and save harmless Owner from all demands or suits, actions, claims of liens or other charges filed or asserted against the Owner arising out of the performance by Design Builder of the Work covered by this Release and Affidavit.

(4) This Release and Affidavit is given in connection with Design Builder's [monthly/final] Application for Payment No. _____.

DESIGN BUILDER

_____

BY:_____

_____ ITS:_____ President

_____ DATE:_____
Witnesses

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____, 20___, by _____, as _____ of _____, a _____ corporation, on behalf of the corporation. He/she is personally known to me or has produced _____ as identification and did (did not) take an oath.

My Commission Expires:

_____
(Signature of Notary)

NAME: _____
(Legibly Printed)

(AFFIX OFFICIAL SEAL)

Notary Public, State of _____
Commissioner No.: _____

EXHIBIT D

FORM OF CONTRACT APPLICATION FOR PAYMENT (PHASE 1 ONLY)

FORM OF CONTRACT APPLICATION FOR PAYMENT IN PHASE 2 SHALL BE AIA STANDARD FORM G702

_____FORM OF CONTRACT APPLICATION FOR PAYMENT

_____ (County Project Manager) Contract No._____
_____ (County Department)
Pinellas County Board of County Commissioners (the OWNER)

Project No. _____
Application Date _____

Payment Application No. _____

FROM: _____ (Design Builder's Representative) _____ (Design Builder's Name)
_____ (Design Builder's Address) _____
RE:_____ (Project Name)

Original Contract Time _____ Revised Contract Time _____

Original Contract Amount $_____
Total Net Changes $_____
Revised Contract Amount: $_____

Total Completed and Stored to Date $_____

Retainage @ 5% (Phase 2 only) $ _____

Total Retained to date: (Phase 2 only) $ _____

Total Earned Less Retainage (Phase 2 only) $ _____

Less Previously Paid $ _____

AMOUNT DUE THIS APPLICATION: $_____

Percent Work completed to Date: _____%
Percent Contract Time completed to Date _____%

Liquidated Damages to be Accrued $_____

ATTACH SCHEDULE OF VALUES AND ACCOMPANYING DOCUMENTATION TO THIS APPLICATION

ACCOMPANYING DOCUMENTATION TO THIS APPLICATION

From (Contractor Name)

Pinellas County Department

Payment Application Number
Purchase Order Number

Payment Period From: _____ to _____

CHANGE ORDER SUMMARY			
Change Order #	Date Approved	Additions	Deductions
TOTAL			
NET CHANGE			

PAYMENT SUMMARY

Original Agreement Amount	$
Net Change by Change Order	$
Agreement Sum to Date	$
Total Completed to Date	$
Stored Materials to Install	$
TOTAL	$
Retainage _____ %	
Total Earned Less Retainage	$
Less Previous Payments	$
Current Payment Due	$

I certify that the payment requested is in accordance with the terms of the agreement dated _____ and that previous payments have been used to pay obligations for materials supplied and work performed in conjunction with this project. In accordance with the contract documents and in consideration of _____ ____ paid. _____ ("Contractor") releases and waives for itself and its subcontractors, materialmen, successors, and assigns, all claims demands, damages, costs and expenses, whether in contract or in tort, against the Board of County Commissioners of Pinellas County, Florida, Ex Officio the governing Board of the Pinellas County ("County") relating in any way to the performance of the agreement between contractors and owner, dated _____ for the period from _____ to _____

Contractor **Date**

APPLICATION FOR PAYMENT APPROVED BY:

Consultant or Design Professional/Engineer of Record

Pinellas County _____ (Dept) Engineering Project Manager

Pinellas County Public Works

Director of _____ (Dept)

DESIGN BUILDER'S CERTIFICATION: The undersigned DESIGN BUILDER certifies that: (1) all previous progress payments received from OWNER on account of Work done under the Contract referred to above have been applied to discharge in full all obligations of DESIGN BUILDER incurred in connection with Work covered by any and all prior Applications for Payment; (2) title to all materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to OWNER at time of payment free and clear of all liens, claims, security interests and encumbrances (except such as covered by Bond acceptable to OWNER); (3) all amounts have been paid for work which previous payments were issued and received from the OWNER and that current payment is now due; and (4) DESIGN BUILDER has only included amounts in this Application for Payment properly due and owing and DESIGN BUILDER has not included within the above referenced amount any claims for unauthorized or changed Work that has not been properly approved by Owner in writing and in advance of such Work.

By DESIGN BUILDER: _____ (Design Builder's Name)

_____ Date_____
(Signature)

_____
(Type Name & Title)
(shall be signed by a duly authorized representative of DESIGN BUILDER)

SWORN TO (or affirmed) and subscribed before me this_____day of _____, 20__, by _____ of , a Florida corporation on behalf of the corporation. He is personally known to me or has produced _____ _____ as identification.

_____
(Signature)

_____
(Printed Name)

NOTARY PUBLIC, STATE OF FLORIDA

_____
(Commission Expiration Date)

Payment to the DESIGN BUILDER for the above AMOUNT DUE THIS APPLICATION is approved:

By OWNER'S Project Manager: _____
(Signature)

Date: _____ _____
(Type Name and Title)

EXHIBIT E

CHANGE ORDER

CHANGE ORDER NO._____ CONTRACT NO. _____

TO:_____
_____
_____
_____

DATE: _____

PROJECT NAME:_____

PROJECT NO.:_____

Under our AGREEMENT dated _____.

****

You hereby are authorized and directed to make the following change(s) in accordance with terms and conditions of the Agreement:

For the (Additive) (Deductive) Sum of: _____
($_____).

Original Agreement Amount $_____

Sum of Previous Changes $_____

This Change Order (Add) (Deduct) $_____

Present Agreement Amount $_____

The time for completion shall be (increased/decreased) by _____ calendar days due to this Change Order. Accordingly, the Contract Time is now _____ (_____) calendar days and the Substantial Completion date is _____. Your acceptance of this Change Order shall constitute a modification to our Agreement and will be performed subject to all the same terms and conditions as contained in our Agreement indicated above, as fully as if the same were repeated in this acceptance. The adjustment, if any, to the Agreement shall constitute a full and final settlement of any and all claims arising out of or related to the change set forth herein, including claims for impact and delay costs.

Accepted:_____

EXHIBIT F

CERTIFICATE OF SUBSTANTIAL COMPLETION

[AIA G704 Standard Certificate of Substantial Completion]

EXHIBIT G

FINAL PAYMENT CHECKLIST

Bid No.: _____ Project No.: _____ Date: _____, 20_____
Design Builder: _____

The following items have been secured by the _____
for the Project known as _____
_____
and have been reviewed and found to comply with the requirements of the Contract Documents.

Original Contract Amount: _____ Final Contract Amount: _____

Commencement Date: _____

Substantial Completion Time as set forth in the Agreement: _____ Calendar Days.
Actual Date of Substantial Completion: _____.

Final Completion Time as set forth in the Agreement: _____Calendar Days.
Actual Final Completion Date: _____.

YES	NO	
_____	_____	1. All Punch List items completed on _____
_____	_____	2. Warranties and Guarantees assigned to Owner (attach to this form).
		3. Effective date of General one year warranty from Design Builder is:
_____	_____	_____
		4. 2 copies of Operation and Maintenance manuals for equipment and
_____	_____	system submitted (list manuals in attachment to this form).
_____	_____	5. As-Built drawings obtained and dated: _____
_____	_____	6. Owner and tenants personnel trained on system and equipment operation.
		7. Certificate of Occupancy No.: _____
_____	_____	issued on _____ (attach to this form).
_____	_____	8. Certificate of Substantial Completion issued on _____
_____	_____	9. Final Payment Application and Affidavits received from Design Builder on: _____
_____	_____	10. Consent of Surety received on _____
_____	_____	11. Operating Department personnel and tenants notified Project is in operating phase.
_____	_____	12. All Spare Parts or Special Tools provided to Owner: _____ _____
_____	_____	13. Finished Floor Elevation Certificate provided to Owner: _____ _____
_____	_____	14. Other:_____ _____

If any of the above is not applicable, indicate by N/A. If NO is checked for any of the above, attach explanation.

Acknowledgments:

By Design Builder: _____ (Company Name)
_____ (Signature)
_____ (Typed Name & Title)

By Owner: _____ (Department Name)
_____ (Signature)
_____ (Name & Title)

EXHIBIT H

GENERAL TERMS AND CONDITIONS

1. INTENT OF CONTRACT DOCUMENTS.

1.1. It is the intent of the Contract Documents to describe a functionally complete Project (or portion thereof) to be designed and constructed by Design Builder in accordance with the Contract Documents. Any work, services, materials or equipment that may reasonably be inferred from the Contract Documents as being required to produce the intended result shall be supplied whether or not specifically called for in the Contract Documents. When words which have a well known technical or trade meaning are used to describe work, materials or equipment, such words shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association or to the laws or regulations of any governmental authority having jurisdiction over the Project, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code, law or regulation in effect at the time the Work is performed, except as may be otherwise specifically stated herein.

1.2. If before or during the performance of the Work Design Builder discovers a conflict, error or discrepancy in the Contract Documents, Design Builder immediately shall report same to the Project Manager in writing and before proceeding with the Work affected thereby shall obtain a written interpretation or clarification from the Project Manager; said interpretation or clarification from the Project Manager may require Design Builder to consult directly with another professional, if any, involved with the Project as directed by Owner. Design Builder shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to Design Builder with the Contract Documents before commencing any portion of the Work.

1.3. Construction Documents approved by Owner are intended to show general arrangements, design and extent of Work and are not intended to serve as shop drawings. Specifications are separated into divisions for convenience of reference only and shall not be interpreted as establishing divisions for the Work, trades, subcontracts, or extent of any part of the Work. In the event of a discrepancy between or among the drawings, specifications or other Contract Document provisions, Design Builder shall be required to comply with the provisions identified in Section 16 of the Agreement, “Order of Precedence”. Unless otherwise specifically mentioned, all anchors, bolts, screws, fittings, fillers, hardware, accessories, trim and other parts required in connection with any portion of the Work to make a complete, serviceable, finished and first quality installation shall be furnished and installed as part of the Work, whether or not called for by the Contract Documents.

2. INVESTIGATION AND UTILITIES.

2.1. Subject to Section 2.3 below, Design Builder shall have the sole responsibility of satisfying itself concerning the nature and location of the Work and the general and local conditions, and particularly, but without limitation, with respect to the following: those affecting transportation, access, disposal, handling and storage of materials; availability and quality of labor; water and electric power; availability and condition of roads; work area; living facilities; climatic conditions and seasons; physical conditions at the work-site and the project area as a whole; topography and ground surface conditions; nature and quantity of the surface materials to be encountered; subsurface conditions; equipment and facilities needed preliminary to and during performance of the Work; and all other costs associated with such performance. The failure of Design Builder to acquaint itself with any applicable conditions shall not relieve Design Builder from any of its responsibilities to perform under the Contract Documents, nor shall it be considered the basis for any claim for additional time or compensation.

2.2. Design Builder shall locate all existing roadways, railways, drainage facilities and utility services above, upon, or under the Project site, said roadways, railways, drainage facilities and utilities being referred to in this Sub-Section 2.2 as the "Utilities". Design Builder shall contact the owners of all Utilities to determine the necessity for relocating or temporarily interrupting any Utilities during the construction of the Project. Design Builder shall schedule and coordinate its Work around any such relocation or temporary service interruption. Design Builder shall be responsible for properly shoring, supporting and protecting all Utilities at all times during the course of the Work. The Design Builder is responsible for coordinating all other utility work so as to not interfere with the prosecution of the Work (except those utilities to be coordinated by the Owner as may be expressly described elsewhere in the Contract Documents).

2.3 Notwithstanding anything in the Contract Documents to the contrary, Design Builder assumes all risks with respect to the conditions which are encountered at the Project site, including all (i) subsurface or otherwise concealed physical conditions whether or not they differ materially from those indicated in the Contract Documents and (ii) unknown physical conditions of any nature, whether or not they differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents. Design Builder will not be entitled to any adjustment to the Lump Sum Price or the Contract Time as a result of any site conditions encountered, except for hazardous materials as set forth in Section 9.4 below. It is the specific intention of the Parties that Design Builder will propose and perform as part of its Phase 1 Services any necessary investigation and testing that Design Builder deems necessary to assume such risk.

3. SCHEDULE.

3.1. The Design Builder, within ten (10) calendar days after receipt of the Notice of Award, shall prepare and submit to Project Manager, for his or her review and approval, a progress schedule for the Project. Said schedule shall include but not be limited to an overall progress schedule for all portions of the design and construction of the Project ("Master Project Schedule"). The Master Project Schedule shall (i) relate to all Work required by the Contract Documents, (ii) utilize the Critical Path method of scheduling, (iii) shall provide for expeditious and practicable execution of the Work within the Contract Time, and (iv) be in such form and level of detail as may be required by Owner. The Master Project Schedule shall indicate the dates for starting and completing the various stages of the Work, including the Phase 1 Services to be provided by Design Builder.

3.2. The Master Project Schedule shall be updated monthly by the Design Builder or as specified in the Supplemental Terms and Conditions (if any) attached to the Agreement as Exhibit I. All monthly updates to the Master Project Schedule shall be subject to the Project Manager's review and approval. Design Builder shall submit the updates to the Master Project Schedule with its monthly Applications for Payment noted below. The Project Manager's review and approval of the submitted monthly Master Project Schedule updates shall be a condition precedent to the Owner's obligation to pay Design Builder.

3.3 All Work under this Agreement shall be performed in accordance with the requirements of all Pinellas County Noise Ordinances then in effect. Unless otherwise specified, Work at the Project site will generally be limited to the hours of 7:00 a.m. to 6:00 p.m., Monday through Friday. No Work at the Project site shall be performed outside the specified hours without the prior approval of the Project Manager. Saturday work requires verbal approval and a 24-hour notice. Sunday and holiday work requires written approval. The Contractor shall make the request to work weekends and/or holidays at least 24 hours in advance. Weekday (M-F) overtime work acceptable if the work performed does not require immediate inspection and the County has granted approval requires written approval.

4. PROGRESS PAYMENTS.

4.1 Design Builder's Applications for Payment shall be in the form attached to the Agreement as Exhibit D. Design Builder shall not submit more than one Application for Payment each month.

4.2. At the time it submits its Lump Sum Price proposal to Owner, Design Builder also shall submit to Owner, for its review, a Schedule of Values based upon the Lump Sum Price proposal; all in C.S.I. format, listing the major elements of the Work and the dollar value for each element. That Schedule of Values, as further revised to reflect the final negotiated Lump Sum Price and as approved by Owner, will be attached to the Lump Sum Amendment and shall be used as the basis for Design Builder's monthly Applications for Payment thereafter. The revised Schedule of Values shall be updated for the current month Change Orders and Construction Change Directives and submitted each month to Owner by Design Builder along with a completed and notarized copy of the Application for Payment form attached to the Agreement as Exhibit D.

4.3 When Design Builder submits its Lump Sum Price proposal to Owner, Design Builder shall provide to the Project Manager a list of its Subcontractors and materialmen showing the work and materials involved and the dollar amount of each subcontract and purchase order. Design Builder acknowledges and agrees that any modifications to the list of Subcontractors and any subsequently identified Subcontractors are subject to Owner's prior written approval. The first Application for Payment shall be submitted no earlier than thirty (30) days after the Commencement Date. Notwithstanding anything herein to the contrary, if approved by Owner in its sole discretion, Design Builder may submit its invoice for any required Payment and Performance Bonds prior to the first Application of Payment provided that Design Builder has furnished Owner certified copies of the receipts evidencing the premium paid by Design Builder for the bonds.

4.4. Unless expressly approved by Owner in advance and in writing, said approval at Owner's sole discretion, Owner is not required to make any payment for materials or equipment that have not been incorporated into the Project. If payment is requested on the basis of materials and equipment not incorporated into the Project, but delivered and suitably stored at the site or at another location, and such payment and storage have been agreed to by Owner in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice or other documentation warranting that the Owner has received the materials and equipment free and clear of all liens, charges, security interests and encumbrances, together with evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect Owner's interest therein, all of which shall be subject to the Owner's satisfaction. Thereafter, with each subsequent Application for Payment, Design Builder also shall complete and submit to Owner as part of its Application for Payment, the Stored Materials Record attached hereto and made a part hereof as Exhibit T.

4.5. Design Builder shall submit a draft copy of its monthly Application for Payment to the Project Manager or his or her designee, as directed by Owner. After the Project Manager has reviewed and approved or corrected the draft, the Design Builder shall forward an electronic copy of the final version to Pinellas County's Finance Department (e-mail address to be confirmed upon execution of this Agreement). Payments of proper invoices in the amounts approved shall be processed in accordance with Section 218.735, Florida Statutes "Local Government Prompt Payment Act" and the administrative procedures established by the County's Purchasing Department and the Clerk of Court's Finance Department respectively. In the event of a total denial by Owner and return of the Application for Payment by the Project Manager, the Design Builder may make the necessary corrections and re-submit the Application for Payment. The Owner shall, within ten (10) business days after the Application for Payment is stamped and received and after Project Manager approval of an Application for Payment, pay the Design Builder the amounts so approved.

4.6 During Phase 2 only, Owner shall retain five percent (5%) of the gross amount of each monthly payment request or five percent (5%) of the portion thereof approved by the Project Manager for payment, whichever is less. Such sum shall be accumulated and not released to Design Builder until final payment is due unless otherwise agreed to by the Owner.

4.7 Monthly payments to Design Builder shall in no way imply approval or acceptance of Design Builder's Work.

4.8 Each Application for Payment, shall be accompanied by a Release and Affidavit, in the form attached as Exhibit C, acknowledging Design Builder's receipt of payment in full for all materials, labor, services, equipment and other bills that are then due and payable by Owner with respect to the current Application for Payment. Further, to the extent directed by Owner and in Owner's sole discretion, Design Builder shall also submit a Release and Affidavit in the form attached as Exhibit C acknowledging that each Subconsultant, Subcontractor, sub-subcontractor or supplier has been paid in full through the previous month's Application for Payment (for which the Design Builder has actually been paid). The Owner shall not be required to make payment until and unless these affidavits are furnished by Design Builder. Further, if Design Builder is withholding any portion of a payment to any subcontractor, supplier or subconsultant for any labor, services, equipment or materials for which Owner has paid Design Builder, Design Builder agrees to refund such money to Owner upon demand by Owner.

4.9 Notwithstanding anything in the Contract Documents to the contrary, Design Builder acknowledges and agrees that in the event of a dispute concerning payments for Work performed under this Agreement, Design Builder shall continue to perform the Work required of it under this Agreement pending resolution of the dispute provided that Owner continues to pay Design Builder all amounts that Owner does not dispute are due and payable.

5. PAYMENTS WITHHELD.

5.1. The Project Manager may decline to approve any Application for Payment, or portions thereof, because of subsequently discovered evidence or subsequent inspections that reveal non-compliance with the Contract Documents. The Project Manager may nullify the whole or any part of any approval for payment previously issued and Owner may withhold any payments otherwise due Design Builder under this Agreement or any other agreement between Owner and Design Builder, to such extent as may be necessary in the Owner's opinion to protect it from loss because of: (a) defective Work not remedied; (b) third party claims filed or reasonable evidence indicating probable filing of such claims; (c) failure of Design Builder to make payment properly to subcontractors or for labor, materials or equipment; (d) reasonable doubt that the Work can be completed for the unpaid balance of the Contract Amount; (e) reasonable indication that the Work will not be completed within the Contract Time; (f) unsatisfactory prosecution of the Work by the Design Builder; or (g) any other material breach of the Contract Documents by Design Builder.

5.2. If any conditions described in 5.1. are not remedied or removed, Owner may, after three (3) days written notice, rectify the same at Design Builder's expense. Provided, however, in the event of an emergency, Owner shall not be required to provide Design Builder any written notice prior to rectifying the situation at Design Builder's expense. Owner also may offset against any sums due Design Builder the amount of any liquidated or non-liquidated obligations of Design Builder to Owner, whether relating to or arising out of this Agreement or any other agreement between Design Builder and Owner.

6. FINAL PAYMENT.

6.1. Owner shall make final payment to Design Builder in accordance with Florida Statutes Section 218.735 and the administrative procedures established by the County's Purchasing Department and the Clerk of Court's Finance Department after the Work is finally inspected and accepted by Project Manager as set forth in Section 20.1 herein, provided that Design Builder first, and as an explicit condition precedent to the accrual of Design Builder's right to final payment, shall have furnished Owner with a properly executed and notarized copy of the Release and Affidavit attached as Exhibit C, as well as, a duly executed copy of the Surety's consent to final payment and such other documentation that may be required by the Contract Documents and the Owner. Prior to release of final payment and final retainage, the Design Builder's Representative and the Project Manager shall jointly complete the Final Payment Checklist, a representative copy of which is attached to this Agreement as Exhibit G.

6.2. Design Builder's acceptance of final payment shall constitute a full waiver of any and all claims by Design Builder against Owner arising out of this Agreement or otherwise relating to the Project, except those previously made in writing in accordance with the requirements of the Contract Documents and identified by Design Builder as unsettled in its final Application for Payment. Neither the acceptance of the Work nor payment by Owner shall be deemed to be a waiver of Owner's right to enforce any obligations of Design Builder hereunder or to the recovery of damages for defective Work not discovered by the Project Manager at the time of final inspection.

7. SUBMITTALS AND SUBSTITUTIONS.

7.1. Design Builder shall carefully examine the Contract Documents for all requirements for approval of materials to be submitted such as shop drawings, data, test results, schedules and samples. It is Design Builder's obligation to confirm and Design Builder will be deemed to have certified to Owner that all submittals reviewed and approved by it fully comply with all requirements of the Contract Documents. During Phase 1, Design Builder shall prepare and submit to Owner, for Owner's approval, procedures for Design Builder's handling and processing of submittals. Owner shall identify, in its sole discretion, which submittals must be submitted to Owner for its approval. Further, Design Builder shall submit all such materials at its own expense and in such form as required by the Contract Documents in sufficient time to prevent any delay in the delivery of such materials and the installation thereof. To the extent that a submittal requires Owner's approval as set forth above, Design Builder shall also carefully review and certify to Owner the accuracy and completeness of such shop drawings and other submittals and then forward the same to Owner for its review and approval. In such case, Owner will transmit them back to Design Builder who will then issue the submittals to the affected subcontractor for fabrication or revision. Design Builder shall maintain a suspense control system to promote the expeditious handling of shop drawings and all other submittals. At Owner's request, copies of submittals and/or Design Builder's responses will be provided to Owner. At the completion of the project, the Design Builder will provide the Owner with a complete set of approved submittals in scanned format on CDs.

7.2. Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular supplier, the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other suppliers may be accepted by Owner if sufficient information is submitted by Design Builder to allow the Owner to determine that the material or equipment proposed is equivalent or equal to that named. Requests for review of substitute items of material and equipment will not be accepted by Owner from anyone other than Design Builder and all such requests, to the extent possible, must be submitted by Design Builder to Project Manager prior to the execution of the Lump Sum Amendment, unless otherwise mutually agreed in writing by Owner and Design Builder.

7.3. If Design Builder wishes to furnish or use a substitute item of material or equipment, Design Builder shall make application to the Project Manager for acceptance thereof, certifying that the proposed substitute shall adequately perform the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The application shall state that the evaluation and acceptance of the proposed substitute will not prejudice Design Builder's achievement of substantial completion on time, whether or not acceptance of the substitute for use in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for the Project) to adapt the design to the proposed substitute and whether or not incorporation or use by the substitute in connection with the Work is subject to payment of any license fee or royalty. All variations of the proposed substitute from that specified will be identified in the application and available maintenance, repair and replacement service shall be indicated. The application also shall contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs for redesign and claims of other contractors affected by the resulting change, all of which shall be considered by the Project Manager in evaluating the proposed substitute. The Project Manager may require Design Builder to furnish at Design Builder's expense additional data about the proposed substitute.

7.4. If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, Design Builder may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to the Project Manager, if Design Builder submits sufficient information to allow the Project Manager to determine that the substitute proposed is equivalent to that indicated or required by the Contract Documents. The procedures for submission to and review by the Project Manager shall be the same as those provided herein for substitute materials and equipment.

7.5. The Project Manager shall be allowed a reasonable time within which to evaluate each proposed substitute. Owner shall be the sole judge of the acceptability of any substitute. No substitute will be ordered, installed or utilized without the Project Manager's prior written acceptance which shall be evidenced by either a Change Order, a Work Directive Change, a Field Order or an approved Shop Drawing. The Owner may require Design Builder to furnish at Design Builder's expense a special performance guarantee or other surety with respect to any substitute. The Project Manager will record time required by the Project Manager and the Project Manager's consultants in evaluating substitutions proposed by Design Builder and making changes in the Contract Documents occasioned thereby. Whether or not the Owner accepts a proposed substitute, Design Builder shall reimburse Owner costs of evaluating each proposed substitute.

7.6 Notwithstanding anything in the Contract Documents to the contrary, Design Builder expressly acknowledges and agrees that Owner’s review or approval of any design documents submitted by Design Builder, including but not limited to any submittals as described herein, shall not relieve Design Builder of its responsibilities or liabilities for design hereunder. Notwithstanding anything in the Contract Documents to the contrary, Design Builder further expressly acknowledges and agrees that any such review or approval shall not be deemed as Owner’s approval of any deviations to such design documents unless such deviation is expressly brought to Owner’s attention by Design Builder in writing and Owner expressly approves such deviation in writing.

8. DAILY REPORTS, AS-BUILTS AND MEETINGS.

8.1. Design Builder shall prepare and maintain a daily log of the work on the job site. The daily log records shall be kept current and available for Owner's review. The daily log shall document activities at the Project site including, but not limited to, the following:

8.1.1. Weather conditions showing the high and low temperatures during work hours, the amount of precipitation received on the Project site, and any other weather conditions which adversely affect the Work;

8.1.2. Soil conditions which adversely affect the Work;

8.1.3. The hours of operation by Design Builder's and its subcontractors' and subconsultants' personnel;

8.1.4. The number of Design Builder's and Subconsultant's and Subcontractor's personnel present and working at the Project site, by subcontract and trade;

8.1.5. All equipment present at the Project site, description of equipment use and designation of time equipment was used (specifically indicating any down time);

8.1.6. Description of Work being performed at the Project site;

8.1.7. Any unusual or special occurrences at the Project site;

8.1.8. Materials received at the Project site;

8.1.9. A list of all visitors to the Project

8.1.10. Any problems that might impact either the cost or quality of the Work or the time of performance.

The daily log shall not constitute nor take the place of any notice required to be given by Design Builder to Owner pursuant to the Contract Documents.

8.2. Design Builder shall maintain in a safe place at the Project site one record copy of the Contract Documents, including, but not limited to, all drawings, specifications, addenda, amendments, Change Orders, Work Directive Changes and Field Orders, as well as all written interpretations and clarifications issued by the Owner, in good order and annotated to show all changes made during construction. The annotated drawings shall be continuously updated by the Design Builder throughout the prosecution of the Work to accurately reflect all field changes that are made to adapt the Work to field conditions, changes resulting from Change Orders, Work Directive Changes and Field Orders, and all concealed and buried installations of piping, conduit and utility services. All buried and concealed items, both inside and outside the Project site, shall be accurately located on the annotated drawings as to depth and in relationship to not less than two (2) permanent features (e.g. interior or exterior wall faces). The annotated drawings shall be clean and all changes, corrections and dimensions shall be given in a neat and legible manner in a contrasting color. The "As-Built" record documents, together with all approved samples and a counterpart of all approved shop drawings shall be available to the Project Manager for reference. Upon completion of the Work and as a condition precedent to Design Builder's entitlement to final payment, these "As-Built" record documents, samples and shop drawings (along with electronic copies on CDs) shall be delivered to Project Manager by Design Builder for Owner.

8.3. Design Builder shall keep all records and supporting documentation which concern or relate to the Work hereunder for a minimum of five (5) years from the date of termination of this Agreement or the date the Project is completed or such longer period as may be required by law, whichever is later. Owner, or any duly authorized agents or representatives of Owner, shall have the right to audit, inspect and copy all such records and documentation as often as they deem necessary during the period of this Agreement and during the document retention period noted above; provided, however, such activity shall be conducted only during normal business hours.

8.4 Design Builder shall advise Owner, Project Manager and their representatives of their requested or required participation in any meeting or inspection giving each at least one week written notice unless such notice is made impossible by conditions beyond Design Builder's fault and control, in which case at least 48 hours prior written notice must be given.

9. CONTRACT TIME AND TIME EXTENSIONS.

9.1. Design Builder shall diligently pursue the completion of the Work and coordinate the Work being done on the Project by its subconsultants, subcontractors and material-men, as well as coordinating its Work with all work of others at the Project Site, so that its Work or the work of others shall not be delayed or impaired by any act or omission by Design Builder or anyone for whom Design Builder is liable. Design Builder shall be solely responsible for all construction means, methods, techniques, sequences, and procedures, as well as coordination of all portions of the Work under the Contract Documents, and the coordination of Owner's suppliers and contractors as set forth in Paragraph 12.2. herein.

9.2. Should Design Builder be obstructed or delayed in the prosecution of or completion of the Work as a result of unforeseeable causes beyond the control of Design Builder, and not due to its fault or neglect, including but not restricted to acts of Nature or of the public enemy, acts of government, fires, floods, epidemics, quarantine regulation, strikes or lockouts, Design Builder shall notify the Owner in writing within forty-eight (48) hours after the commencement of such delay, stating the cause or causes thereof, or be deemed to have waived any right which Design Builder may have had to request a time extension.

9.3. No interruption, interference, inefficiency, suspension or delay in the commencement or progress of the Work from any cause whatever, including those for which Owner may be responsible, in whole or in part, shall relieve Design Builder of its duty to perform or give rise to any right to damages or additional compensation from Owner. Design Builder expressly acknowledges and agrees that it shall receive no damages for delay. Design Builder's sole remedy, if any, against Owner will be the right to seek an extension to the Contract Time; provided, however, the granting of any such time extension shall not be a condition precedent to the aforementioned "No Damage For Delay" provision. This paragraph shall expressly apply to claims for early completion, as well as to claims based on late completion.

9.4 Notwithstanding anything contained within Section 2.3 to the contrary, if Design Builder encounters on the Project site any materials reasonably believed by Design Builder to be petroleum or petroleum related products or other hazardous or toxic substances which have not been rendered harmless, Design Builder immediately shall (i) stop Work in the area affected and (ii) report the condition to Owner in writing. If the Work is so stopped and hazardous material is found, the Work in the affected area shall not thereafter be resumed except by Change Order. Any such Change Order shall include, but not be limited to, an adjustment to the Lump Sum Price and Contract Time as appropriate. If no hazardous material is found after the Work is stopped, no Change Order is required to resume the Work in the affected area. Notwithstanding the foregoing sentences in this Section 9.4, if the hazardous material encountered was generated or caused by Design Builder or any of its employees, agents, subconsultants, subcontractors, or material suppliers, no adjustment to the Contract Time or Lump Sum Price shall be made and Design Builder shall indemnify Owner and hold Owner harmless for any costs incurred by Owner with respect to such hazardous material. Design Builder will coordinate and cooperate with any person or entity who is hired to perform any hazardous material mitigation services.

9.5 In no event shall any approval by Owner authorizing Design Builder to continue performing Work under this Agreement or any payment issued by Owner to Design Builder be deemed a waiver of any right or claim Owner may have against Design Builder for delay damages hereunder.

10. CHANGES IN THE WORK.

10.1. Owner shall have the right at any time during the progress of the Work to increase or decrease the Work. Promptly, but in no event more than 10 days after being notified of a change, Design Builder shall submit an itemized estimate of any cost or time increases or savings it foresees as a result of the change. Except in an emergency endangering life or property, or as expressly set forth herein, no addition or changes to the Work shall be made except upon written order of Owner, and Owner shall not be liable to the Design Builder for any increased compensation without such written order. No officer, employee or agent of Owner is authorized to direct any extra or changed work orally. Any alleged changes must be approved by Owner in writing prior to starting such items. Owner will not be responsible for the costs of any changes commenced without Owner's express prior written approval. Failure to obtain such prior written approval for any changes will be deemed: (i) a waiver of any claim by Design Builder for such items and (ii) an admission by Design Builder that such items are in fact not a change but rather are part of the Work required of Design Builder hereunder.

10.2. A Change Order, in the form attached as Exhibit E to this Agreement, shall be issued and executed promptly after an agreement is reached between Design Builder and Owner concerning the requested changes. Design Builder shall promptly perform changes authorized by duly executed Change Orders. The Contract Amount and Contract Time shall be adjusted in the Change Order in the manner as Owner and Design Builder shall mutually agree.

10.3. If Owner and Design Builder are unable to agree on a Change Order for the requested change, Design Builder shall, nevertheless, promptly perform the change as directed by Owner in a written Work Directive Change. In that event, the Contract Amount and Contract Time shall be adjusted as directed by Owner. If Design Builder disagrees with the Owner's adjustment determination, Design Builder must make a claim pursuant to Section 11 of these General Conditions or else be deemed to have waived any claim on this matter it might otherwise have had.

10.4. In the event a requested change is approved by Owner which results in an increase to the Lump Sum Price, a Change Order shall be issued which increases the Lump Sum Price by the amount of Design Builder's actual and reasonable direct increased Cost for such change work plus a maximum ten percent (10%) markup for Design Builder's overhead and profit. In the event such change work is performed by a subconsultant or subcontractor, a maximum ten percent (10%) total markup for all overhead and profit for all subconsultants', subcontractors', sub-subconsultants' and sub-subcontractors' direct labor and material costs and actual equipment costs shall be permitted. Design Builder shall not be entitled to any mark-up for Change Order work performed by subcontractors or subconsultants. All compensation due any Sub-consultant or Subcontractor for field and home office overhead is included in the markups noted above. Subcontractor's bond costs associated with any change order shall be included in the overhead and profit markups and shall not be paid as a separate line item.

10.5 Owner shall have the right to conduct an audit of Design Builder's books and records, as well as those of its subconsultants, subcontractors and suppliers to verify the accuracy of the Design Builder's claim with respect to Design Builder's costs associated with any Change Order or Work Directive Change.

10.6 The Project Manager shall have authority to order minor changes in the Work not involving an adjustment to the Contract Amount or an extension to the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes may be effected by Field Order or by other written order. Such changes shall be binding on the Design Builder.

10.7 No action, conduct, omission or course of conduct by Owner shall act to waive, alter, or change the requirement that Amendments, Change Orders, and Work Directive Changes must be in writing and signed by Owner. Such written and signed Amendments, Change Orders and Work Directive Changes are the sole and exclusive way to change either the amount of compensation to be paid to Design Builder or the time within which Design Builder is to perform its obligations hereunder. No changes will be allowed based upon actual, constructive, or oral notice or lack of prejudice to Owner.

11. CLAIMS AND DISPUTES.

11.1 Claim is a demand or assertion by one of the parties seeking an adjustment or interpretation of the terms of the Contract Documents, payment of money, extension of time or other relief with respect to the terms of the Contract Documents. The term "Claim" also includes other disputes and matters in question between Owner and Design Builder arising out of or relating to the Contract Documents. The responsibility to substantiate a Claim shall rest with the party making the Claim.

11.2. Claims by the Design Builder shall be made in writing to the Project Manager within forty-eight (48) hours from when the Design Builder knew or should have known of the event giving rise to such Claim or else the Design Builder shall be deemed to have waived the Claim. Written supporting data shall be submitted to the Project Manager within fifteen (15) calendar days after the occurrence of the event, unless the Owner grants additional time in writing, or else the Design Builder shall be deemed to have waived the Claim. Claims not settled by the aforesaid procedure, shall be resolved according to the Dispute Resolution Procedure copies of which are available in the County Attorney's Office or Purchasing Department. All Claims shall be priced in accordance with the provisions of Subsection 10.4.

11.3. The Design Builder shall proceed diligently with its performance as directed by the Owner, regardless of any pending Claim, action, suit or administrative proceeding, unless otherwise agreed to by the Owner in writing. Owner shall continue to make payments in accordance with the Contract Documents during the pendency of any Claim.

12. OTHER WORK.

12.1. Owner may perform other work related to the Project at the site by Owner's own forces, have other work performed by utility owners or let other direct contracts. If the fact that such other work is to be performed is not noted in the Contract Documents, written notice thereof will be given to Design Builder prior to starting any such other work. If Design Builder believes that such performance will involve additional expense to Design Builder or require additional time, Design Builder shall send written notice of that fact to Owner within forty-eight (48) hours of being notified of the other work. If the Design Builder fails to send the above required forty-eight (48) hour notice, the Design Builder will be deemed to have waived any rights it otherwise may have had to seek an extension to the Contract Time or adjustment to the Contract Amount.

12.2. Design Builder shall afford each utility owner and other Design Builder who is a party to such a direct contract (or Owner, if Owner is performing the additional work with Owner's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work and shall properly connect and coordinate its Work with theirs. Design Builder shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. Design Builder shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of the Project Manager and the others whose work will be affected. The duties and responsibilities of Design Builder under this paragraph are for the benefit of such utility owners and other Contractors to the extent that there are comparable provisions for the benefit of Design Builder in said direct contracts between Owner and such utility owners and other contractors.

12.3. If any part of Design Builder's Work depends for proper execution or results upon the work of any other contractor of Owner or utility owner (or Owner), Design Builder shall inspect and promptly report to Project Manager in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. Design Builder's failure to report will constitute an acceptance of the other work as fit and proper for integration with Design Builder's Work.

13. INDEMNIFICATION AND INSURANCE.

13.1 The Contractor must maintain insurance in at least the amounts required in the Request for Proposal throughout the term of this contract. The contractor must provide a Certificate of Insurance in accordance with Insurance Requirements of Exhibit B to the agreement, evidencing such coverage prior to issuance of purchase order or commencement of any work under this contract.

13.2 To the maximum extent permitted by Florida law, Design Builder shall indemnify and hold harmless Owner and its officers and employees from any and all liabilities, claims, damages, penalties, demands, judgments, actions, proceedings, losses or costs, including, but not limited to, reasonable attorneys' fees and paralegals' fees, whether resulting from any claimed breach of this Agreement by Design Builder or from personal injury, property damage, direct or consequential damages, or economic loss, to the extent caused by the negligence, recklessness, or intentional wrongful misconduct of Design Builder or anyone employed or utilized by the Design Builder in the performance of this Agreement.

14. COMPLIANCE WITH LAWS.

14.1. Design Builder agrees to comply, at its own expense, with all federal, state and local laws, codes, statutes, ordinances, rules, regulations and requirements applicable to the Project, including but not limited to those dealing with taxation, worker's compensation, equal employment and safety (including, but not limited to, the Trench Safety Act, Chapter 553, Florida Statutes). If Design Builder observes that the Contract Documents are at variance therewith, it shall promptly notify Project Manager in writing. To the extent any law, rule, regulation, code, statute, or ordinance requires the inclusion of certain terms in this Agreement in order for this Agreement to be enforceable, such terms shall be deemed included in this Agreement. Notwithstanding anything in the Contract Documents to the contrary, it is understood and agreed that in the event of a change in any applicable laws, ordinances, rules or regulations subsequent to the date the Lump Sum Amendment has been executed that increases the Design Builder's time or cost of performance of the Work, Design Builder is entitled to a Change Order for such increases, except to the extent Design Builder knew or should have known of the reasonable prospect of such changes prior to the date of the Lump Sum Amendment.

15. CLEANUP AND PROTECTIONS.

15.1. Design Builder agrees to keep the Project site clean at all times of debris, rubbish and waste materials arising out of the Work. At the completion of the Work, Design Builder shall remove all debris, rubbish and waste materials from and about the Project site, as well as all tools, appliances, construction equipment and machinery and surplus materials, and shall leave the Project site clean and ready for occupancy by Owner.

15.2. Any existing surface or subsurface improvements, including, but not limited to, pavements, curbs, sidewalks, pipes, utilities, footings, structures, trees and shrubbery, not indicated in the Contract Documents to be removed or altered, shall be protected by Design Builder from damage during the prosecution of the Work. Subject to the Section 2.3 above, any such improvements so damaged shall be restored by Design Builder to the condition equal to that existing at the time of Design Builder's commencement of the Work.

16. ASSIGNMENT.

16.1. Design Builder shall not assign this Agreement or any part thereof, without the prior consent in writing of Owner. Any attempt to assign or otherwise transfer this Agreement, or any part herein, without the Owner's consent, shall be void. If Design Builder does, with approval, assign this Agreement or any part thereof, it shall require that its assignee be bound to it and to assume toward Design Builder all of the obligations and responsibilities that Design Builder has assumed toward Owner.

17. PERMITS, LICENSES AND TAXES.

17.1. All permits, fees and licenses necessary for the prosecution of the Work shall be acquired and paid for by the Design Builder. If Design Builder performs any Work without obtaining, or contrary to, such permits or licenses, Design Builder shall bear all costs arising therefrom.

17.2. Design Builder shall pay all sales, consumer, use and other similar taxes associated with the Work or portions thereof, which are applicable during the performance of the Work.

18. TERMINATION FOR DEFAULT.

18.1. Design Builder shall be considered in material default of the Agreement and such default shall be considered cause for Owner to terminate the Agreement, in whole or in part, as further set forth in this Section, if Design Builder: (1) fails to begin the Work under the Contract Documents within the time specified herein; or (2) fails to properly and timely perform the Work as directed by the Project Manager or as provided for in the approved Master Project Schedule; or (3) performs the Work unsuitably or neglects or refuses to remove materials or to correct or replace such Work as may be rejected as unacceptable or unsuitable; or (4) discontinues the prosecution of the Work; or (5) fails to resume Work which has been suspended within a reasonable time after being notified to do so; or (6) becomes insolvent or is declared bankrupt, or commits any act of bankruptcy; or (7) allows any final judgment to stand against it unsatisfied for more than ten (10) days; or (8) makes an assignment for the benefit of creditors; or (9) fails to obey any applicable codes, laws, ordinances, rules or regulations with respect to the Work; or (10) materially breaches any other provision of the Contract Documents.

18.2. Owner shall notify Design Builder in writing of Design Builder's default(s). If Owner determines that Design Builder has not remedied and cured the default(s) within seven (7) calendar days following receipt by Design Builder of said written notice or such longer period of time as may be consented to by Owner in writing and in its sole discretion, then Owner, at its option, without releasing or waiving its rights and remedies against the Design Builder's sureties and without prejudice to any other right or remedy it may be entitled to hereunder or by law, may terminate Design Builder's right to proceed under the Agreement, in whole or in part, and take possession of all or any portion of the Work and any materials, tools, equipment, and appliances of Design Builder, take assignments of any of Design Builder's subcontracts and purchase orders, and complete all or any portion of Design Builder's Work by whatever means, method or agency which Owner, in its sole discretion, may choose.

18.3. If Owner deems any of the foregoing remedies necessary, Design Builder agrees that it shall not be entitled to receive any further payments hereunder until after the Project is completed. All moneys expended and all of the costs, losses, damages and extra expenses, including all management, administrative and other overhead and other direct and indirect expenses (including attorneys' fees) or damages incurred by Owner incident to such completion, shall be deducted from the Contract Amount, and if such expenditures exceed the unpaid balance of the Contract Amount, Design Builder agrees to pay promptly to Owner on demand the full amount of such excess, including costs of collection, attorneys' fees (including appeals) and interest thereon at the maximum legal rate of interest until paid. If the unpaid balance of the Contract Amount exceeds all such costs, expenditures and damages incurred by the Owner to complete the Work, such excess shall be paid to the Design Builder. The amount to be paid to the Design Builder or Owner, as the case may be, shall be approved by the Project Manager, upon application, and this obligation for payment shall survive termination of the Agreement.

18.4. The liability of Design Builder hereunder shall extend to and include the full amount of any and all sums paid, expenses and losses incurred, damages sustained, and obligations assumed by Owner in good faith under the belief that such payments or assumptions were necessary or required, in completing the Work and providing labor, materials, equipment, supplies, and other items therefor or re-letting the Work, and in settlement, discharge or compromise of any claims, demands, suits, and judgments pertaining to or arising out of the Work hereunder.

18.5. If, after notice of termination of Design Builder's right to proceed pursuant to this Section, it is determined for any reason that Design Builder was not in default, or that its default was excusable, or that Owner is not entitled to the remedies against Design Builder provided herein, then the termination will be deemed a termination for convenience and Design Builder's remedies against Owner shall be the same as and limited to those afforded Design Builder under Section 19 below.

18.6 In the event (i) Owner fails to make any undisputed payment to Design Builder in accordance with the Local Government Prompt Payment Act, Section 218.70, et.seq. of the Florida State Statutes or Owner otherwise persistently fails to fulfill some material obligation owed by Owner to Design Builder under this Agreement, and (ii) Owner has failed to cure such default within fourteen (14) days of receiving written notice of same from Design Builder, then Design Builder may stop its performance under this Agreement until such default is cured, after giving Owner a second fourteen (14) days written notice of Design Builder's intention to stop performance under the Agreement. If the Work is so stopped for a period of one hundred and twenty (120) consecutive days through no act or fault of the Design Builder or its Subcontractors or their agents or employees or any other persons performing portions of the Work under contract with the Design Builder or any Subcontractor, the Design Builder may terminate this Agreement by giving written notice to Owner of Design Builder's intent to terminate this Agreement. If Owner does not cure its default within fourteen (14) days after receipt of Design Builder's written notice, Design Builder may, upon fourteen (14) additional days' written notice to the Owner, terminate the Agreement and recover from the Owner payment for Work performed through the termination date, but in no event shall Design Builder be entitled to payment for Work not performed or any other damages from Owner.

19. TERMINATION FOR CONVENIENCE AND RIGHT OF SUSPENSION.

19.1. Owner shall have the right to terminate this Agreement without cause upon seven (7) calendar days written notice to Design Builder. In the event of such termination for convenience, Design Builder's recovery against Owner shall be limited to that portion of the Contract Amount earned through the date of termination, together with any retainage withheld and reasonable termination expenses incurred, but Design Builder shall not be entitled to any other or further recovery against Owner, including, but not limited to, damages or any anticipated profit on portions of the Work not performed.

19.2. Owner shall have the right to suspend all or any portions of the Work upon giving Design Builder not less than five (5) calendar days' prior written notice of such suspension. If all or any portion of the Work is so suspended, Design Builder's sole and exclusive remedy shall be to seek an extension of time to its schedule in accordance with the procedures set forth in the Contract Documents. In no event shall the Design Builder be entitled to any additional compensation or damages. Provided, however, if the ordered suspension exceeds six (6) months, the Design Builder shall have the right to terminate the Agreement with respect to that portion of the Work which is subject to the ordered suspension.

20. COMPLETION.

20.1. Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use provided, however, that as a condition precedent to Substantial Completion, the Owner has received all certificates of occupancy and any other permits, approvals, licenses, and other documents, that are Design Builder's responsibility to obtain under the Contract Documents from any governmental authority having jurisdiction thereof necessary for the beneficial occupancy of the Work; provided, however, such condition precedent shall be waived to the extent the failure to obtain any such item is not due to the fault or neglect of Design Builder or anyone for whom Design Builder is responsible. In general, the only remaining Work shall be minor in nature, so that the Owner could occupy the Work on that date and the completion of the Work by the Design Builder thereafter would not unreasonably interfere with the Owner's normal business operations or create an unsafe condition. The "punch list" shall be completed within 60 consecutive calendar days or as agreed upon following the Substantial Completion Date ("Final Completion").

20.2. When the entire Work (or any portion thereof designated in writing by Owner) is ready for its intended use, Design Builder shall notify Project Manager in writing that the entire Work (or such designated portion) is substantially complete and ready for Certificate of Substantial Completion (or Certificate of Partial Substantial Completion) to be issued. Said written notice from Design Builder shall include a proposed punch-list of all items of Work to be completed or corrected by Design Builder. Within a reasonable time thereafter, Owner and Design Builder shall make an inspection of the Work (or designated portion thereof) to determine the status of completion. If Owner does not consider the Work (or designated portion) substantially complete, Project Manager shall notify Design Builder in writing giving the reasons therefor. In such case, Design Builder shall pay the costs of all additional Substantial Completion inspections. If Owner considers the Work (or designated portion) substantially complete, Design Professional shall prepare a Certificate of Substantial Completion (or Certificate of Partial Substantial Completion), which includes a Certificate of Occupancy issued by the local building official, for Owner's review, approval and execution which shall fix the date of Substantial Completion for the entire Work (or designated portion thereof) and include a tentative punch-list of items to be completed or corrected by Design Builder before final payment. Failure to include an item on the final punch-list does not waive Owner's right to demand completion of the item pursuant to the Contract Documents either prior to or after final payment. Owner shall have the right to exclude Design Builder from the Work and Project site (or designated portion thereof) after the date of Substantial Completion, but Owner shall allow Design Builder reasonable access to complete or correct items on the tentative punch-list.

20.3. Upon receipt of written certification by Design Builder that the Work is completed in accordance with the Contract Documents and is ready for final inspection and acceptance, Project Manager will make such inspection and, if he or she finds the Work acceptable and fully performed under the Contract Documents shall promptly issue a final Certificate for Payment, recommending that, on the basis of his or her observations and inspections, and the Design Builder's certification that the Work has been completed in accordance with the terms and conditions of the Contract Documents, that the entire balance found to be due Design Builder is due and payable. Neither the final payment nor the retainage shall become due and payable until Design Builder submits:

(1) Receipt of Design Builder's Final Application for Payment.
(2) The Release and Affidavit in the form attached as Exhibit C.
(3) Consent of surety to final payment.
(4) Receipt of the final payment check list.
(5) If required by Owner, other data establishing payment or satisfaction of all obligations, such as receipts, releases and waivers of liens, arising out of the Contract Documents, to the extent and in such form as may be designated by Owner.

Owner reserves the right to inspect the Work and make an independent determination as to the Work's acceptability, even though the Project Manager may have issued his or her recommendations. Unless and until the Owner is completely satisfied, neither the final payment nor the retainage shall become due and payable.

21. WARRANTY.

21.1. Design Builder shall obtain and assign to Owner all express warranties given to Design Builder or any subcontractors by any subcontractor or materialmen supplying materials, equipment or fixtures to be incorporated into the Project. Design Builder warrants to Owner that any materials and equipment furnished under the Contract Documents shall be new unless otherwise specified, and that all Work shall be of good quality, free from all defects and in conformance with the Contract Documents. Design Builder further warrants to Owner that all materials and equipment furnished under the Contract Documents shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturers, fabricators, suppliers or processors except as otherwise provided for in the Contract Documents. If, within one (1) year after Substantial Completion, any Work is found to be defective or not in conformance with the Contract Documents, Design Builder shall correct it promptly after receipt of written notice from Owner. Design Builder shall also be responsible for and pay for replacement or repair of adjacent materials or Work which may be damaged as a result of such replacement or repair. Further, in the event of an emergency, Owner may commence to correct any defective Work, without prior notice to Design Builder, at Design Builder's expense. These warranties are in addition to those implied warranties to which Owner is entitled as a matter of law.

21.2 No later than 30 days prior to expiration of the warranty, the Project Manager, or another representative of the Owner, shall conduct an inspection of the warranted work to verify compliance with the requirements of the Agreement. The Design Builder's Representative shall be present at the time of inspection and shall take remedial actions to correct any deficiencies noted in the inspection. Failure of the Design Builder to correct the cited deficiencies shall be grounds for the Owner to disqualify the Design Builder from future bid opportunities with the Owner, in addition to any other rights and remedies available to Owner.

22. TESTS AND INSPECTIONS.

22.1. Owner and its respective representatives, agents and employees, and governmental agencies with jurisdiction over the Project shall have access at all times to the Work, whether the Work is being performed on or off of the Project site, for their observation, inspection and testing. Design Builder shall provide proper, safe conditions for such access. Design Builder shall provide Project Manager with timely notice of readiness of the Work for all required inspections, tests or approvals.

22.2. If the Contract Documents or any codes, laws, ordinances, rules or regulations of any public authority having jurisdiction over the Project requires any portion of the Work to be specifically inspected, tested or approved, Design Builder shall assume full responsibility therefore, pay all costs in connection therewith and furnish Project Manager the required certificates of inspection, testing or approval. All inspections, tests or approvals shall be performed in a manner and by organizations acceptable to the Project Manager.

22.3 Design Builder is responsible, without reimbursement from Owner, for re-inspection fees and costs; to the extent such re-inspections are due to the fault or neglect of Design Builder.

22.3. If any Work that is to be inspected, tested or approved is covered without written concurrence from the Project Manager, such work must, if requested by Project Manager, be uncovered for observation. Such uncovering shall be at Design Builder's expense unless Design Builder has given Project Manager timely notice of Design Builder's intention to cover the same and Project Manager has not acted with reasonable promptness to respond to such notice. If any Work is covered contrary to written directions from Project Manager, such Work must, if requested by Project Manager, be uncovered for Project Manager's observation and be replaced at Design Builder's sole expense.

22.4. The Owner shall charge to Design Builder and may deduct from any payments due Design Builder all engineering and inspection expenses incurred by Owner in connection with any overtime work. Such overtime work consisting of any work during the construction period beyond the regular eight (8) hour day and for any work performed on Saturday, Sunday or holidays.

22.5. Neither observations nor other actions by the Project Manager nor inspections, tests or approvals by others shall relieve Design Builder from Design Builder's obligations to perform the Work in accordance with the Contract Documents.

22.6 Owner shall have the right, but not the obligation, to hire any consultant it deems appropriate to perform a peer review on Design Builder’s design documents. Design Builder agrees to cooperate with any such peer review.

23. DEFECTIVE WORK.

23.1. Work not strictly conforming to the requirements of the Contract Documents shall be deemed defective Work. If required by Project Manager, Design Builder shall as directed, either correct all defective Work, whether or not fabricated, installed or completed, or if the defective Work has been rejected by Project Manager, remove it from the site and replace it with non-defective Work. Design Builder shall bear all direct, indirect and consequential costs of such correction or removal (including, but not limited to fees and charges of engineers, architects, attorneys and other professionals) made necessary thereby, and shall hold Owner harmless for same.

23.2. If the Project Manager considers it necessary or advisable that covered Work be observed or inspected or tested by others and such Work is not otherwise required to be inspected or tested, Design Builder, at Project Manager's request, shall uncover, expose or otherwise make available for observation, inspection or tests as Project Manager may require, that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is defective, Design Builder shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction (including, but not limited to, fees and charges of engineers, architects, attorneys and other professionals), and Owner shall be entitled to an appropriate decrease in the Lump Sum Price. If, however, such Work is not found to be defective, Design Builder shall be allowed an increase in the Lump Sum Price and/or an extension to the Contract Time, to the extent solely attributable to such uncovering, exposure, observation, inspection, testing and reconstruction.

23.3. If any portion of the Work is defective, or if Design Builder fails to supply sufficient skilled workers, suitable materials or equipment or fails to finish or perform the Work in such a way that the completed Work will conform to the Contract Documents, or satisfactorily maintain the Project schedules, Project Manager may order Design Builder to stop the Work, or any portion thereof, until the cause for such order has been eliminated. The right of Project Manager to stop the Work shall be exercised, if at all, solely for Owner's benefit and nothing herein shall be construed as obligating the Project Manager to exercise this right for the benefit of Design Builder or any other person.

23.4. Should the Owner determine, in its sole opinion, it is in the Owner's best interest to accept defective Work, the Owner may do so. Design Builder shall bear all direct, indirect and consequential costs attributable to the Owner's evaluation of and determination to accept defective Work. If such determination is rendered prior to final payment, a Change Order shall be executed evidencing such acceptance of such defective Work, incorporating the necessary revisions in the Contract Documents and reflecting an appropriate decrease in the Contract Amount. If the Owner accepts such defective Work after final payment, Design Builder shall promptly pay Owner an appropriate amount to adequately compensate Owner for its acceptance of the defective Work.

23.5. If Design Builder fails, within a reasonable time, which in no event shall be more than 14 days after the written notice from Project Manager, to correct defective Work or to remove and replace rejected defective Work as required by Project Manager or Owner, or if Design Builder fails to perform the Work in accordance with the Contract Documents, or if Design Builder fails to comply with any of the provisions of the Contract Documents, Owner may, after seven (7) days written notice to Design Builder, correct and remedy any such deficiency. Provided, however, Owner shall not be required to give notice to Design Builder in the event of an emergency. To the extent necessary to complete corrective and remedial action, Owner may exclude Design Builder from any or all of the Project site, take possession of all or any part of the Work, and suspend Design Builder's services related thereto, take possession of Design Builder's tools, appliances, construction equipment and machinery at the Project site and incorporate in the Work all materials and equipment stored at the Project site or for which Owner has paid Design Builder but which are stored elsewhere. Design Builder shall allow Owner and its respective representatives, agents, and employees such access to the Project site as may be necessary to enable Owner to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of Owner in exercising such rights and remedies shall be charged against Design Builder, and a Change Order shall be issued, incorporating the necessary revisions to the Contract Documents, including an appropriate decrease to the Contract Amount. Such direct, indirect and consequential costs shall include, but not be limited to, fees and charges of engineers, architects, attorneys and other professionals, all court costs and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of Design Builder's defective Work. Design Builder shall not be allowed an extension of the Contract Time because of any delay in performance of the Work attributable to the exercise by Owner of Owner's rights and remedies hereunder.

24. SUPERVISION AND SUPERINTENDENTS.

24.1. Design Builder is responsible for supervising, coordinating and performing the Work with the highest level of care and skill as would be provided by a designer and contractor with extensive and special expertise in the type of design and construction services required under the Contract Documents. Design Builder shall plan, organize, supervise, schedule, monitor, direct and control the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in strict accordance with the Contract Documents. Design Builder shall be responsible to see that the finished Work complies accurately with the Contract Documents. Design Builder shall keep on the Work at all times during its progress a competent resident superintendent, who shall be subject to Owner's approval and who shall not be replaced without prior written notice to Project Manager except under extraordinary circumstances. The superintendent shall be employed by the Design Builder and be the Design Builder's representative at the Project site and shall have authority to act on behalf of Design Builder. All communications given to the superintendent shall be as binding as if given to the Design Builder. Owner shall have the right to direct Design Builder to remove and replace its Project superintendent, with cause. Attached to the Agreement as Exhibit S is Design Builder's list identifying Design Builder's Project Superintendent and all of Design Builder's key personnel who are assigned to the Project; such identified personnel shall not be removed without Owner's prior written approval, and if so removed must be immediately replaced with a person acceptable to Owner.

24.2 Design Builder shall have a competent, experienced superintendent on the project at all times whenever Design Builder's work crews, or work crews of other parties authorized by the Project Manager are engaged in any activity whatsoever associated with the Project. Should the Design Builder fail to comply with the above condition, the Project Manager shall, at his discretion, deduct from the Design Builder's monthly pay estimate, sufficient moneys to account for the Owner's loss of adequate project supervision, not as a penalty, but as liquidated damages, separate from the liquidated damages described in Section 5, for services not rendered.

25. PROTECTION OF WORK.

25.1. Design Builder shall fully protect the Work from loss or damage and shall bear the cost of any such loss or damage until final completion is achieved. If Design Builder or any one for whom Design Builder is legally liable for is responsible for any loss or damage to the Work, or other work or materials of Owner or Owner's separate contractors, Design Builder shall be charged with the same, and any moneys necessary to replace such loss or damage shall be deducted from any amounts due Design Builder.

25.2. Design Builder shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Design Builder subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

25.3. Design Builder shall not disturb any benchmark established by the Owner with respect to the Project. If Design Builder, or its subcontractors, agents or anyone for whom Design Builder is legally liable, disturbs the Owner's benchmarks, Design Builder shall immediately notify Project Manager. The Owner shall re-establish the benchmarks and Design Builder shall be liable for all costs incurred by Owner associated therewith.

26. EMERGENCIES.

26.1. In the event of an emergency affecting the safety or protection of persons or the Work or property at the Project site or adjacent thereto, Design Builder, without special instruction or authorization from Owner, is obligated to act to prevent threatened damage, injury or loss. Design Builder shall give Project Manager written notice within forty-eight (48) hours after Design Builder knew or should have known of the occurrence of the emergency, if Design Builder believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If the Project Manager determines that a change in the Contract Documents is required because of the action taken in response to an emergency, and such emergency was not due to the fault or neglect of the Design Builder, a Change Order shall be issued to document the consequences of the changes or variations. If Design Builder fails to provide the forty-eight (48) hour written notice noted above, the Design Builder shall be deemed to have waived any right it otherwise may have had to seek an adjustment to the Contract Amount or an extension to the Contract Time.

27. USE OF PREMISES.

27.1. Design Builder shall maintain all construction equipment, the storage of materials and equipment and the operations of workers to the Project site and land and areas identified in and permitted by the Contract Documents and other lands and areas permitted by law, rights of way, permits and easements, and shall not unreasonably encumber the Project site with construction equipment or other material or equipment. Design Builder shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or any land or areas contiguous thereto, resulting from the performance of the Work.

27.2 Design Builder acknowledges that Work may be performed at a particular Project site where Owner simultaneously is conducting and continuing its operations upon the same site. In such event, Design Builder shall coordinate its Work and cooperate so as to cause no unreasonable interference with or disruption to Owner's operations.

27.3 Owner may take early occupancy of all or any portions of the Work, at Owner's election, by designating in writing to Design Builder the specific portions of the Work to be occupied and the date such occupancy shall commence. If any such specific early occupancy was not expressly identified at the time the Lump Sum Amendment was executed and such early occupancy negatively impacts Design Builder's cost or time of performance, Design Builder shall be entitled to an equitable adjustment to the Contract Amount and the Contract Time, all in accordance with the other terms and conditions of the Contract Documents.

28. SAFETY.

28.1. Design Builder shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Design Builder shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

28.1.1. All employees on or about the project site and other persons and/or organizations who may be affected thereby;

28.1.2. All the Work and materials and equipment to be incorporated therein, whether in storage on or off the Project site; and

28.1.3. Other property on Project site or adjacent thereto, including trees, shrubs, walks, pavements, roadways, structures, utilities and any underground structures or improvements not designated for removal, relocation or replacement in the Contract Documents.

28.2. Design Builder shall comply with all applicable codes, laws, ordinances, rules and regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. Design Builder shall erect and maintain all necessary safeguards for such safety and protection. Design Builder shall notify owners of adjacent property and of underground structures and improvements and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation or replacement of their property. Design Builder's duties and responsibilities for the safety and protection of the Work shall continue until such time as the Work is completed and final acceptance of same by Owner has occurred.

28.3. Design Builder shall designate a responsible representative located on a full time basis at the Project site whose duty shall be the prevention of accidents. This person shall be Design Builder's superintendent unless otherwise designated in writing by Design Builder to Owner.

28.4 Alcohol, drugs and all illegal substances are strictly prohibited on any Owner property. All employees of Design Builder, as well as those of all Design Builder's subconsultants and subcontractors and those of any other person or entity for whom Design Builder is legally liable (collectively referred to herein as "Employees"), shall not possess or be under the influence of any such substances while on any Owner property. Further, Employees shall not bring on to any Owner property any gun, rifle or other firearm, or explosives of any kind.

28.5 Design Builder acknowledges that the Work may be progressing on a Project site which is located upon or adjacent to an existing Owner facility. In such event, Design Builder shall comply with the following:

28.5.1 All Owner facilities are smoke free. Smoking is strictly prohibited;

28.5.2 All Employees working at the Project site must log in and out with the Design Builder each day;

28.5.3 Design Builder shall strictly limit its operations to the designated work areas and shall not permit any Employees to enter any other portions of Owner's property without Owner's express prior written consent;

28.5.4 All Employees are prohibited from distributing any papers or other materials upon Owner's property, and are strictly prohibited from using any of Owner's telephones or other office equipment;

28.5.5 All Employees shall at all times comply with the OSHA regulations with respect to dress and conduct at the Project site. Further, all Employees shall comply with the dress, conduct and facility regulations issued by Owner's officials onsite, as said regulations may be changed from time to time;

28.5.6 All Employees shall enter and leave Owner's facilities only through the ingress and egress points identified in the site utilization plan approved by Owner or as otherwise designated, from time to time, by Owner in writing;

28.5.7 When requested, Design Builder shall cooperate with any ongoing Owner investigation involving personal injury, economic loss or damage to Owner's facilities or personal property therein;

28.5.8 The Employees may not solicit, distribute or sell products while on Owner's property. Friends, family members or other visitors of the Employees are not permitted on Owner's property; and

28.5.9 At all times, Design Builder shall adhere to Owner's safety and security regulations, and shall comply with all security requirements at Owner's facilities, as said regulations and requirements may be modified or changed by Owner from time to time.

28.5.10 At all times while at the Project site, all Employees shall refrain from any abusive or offensive language and shall refrain from the harassment of any Owner employee, agent or invitee on the Project site.

29. PROJECT MEETINGS.

Prior to the commencement of any Work, the Design Builder shall attend a conference with the Project Manager and others as appropriate to discuss the Master Project Schedule, procedures for handling design documents, shop drawings and other submittals, and for processing Applications for Payment, and to establish a working understanding among the parties as to the Work. During the prosecution of the Work, the Design Builder shall attend any and all meetings convened by the Project Manager with respect to the Project, when directed to do so by the Project Manager. The Design Builder shall have its subconsultants, subcontractors and suppliers attend all such meetings (including the pre-construction conference) as may be directed by the Project Manager.

30. MAINTENANCE OF TRAFFIC POLICY.

For all projects that are conducted within a Pinellas County Right-of-Way, the Design Builder shall provide and erect Traffic Control Devices as prescribed in the current edition of the Manual On Uniform Traffic Control Devices (MUTCD), where applicable on local roadways and as prescribed in the Florida Department of Transportation Design Standards (DS), where applicable on state roadways. These projects shall also comply with Pinellas County's Maintenance of Traffic Policy, incorporated herein by reference. Copies are available through Owner's Risk Management.

The Design Builder will be responsible for obtaining copies of all required manuals, MUTCD, FDOT Roadway & Traffic Design Standards Indexes, or other related documents, so to become familiar with their requirements. Strict adherence to the requirements of the Maintenance of Traffic ("MOT") policy will be enforced under this Contract.

All costs associated with the Maintenance of Traffic shall be included within the Lump Sum Agreement.

If MOT is required, MOT is to be provided beginning with the Phase 2 Commencement Date.

31. SUBCONTRACTS.

31.1 As the design is being developed by or for Design Builder, Design Builder shall review the design and shall determine how it desires to divide the sequence of construction activities. Design Builder will determine the breakdown and composition of bid packages for award of subcontracts, based on the current Master Project Schedule, and shall supply a copy of that breakdown and composition to Owner for its review and approval prior to submitting its Lump Sum Price proposal. Design Builder shall take into consideration such factors as natural and practical lines of severability, sequencing effectiveness, access and availability constraints, total time for completion, construction market conditions, availability of labor and materials, community relations and any other factors pertinent to saving time and costs.

31.2 A Subcontractor is any person or entity who is performing, furnishing, supplying or providing any portion of the Work pursuant to a contract with Design Builder, including any of the required design services. Design Builder shall be solely responsible for and have control over the Subcontractors. Design Builder shall negotiate all Change Orders, Work Directive Changes, Field Orders and Requests for Proposal, with all affected Subcontractors and shall review the costs of those proposals and advise Owner of their validity and reasonableness, acting in Owner's best interest, prior to requesting approval of any Change Order from Owner. All Subcontractors performing any portion of the Work on this Project must possess all licenses required by state or local law and must be "qualified," meaning a person or entity that has the capability in all respects to perform fully the Agreement requirements with respect to its portion of the Work and has the integrity and reliability to assure good faith performance.

31.3 When Design Builder submits its Lump Sum Price proposal to Owner, Design Builder shall identify all Subcontractors, including their addresses, licensing information and phone numbers, it intends to utilize for the Project. All Subcontractors must be approved by Owner prior to Design Builder entering into any subcontract or purchase order with them and prior to any Subcontractor commencing any work on the Project. The list identifying Subcontractors shall be attached as an Attachment to the Lump Sum Price proposal and cannot be modified, changed, or amended without prior written approval from Owner. Any and all Subcontractor work to be self-performed by Design Builder must be approved in writing by Owner in its sole discretion prior to commencement of such work. As additional Subcontractors may be approved by Owner after the Lump Sum Amendment is executed, Design Builder shall continuously update that Subcontractor list, so that it remains current and accurate throughout the entire performance of the Work.

31.4 Design Builder shall not enter into a subcontract or purchase order with any Subcontractor, if Owner reasonably objects to that Subcontractor. Design Builder shall not be required to contract with anyone to whom it reasonably objects. Design Builder shall keep on file a copy of the license for every Subcontractor and sub-subcontractor performing any portion of the Work, as well as maintain a log of all such licenses. All subcontracts and purchase orders between Design Builder and its Subcontractors shall be in writing and are subject to Owner's approval. Further, unless expressly waived in writing by Owner, all subcontracts and purchase orders shall (1) require each Subcontractor to be bound to Design Builder to the same extent Design Builder is bound to Owner by the terms of the Contract Documents, as those terms may apply to the portion of the Work to be performed by the Subcontractor, (2) provide for the assignment of the subcontract or purchase order from Design Builder to Owner at the election of Owner upon termination of Design Builder, (3) provide that Owner will be an additional indemnified party of the subcontract or purchase order, (4) provide that Owner will be an additional insured on all liability insurance policies required to be provided by the Subcontractor except workman's compensation and professional liability policies, (5) assign all warranties directly to Owner, and (6) identify Owner as an intended third-party beneficiary of the subcontract or purchase order. Design Builder shall make available to each proposed Subcontractor, prior to the execution of the subcontract, copies of the Contract Documents to which the Subcontractor will be bound. Each Subcontractor shall similarly make copies of such documents available to its sub-subcontractors.

31.5 All Subcontractors providing any construction services must agree to provide field (on-site) supervision through a named superintendent for each trade (e.g., general concrete forming and placement, masonry, mechanical, plumbing, electrical and roofing) included in its subcontract or purchase order. In addition, the Subcontractor shall assign and name a qualified employee for scheduling direction for its portion of the Work. The supervisory employees of the Subcontractor (including field superintendent, foreman and schedulers at all levels) must have been employed in a supervisory (leadership) capacity of substantially equivalent level on a similar project for at least two years within the last five years. The Subcontractor shall include a resume of experience for each employee identified by it to supervise and schedule its work.

31.6 Unless otherwise expressly waived by Owner in writing, all subcontracts and purchase orders shall provide:

31.6.1 That the Subcontractor's exclusive remedy for delays in the performance of the subcontract or purchase order caused by events beyond its control, including delays claimed to be caused by Owner or attributable to Owner and including claims based on breach of contract or negligence, shall be an extension of its contract time.

31.6.2 In the event of a change in the work, the Subcontractor's claim for adjustments in the contract sum are limited exclusively to its actual costs for such changes plus no more than 10% for overhead and profit.

31.6.3 The subcontract or purchase order, as applicable, shall require the Subcontractor to expressly agree that the foregoing constitute its sole and exclusive remedies for delays and changes in the Work and thus eliminate any other remedies for claim for increase in the contract price, damages, losses or additional compensation. Further, Design Builder shall require all Subcontractors to similarly incorporate the terms of this Section 31.6 into their sub-subcontracts and purchase orders.

31.7 Each subcontract and purchase order shall require that any claims by Subcontractor for delay or additional cost must be submitted to Design Builder within the time and in the manner in which Design Builder must submit such claims to Owner, and that failure to comply with such conditions for giving notice and submitting claims shall result in the waiver of such claims.

32. DESIGN BUILDER RESPONSIBILITIES.

Design Builder shall provide the following review and commentary services, in addition to any other Work required by the terms of this Contract:

32.1 Allowances. The Lump Sum Price may include Allowances with respect to the Work, as established in the Lump Sum Amendment. Design Builder may expend Allowance money (up to the amount designated) only with the express prior written approval of Owner.

32.2 Responsibility for Work. Notwithstanding any requirements herein for Owner's review, inspection, consent or approval, the parties acknowledge and agree that Design Builder shall be solely responsible and liable for the proper performance of the Work as provided for herein.

32.3 Notices and Compliance with Law. Design Builder shall be responsible for giving all notices and for complying with all laws, ordinances, rules, regulations and lawful orders of any public authorities having jurisdiction over the particular portion of the Project with respect to the performance of the subject Work. The Master Project Schedule for the subject Work and the Lump Sum Price associated therewith shall be based upon the laws, ordinances and regulations which are then in effect on the date the Lump Sum Amendment is executed. Any changes in laws, ordinances or regulations thereafter that require additional work outside Design Builder's established scope shall be the subject of a Change Order as provided in section 14.1 of these General Terms and Conditions.

32.4 Indemnification for Infringement. Design Builder shall pay all royalty and license fees required for the design and construction of any portion of the Project assigned to it. To the maximum extent permitted by law, Design Builder shall defend any and all suits or claims for infringement of patent rights and shall indemnify and save Owner harmless from all loss or expense on account thereof (including attorneys' and paralegals' fees).

32.5 Review, Recommendations and Warranty: Design Builder shall familiarize itself thoroughly with the evolving architectural, civil, mechanical, plumbing, electrical and structural plans and specifications being prepared by its Design Professionals and shall follow the development of the Project design through all required design sub-phases in Phase 1. Design Builder shall make recommendations with respect to the selection of systems and materials, and cost-reducing alternatives including assistance to Owner in evaluating alternative comparisons versus long term cost effects. The evaluation shall address the benefits of the speed of erection and early completion of the Work. Design Builder shall furnish pertinent information as to the availability of materials and labor that will be required. Design Builder shall submit to Owner such comments as may be appropriate concerning construction feasibility and practicality. Design Builder shall call to Owner's attention any defects in the design, drawings and specifications or other documents of which it is aware. Design Builder shall prepare estimates of the construction cost utilizing the unit quantity survey method in the CSI format. These estimates shall be performed at the completion of the Program Verification Phase and shall be called the Program Estimate, followed by a Schematic Design Estimate, which shall be followed by the Design Development Estimate, which shall be followed by a 50% Construction Document Estimate, which shall be followed by the setting of the Lump Sum Price.

32.6 Review Reports: Within ten (10) days after receiving the documents produced by its Design Professionals, Design Builder shall perform a specific review thereof, focused upon factors of a nature encompassed in Paragraph 34.5 above and on factors set out in Paragraphs 34.7 and 34.8 below. Within the same ten (10) day period, Design Builder shall submit to Owner a written report covering suggestions or recommendations previously submitted, additional suggestions or recommendations as Design Builder may deem appropriate, and all actions taken by Design Builder with respect to same, any comments Design Builder may deem to be appropriate with respect to separating the Work into separate subcontracts, alternative materials, and any other appropriate or required comments.

32.7 AT THE TIME THE LUMP SUM PRICE IS MUTUALLY ESTABLISHED, EXCEPT ONLY AS TO SPECIFIC MATTERS AS MAY BE IDENTIFIED IN THE LUMP SUM AMENDMENT, THE DESIGN BUILDER SHALL BE DEEMED TO HAVE WARRANTED TO OWNER, THAT THE CONSTRUCTION DOCUMENTS ARE CONSISTENT WITH EACH OTHER, PRACTICAL, FEASIBLE AND CONSTRUCTABLE FOR THE CONTRACT AMOUNT. FURTHER, THE DESIGN BUILDER SHALL BE DEEMED TO HAVE WARRANTED TO OWNER THAT THE WORK DESCRIBED IN THE CONSTRUCTION DOCUMENTS IS CONSTRUCTABLE WITHIN THE CONTRACT TIME, AND THAT NO ADDITIONAL SITE INVESTIGATION IS NECESSARY OR DESIRED BY DESIGN BUILDER.

32.8 Long Lead Procurement: Design Builder shall review the Project design for the purpose of identifying long lead procurement items (machinery, equipment, materials and supplies) and consult with the Project Manager concerning same. When each item is identified, Design Builder shall notify the subcontractors and Owner of the required procurement and schedule. Such information shall be included in the bid documents and made a part of all affected subcontracts. Design Builder shall keep itself informed of the progress of the respective subcontractors or suppliers, manufacturing or fabricating such items, and advise Owner of any problems or possible delays in delivery.

32.9 Interfacing:

32.9.1 Design Builder shall take such measures as are appropriate to provide that all construction requirements will be covered in the separate procurement of long lead items, the separate construction subcontractors and the general conditions items without duplication or overlap, and sequenced to maintain completion of all Work on schedule. Particular attention shall be given to provide that each bid package clearly identifies the Work included in that particular separate subcontract, its schedule for start and completion and its relationship to the other separate subcontractors.

32.9.2 Design Builder shall include in the reports required under Paragraph 32.6 above, comments on overlap with any other separate subcontracts, omissions, lack of correlation between drawings, and any other deficiencies noted, in order that Design Builder may arrange for necessary corrections.

33. OWNER'S RESPONSIBILITIES.

33.1 Design Criteria Package. Owner has provided Design Builder with the Design Criteria Package and will provide responses or clarification within a reasonable period of time to Design Builder's inquiries with respect to the Design Criteria Package.

33.2 Owner's Representative. Owner designates Andrew Pupke as Project Manager who shall be fully acquainted with the scope of the Work and authorized to act on Owner's behalf with respect to Design Builder's services for the Project. Provided, however, that Project Manager is not authorized to issue any orders or instructions to Design Builder that would have the effect, or be interpreted to have the effect, of modifying or changing in any way whatsoever the: (1) scope of services to be provided and performed by Design Builder hereunder; (2) the time Design Builder is obligated to commence and complete all such services; or (3) the amount of compensation Owner is obligated or committed to pay Design Builder. As set forth herein, Project Manager shall review and make appropriate recommendations on all requests submitted by Design Builder for payment for services and work provided and performed in accordance with this Agreement.

34. **MARKET ANALYSIS AND SOLICITATION OF BIDS.**

34.1 The purpose of this Paragraph is to insure that Design Builder makes a genuine effort to stimulate subcontractor interest in the Project and maximize participation of potential qualified subcontractors in the bidding process. At all times Owner shall have access to and the right to require copies of all correspondence, records, files and other bid documents (including all bid responses) with respect to the bidding process. Further, Design Builder shall notify Owner of the date, time and place of all bid openings and Owner shall have the right to attend any and all such bid openings. All bid openings shall be conducted in Pinellas County, Florida.

34.1.1 Design Builder shall monitor conditions in the construction market to identify factors that will or may affect costs and time for completing the Work; Design Builder shall make an analysis as necessary to (i) determine and report on availability of labor, materials, equipment, potential bidders, and possible impact of any shortages or surpluses of labor or material, and (ii) in light of such determination, make recommendations and take action as may be appropriate with respect to long lead procurement, separation of construction into bid packages, sequencing of Work, use of alternative materials, equipment or methods, other economics in design or construction, and other matters that will promote cost savings and completion within the Contract Time.

34.1.2 Within thirty (30) days after execution of this Contract, Design Builder shall submit a written "Construction Market Analysis and Prospective Bidders Report" setting out recommendations and providing information as to prospective bidders. As various bid packages are prepared for bidding, Design Builder shall submit to Owner a list of potential bidders for its review and approval. Design Builder shall be responsible for promoting and encouraging bid competition.

34.1.3 Design Builder shall carry out an active program of stimulating interest of qualified subcontractors in bidding on the Work and of familiarizing those bidders with the requirements of this Project.

34.2 Design Builder shall prepare invitations for bids and all other appropriate bid documents for all procurement of long lead items, materials and services, for subcontractor contracts and for site utilities. All such invitations for bids and bid packages shall be submitted to Owner for its review and approval prior to distribution to bidders.

34.2.1 Except as hereafter provided in Paragraph 34.3, all subcontracts are to be awarded to the lowest responsive and responsible bidder.

34.2.2 Design Builder shall establish the lump sum price through a competitive bid process. Design Builder shall obtain at least three bids, wherever possible, and shall provide all associated documentation to Owner within a reasonable time after receipt of Owner's written request.

34.3 Notwithstanding the provision above requiring award of subcontracts to the lowest responsive and responsible bidder, Design Builder may award subcontract(s) to someone other than the lowest responsive and responsible bidder provided Design Builder has first received Owner's express written consent to such award. Owner's consent to any such award will be at Owner's sole discretion. Whenever Design Builder wishes to award a subcontract to someone who is not the lowest responsive and responsible bidder, Design Builder must notify Owner in writing, setting out in detail the reasons and justifications for the suggested award.

34.4 To the extent that Design Builder desires to self-perform any portion of the Work, Design Builder shall obtain Owner's written approval and at least three (3) written sealed bids from subcontractors not affiliated with Design Builder.

35. SECURING AGREEMENT.

35.1 Design Builder warrants that Design Builder has not employed or retained any company or person, other than a bona fide employee working solely for Design Builder, to solicit or secure this Contract and that Design Builder has not paid or agreed to pay any person, company, corporation, individual or firm, other than a bona fide employee working solely for Design Builder, any fee, commission, percentage, gift or any other consideration contingent upon or resulting from the award or making of this Contract. At the time this Contract is executed, Design Builder shall sign and deliver to Owner the Truth-in-Negotiation Certificate attached hereto and made a part hereof as Exhibit R. The Design Builder's compensation shall be adjusted to exclude any sums by which Owner determines the compensation was increased due to inaccurate, incomplete, or non-current wage rates or other factual unit costs.

36. PUBLIC ENTITY CRIMES.

36.1 DESIGN BUILDER is directed to the Florida Public Entity Crime Act, Fla. Stat. 287.133, and Fla. Stat. 287.135 regarding Scrutinized Companies, and DESIGN BUILDER agrees that its bid and, if awarded, its performance of the agreement will comply with all applicable laws including those referenced herein. DESIGN BUILDER represents and certifies that DESIGN BUILDER is and will at all times remain eligible to bid for and perform the services subject to the requirements of these, and other applicable, laws. DESIGN BUILDER agrees that any contract awarded to DESIGN BULDER will be subject to termination by the County if DESIGN BUILDER fails to comply or to maintain such compliance.

37. PUBLIC RECORDS.

37.1 Contractor acknowledges that information and data it manages as part of the services may be public records in accordance with Chapter 119, Florida Statutes and Pinellas County public records policies. Contractor agrees that prior to providing services it will implement policies and procedures to maintain, produce, secure, and retain public records in accordance with applicable laws, regulations, and County policies, including but not limited to the Section 119.0701, Florida Statutes. Notwithstanding any other provision of this Agreement relating to compensation, the Contractor agrees to charge the County, and/or any third parties requesting public records only such fees allowed by Section 119.07, Florida Statutes, and County policy for locating and producing public records during the term of this Agreement.

37.2 **If the contractor has questions regarding the application of Chapter 119, Florida Statutes, to the Contractor's duty to provide public records relating to this contract, contact the Pinellas County Board of County Commissioners, Purchasing Department, Operations Manager custodian of public records at 727-464-3311, purchase@pinellascounty.org, Pinellas County Government, Purchasing Department, Operations Manager, 400 S. Ft. Harrison Ave, 6th Floor, Clearwater, FL 33756**.

EXHIBIT I
SUPPLEMENTAL TERMS AND CONDITIONS

The following Supplemental Terms and Conditions hereby amend, modify and supersede in the event of a conflict the terms of the Agreement and the General Terms and Conditions attached thereto as Exhibit H.

A. Reports

1. Monthly Summary Reports:

1.1 The Design Builder shall prepare monthly written reports as described hereunder. All reports shall be in 8 1/2" x 11" format.

1.2 The Reports shall include the following:

1.2.1. A Monthly Executive Summary which provides an overview of current issues and pending decisions, future developments and expected achievements, and any problems or delays, including code violations found by any permitting authority.

1.2.2. A Monthly Scheduling Report summarizing the current status of the overall Master Project Schedule and an explanation of all variances from the plan. This report shall include an analysis of the various Project sub-schedules, a description of the critical path, and other analyses as necessary to compare planned performance with actual performance.

1.2.3. A Monthly Design and Construction Progress Report during the Phase 1 and Phase 2 summarizing the Work of the various subconsultants and subcontractors. Once construction at the site commences, this report shall include information from the weekly job site meetings as applicable such as general conditions, long lead supplies, current deliveries, safety and labor relations, programs, permits, construction problems and recommendations, and plans for the succeeding month.

1.3. The Reports outlined in subparagraphs 1.2.1 through 1.2.3 above shall be bound with applicable computer schedule reports and submitted monthly during Phase 1 and Phase 2 and shall be current through the end of the preceding month. Copies shall be delivered to the Owner. A bound copy of the complete diary shall be submitted to the Owner at the conclusion of the Project. An electronic pdf file of each Progress Report shall be delivered to the Owner's Representative each month.

2. Schedule Control Subsystem.

2.1. Master Project Schedule: Prior to the submittal of its first Application for Payment, the Design Builder shall submit to the Owner for its review and approval a Master Project Schedule covering the planning and design approvals, construction, and Owner occupancy of the Project. This schedule shall conform to the format outlined in Paragraph 2.3 below. This schedule shall serve as the framework for the subsequent development of all detailed schedules and shall be updated monthly by the Design Builder throughout the Project. Within fifteen (15) calendar days of the Design Builder's submittal, the Owner shall review the schedule and provide the Design Builder a written list of corrections needed to approve the schedule. The Design Builder must make all corrections and resolve all comments within thirty (30) calendar days after its receipt of Owner's comments. If the schedule is not approved within said thirty (30) calendar days, the Owner will withhold all Contract payments until the schedule is approved. The acceptance of the schedule by the Owner in no way attests to the validity of the assumptions, logic constraints, dependency relationships, resource allocations, manpower and equipment, and any other aspect of the proposed schedule. The Design Builder is and shall remain solely responsible for the planning and execution of all Work in order to meet Project milestones or Contract completion dates.

2.2. Construction Schedule: The Design Builder shall prepare and submit to the Owner, for its review and approval, a Construction Schedule. This schedule shall conform to the format outlined in Paragraph 2.3 below. The approved Construction Schedule shall be attached to the Lump Sum Amendment. The Construction Schedule shall be integrated into the Master Project Schedule.

2.2.1. Following development and approval of the Construction Schedule as aforesaid, the Design Builder shall, at the end of each calendar month occurring thereafter during the period of time required to finally complete the Project, or at such earlier intervals as circumstances may require, update and/or revise the Construction Schedule which shall be submitted to the Owner in duplicate. No additional compensation will be due the Design Builder for making such updates. Failure of the Design Builder to update, revise, and submit the Construction Schedule as aforesaid shall be sufficient grounds for the Owner to find the Design Builder in substantial default hereunder and that sufficient cause exists to terminate the Contract or to withhold payment to the Design Builder until a schedule or schedule update acceptable to the Owner is submitted.

2.3. Schedule Format: The Master Project Schedule and the Construction Schedule shall be planned and recorded with a Critical Path Method (CPM) schedule in the form of an activity-on-node diagram. All activity-on-node diagrams shall include the Activity Identification, Activity Description, and the type of relationship between activities, including any lead or lag time.

2.4. Recovery Schedule: If the initial schedule or any current updates fail to reflect the Work's actual plan or method of operation, or a contractual milestone date is more than fifteen (15) days behind, the Owner may require that a recovery schedule for completion of the remaining Work be submitted. The Recovery Schedule must be submitted within seven (7) calendar days of the Owner's request. The Recovery Schedule shall describe in detail the Design Builder's plan to complete the remaining Work by the required Contract milestone date. The Recovery Schedule submitted shall meet the same requirements as the original Construction Schedule. The narrative submitted with the Recovery Schedule should describe in detail all changes that have been made to meet the Contract milestone dates.

2.5. Change Orders: When a Change Order is proposed, the Design Builder must identify all logic changes as a result of the Change Order. The Design Builder shall include, as part of each Change Order proposal, a sketch showing all schedule logic revisions, duration changes, and the relationships to other activities in the approved Construction Schedule. This sketch shall be known as the fragnet for the change. Upon acceptance of the fragnet, the Design Builder will revise the Construction Schedule or current update. The logic changes required by the Change Order will be considered incidental to the Design Builder's work. No separate payment will be made.

B. PROGRESS PAYMENTS

1. Retainage:

1.1 The five percent (5%) retainage referenced in Section 4.6 of the General Conditions shall not be applied to this Project during Phase 1.

B. CONTINGENCY

1. Owner Controlled:

1.1 Contingency funds are owner controlled and may not be expended without prior written approval from the Owner.

D. LIFT STATION DESIGN

1. Statement of Responsibility:

1.1 Pinellas County, Florida will/has hired Tetra Tech, Inc. as the Engineer of Record for the design of the Lift Station. Tetra Tech, Inc. will be responsible for any changes in design for the duration of the Project, including Phase 1 and Phase 2. Wharton-Smith, Inc. will be responsible for reviewing the design criteria package related to the current design of the Lift Station and identify aspects of the design that do not meet the County's current pump station standards. Deficiencies will be documented and provided to Pinellas County, Florida. Wharton-Smith, Inc. will not be responsible for any structural design and process design for the Lift Station. Pinellas County, Florida warrants the sufficiency of the intent of Tetra Tech, Inc.'s plans. Furthermore, Pinellas County, Florida agrees Wharton-Smith, Inc. shall be able to rely on the accuracy of any and all information provided to it by the Owner and/or Tetra Tech, Inc.

EXHIBIT J

DESIGN CRITERIA PACKAGE

Attachment A – Design Criteria Package (includes 100% Pump Station 079 Plans and Specifications)

EXHIBIT K

PERMITS

PERMIT INDEX

AGENCY	PERMIT NO.	PAGE NO. (s)
North Redington Beach (Florida Municipal Services)	TBD	
Southwest Florida Water Management District	TBD	
Florida Department of Environmental Protection	TBD	

SUCCESSFUL CONTRACTOR IS RESPONSIBLE FOR ALL OTHER PERMITS NOT PROVIDED HEREIN BY THE COUNTY.

EXHIBIT L
PHASE 1 AND PHASE 2 PROJECT DESIGN MILESTONES AND DELIVERABLES

I. Phase 1
Project Design Milestones and Deliverables (Fire Station)

Programming Services 4 Weeks

Submittals:

- Presentation of results of user interviews and building program update
- Building functions and unique activities
- Identify and describe space requirements for each room/function and their associated adjacencies
- General description outlining site, structural, mechanical, plumbing, electrical and specialty requirements
- Identification of all facilities to be served by chilled water piping distribution
- Statement of Constructability to include analysis of costs, materials selections and cost options

Project Schedule: Updated Project Schedule

Project Cost Estimate: Estimate Summary and Cost Options

Schematic Design – _8 Weeks

Drawings: Three (3) Preliminary Conceptual Design Plans

Architectural	Life Safety Plan(s) Floor Plan(s) Exterior Elevations (min of 4) Building Sections
Civil	Site Plan indicating proposed building location and site improvements Site Plans single-line drawings indicating piping distribution layout to all proposed facilities to be served.
HVAC	Floor Plan(s) single-line drawings indicating locations of all major equipment, air distributions and devices, piping runs/chases, control zones, preliminary equipment schedule and power requirements
Plumbing	Floor Plan(s) single-line drawings indicating fixture locations, piping routes and sizes, equipment schedule and cut sheets
Electrical	Floor Plan(s) indicating location and sizes of electrical, telephone/data and specialty equipment Preliminary systems diagrams

Project Schedule: Updated Project Schedule

Project Cost Estimate: Estimate Summary and Cost Options

Design Development: 8 Weeks

Drawings:

Architectural	Life Safety Plan(s) Site Plan
Floor Plan(s)	Exterior Elevations Building Sections and Details Roof Plan Reflected Ceiling Plan Interior Elevations

Schedules – Room Finish, Door, Window, Hardware, & Equipment/Fixture

Civil	Location Plan Existing Site Plan Site Plan Grading and Drainage Plan Utilities Plan Site Plans - piping distribution layout to all proposed facilities to be served.
Structural	Foundation Plan Framing Plans Elevations Exterior Elevations Sections and Details
HVAC	Floor Plan(s) single-line drawings indicating locations of all equipment, air distributions, devices, air quantities for each room piping runs/chases and control zones Equipment Schedules
Plumbing	Floor Plan(s) single-line drawings indicating fixture locations, piping routes and sizes Fixture Schedules Riser Diagrams
Electrical	Floor Plan(s) indicating location and sizes of electrical, telephone/data and specialty equipment Site Plan indicating existing and proposed underground routing and structures Lighting Plan Power Plan Specialty Area Layout/Plan Telephone/Data Plan Systems Riser Diagrams Equipment and Fixture Schedules
Specifications:	Outline specifications in CSI Format of only those materials and equipment used in the Project
Submittals:	Cut sheets of all proposed equipment and materials that will be the basis for design including a description of the conceptual approach to all major engineering systems
Design Calculations	(references, codes and design data used)
Project Schedule:	Updated Project Schedule
Project Cost Estimate:	Estimate Summary and Cost Options

Construction Documents (50% Completion) – **12 Weeks**

Drawings:

Architectural	Cover Sheet indicating name of projects, list of drawings, location map, County logo, County Project Number, Design/Builder and Design Professional(s) name, address and telephone number Life Safety Plan(s)
Site Plan	
	Floor Plan(s) Enlarged Floor Plans Exterior Elevations Building Sections and Details Roof Plan Reflected Ceiling Plan Interior Elevations Schedules – Room Finish, Door, Window, Hardware, & Equipment/Fixture

Civil Location Plan	Existing Site and Demolition Plan Site Plan with all layout dimensions and elevations Grading and Storm Drainage Plan Utilities Plan Site Plans - piping distribution layout to all proposed facilities to be served.
Structural	Foundation Plan Framing Plans Elevations Exterior Elevations Sections and Details Schedules
HVAC	Floor Plan(s) double-line drawings indicating locations of all equipment, air distributions, devices, air quantities for each room, piping runs and chases Control Diagrams, sequence of operations, control point list and control system electrical requirements Equipment Schedules
Plumbing	Floor Plan(s) single-line drawings indicating fixture locations, piping Routes and sizes Riser & Isometric Diagrams Fixture Schedules
Electrical	Floor Plans indicating location and sizes of electrical, telephone/data and specialty equipment Lighting Plan Power Plan Specialty Area Layout/Plan Telephone/Data Plan Systems Riser Diagrams Equipment and Fixture Schedules
Specifications:	Complete specifications in CSI Format of only those materials and equipment used in the Project

Lump Sum Cost Estimate – **6 Weeks**

Design Build Proposal – **6 Weeks**

Project Schedule: Updated Project Schedule

Project Cost Statement: Final Project Cost Statement

EXHIBIT L
PHASE 1 AND PHASE 2 PROJECT DESIGN MILESTONES AND DELIVERABLES

II. Phase 1
Project Design Milestones and Deliverables (Lift Station)

*****Programming Services 5 Weeks**

Submittals:
- Written evaluation of design criteria, including recommendations for different and/or innovative approaches
- Statement of Constructability, including analysis of costs, material selections and cost options

Project Schedule: Updated Project Schedule

Project Cost Estimate: Estimate Summary and Cost Options

Schematic Design:
Omitted per Pinellas County direction

*****Design Development: 5 Weeks**

Submittals:
- Written evaluation of updated design, including recommendations for different and/or innovative approaches
- Statement of Constructability, including analysis of costs, material selections and cost options

Project Schedule: Updated Project Schedule

Project Cost Estimate: Estimate Summary and Cost Options

*****Construction Documents – 6 Weeks**

Submittals:
- Written evaluation of updated design, including recommendations for different and/or innovative approaches
- Statement of Constructability, including analysis of costs, material selections and cost options

Project Cost Estimate: Final Project Cost Statement

Lump Sum Cost Estimate: 5 Weeks

Design Build (DB) Proposal: 5 Weeks

Project Schedule: Updated Project Schedule

*****For each of the tasks notated above, Wharton-Smith, Inc. will only provide design and cost reviews along with conceptual cost estimates for the Tetra Tech, Inc Design Documents.**

II. Phase 2
Project Design Milestones and Deliverables

Construction Documents (100% Completion)

Drawings:

Architectural	Cover Sheet indicating name of projects, list of drawings, location map, County logo, County Project Number, Design/Builder and Design Professional(s) name, address and telephone number Life Safety Plan(s) Site Plan Floor Plan(s) Enlarged Floor Plans Exterior Elevations Building Sections and Details Roof Plan Reflected Ceiling Plan(s) Interior Elevations Schedules – Room Finish, Door, Window, Hardware, & Equipment /Fixture
Civil	Location Plan Existing Site Plan Site Plan with layout dimensions and elevations Grading and Drainage Plan Utilities Plan Sections & Details Site Plans - piping distribution layout to all proposed facilities to be served.
Structural	Foundation Plan Framing Plans Elevations Exterior Elevations Sections and Details Schedules
HVAC	Floor Plan(s) double-line drawings indicating locations of all equipment, air distributions, devices, air quantities for each room, piping runs and chases Control Diagrams, sequence of operations, control point list and control system electrical requirements Equipment Schedules Enlarged Plans and Details
Plumbing	Floor Plan(s) single-line drawings indicating fixture locations, piping Routes and sizes Riser & Isometric Diagrams Fixture Schedules Enlarged Plans and Details
Electrical	Floor Plans indicating location and sizes of electrical, telephone/data and specialty equipment. Site Plan indicating existing and proposed underground routing and structures. Lighting Plan Power Plan Specialty Area Layout/Plan Telephone/Data Plan Systems Riser Diagrams Equipment and Fixture Schedules Enlarged Plans and Details
Specifications:	Complete specifications in CSI Format of only those materials and equipment used in the Project
Project Schedule:	Updated Project Schedule

III. DESIGN SERVICE REQUIREMENTS AS TO PHASE 1 AND PHASE 2

1.1. Design Builder's design documents shall be consistent with the Final Program at all phases of design unless expressly authorized otherwise in writing by Owner.

1.2. Design Builder shall submit to Owner design notes and computations to document the design conclusions reached during the development of the Project design as requested by Owner.

1.2.1. The design notes and calculations shall include, but not be limited to, the following data:

1.2.1.1 Design criteria used for the Project;
1.2.1.2 Lighting calculations;
1.2.1.3 Structural calculations;
1.2.1.4 Drainage calculations;
1.2.1.5 Acoustical calculations;
1.2.1.6 HVAC calculations;
1.2.1.7 Security and communications calculations;
1.2.1.8 Calculations as required by provisions of the Florida Energy Conservation Standards Act (Department of Community Affairs), latest revision;
1.2.1.9 Thermal Efficiency Standards (Florida Energy Efficiency Code for Building Construction, Department of Community Affairs, F.S. 552.900)
1.2.1.10. Life Cycle Costs (Florida Administrative Code and F.S. 235.26)
1.2.1.11 Calculations showing probable cost comparisons of various alternatives considered;
1.2.1.12 Documentation of decisions reached resulting from meetings, telephone conversations or site visits; and
1.2.1.13 Other Project related correspondence as appropriate.

1.3 All drawing documents for the Project shall be accurate, legible, complete in design, suitable for bidding purposes and in conformance to Owner's design guidelines. Documents shall be furnished in accordance with the Design Schedule.

1.4. Owner in no way obligates itself to check Design Builder's work, and further, is not responsible for maintaining the Design Schedule.

1.5. Owner's approval or acceptance of any service in any phase does not relieve Design Builder of any of its duties, obligations or responsibilities under the Agreement.

1.6. Design Builder will establish a Project budget with the Owner during Phase1. Once the budget has been established and agreed to by both the Owner and Design Builder, Design Builder will continue to maintain same through the end of Phase 1. The final lump sum price included in the proposal at the end of Phase 1 will be at or lower than the budget established in the earlier stages of Phase 1. Design Builder warrants that all professional services to be provided by it under the Agreement shall be in accordance with the terms and conditions set forth in the Agreement and the design of the Project shall be accomplished so that the total Project cost to Owner does not exceed the above noted Owner's budget. Notwithstanding anything herein to the contrary, Design Builder shall revise and modify the Construction Documents and rebid the Work at no additional cost to Owner, if subcontract bids from responsive and responsible bidders exceed Owner's Project budget, as said budget may be modified by Owner, as provided for herein. All such revisions and modifications of the Construction Documents shall be subject to the review and approval of Owner.

EXHIBIT M

DESIGN PROFESSIONAL, ENGINEERS, & CONTRACTOR

Fire Station

Contractor:	Wharton-Smith, Inc. Tampa, FL
General Contractor:	Wharton-Smith, Inc. Tampa, FL
Mechanical Contractor:	Wharton-Smith, Inc. Tampa, FL
Design Manager:	Wilder Architecture, Inc. Tampa, FL
Design Professional:	Wilder Architecture, Inc. Tampa, FL
Civil & Environmental Engineer:	Kimley-Horn and Associates St. Petersburg, FL
Structural Engineer:	Wilder Architecture, Inc. Tampa, FL
Mechanical, Electrical, Plumbing: & Fire Protection:	Wilder Architecture, Inc. Tampa, FL

EXHIBIT M

DESIGN PROFESSIONAL, ENGINEERS, & CONTRACTOR

Lift Station

Contractor:	Wharton-Smith, Inc. Tampa, FL
General Contractor:	Wharton-Smith, Inc. Tampa, FL
Mechanical Contractor:	Wharton-Smith, Inc. Tampa, FL
Design Review:	Kimley-Horn and Associates St. Petersburg, FL

EXHIBIT N

LUMP SUM AMENDMENT AGREEMENT FORM

Pursuant to Sections 3B and 5A of the Design Build Agreement, dated _____, between Pinellas County, Florida ("Owner") and "Design Builder"), for the design and construction of the ("Project"), Owner and Design Builder establish the Lump Sum Price and Contract Time for all the Work as set forth below:

ARTICLE 1

SCOPE OF WORK

The scope of the Work consists of the design and construction of the Project in accordance with the Agreement, this Amendment and other Contract Documents listed as Attachments 1 though 6 below, which are hereby incorporated into and made a part of the Amendment by this reference:

Attachment Number	Description	Pages	Dated
1.	List of Drawings and Specifications	____through ____	_____
2.	Schedule of Values	____through ____	_____
3.	Clarifications,& Exclusions	____through ____	_____
4.	Completion Schedule	____through ____	_____
5.	List of Subcontractors and Major Suppliers	____through ____	_____
6.	Allowances	____through ____	_____

DIRECT PURCHASES

The Owner, at its sole discretion, may elect to directly purchase materials and/or equipment included in the Guaranteed Maximum Price in order to take advantage of tax savings. Should the Owner elect to purchase materials and/or equipment directly, the general procedure shall be as follows:

1. All subcontracts shall be competitively bid by the Design Builder as outlined in other sections of this Agreement.

2. Each selected subcontractor shall submit a documented list of materials and/or equipment in the scope of its work in excess of $15,000 along with the amount of sales tax applicable to such material and/or equipment.

3. The Design Builder shall forward these lists to the Owner, and the Owner shall obtain a purchase order for each item.

4. Once purchase orders have been obtained by the Owner for direct payment of these items, the Design Builder shall remove their direct cost from the schedule of Values accompanying its monthly pay applications. Tax savings realized from the Owner's direct purchase of each item, shall be transferred in the Schedule of Values to the line item for the Owner's Contingency. No retainage will be held on Direct Purchase material.

5. The Design Builder will order the materials as approved by the Owner (County Project Manager).

6. Invoices will be delivered directly to the Design Builder.

7. The Design Builder and the Owner will sign off on the packing slips to ensure materials ordered were received.

8. Design Builder will match the invoices to the packing slips and submit to the Owner (Pinellas County's Finance Department) via email to ClerkFinanceDivisionFixedAssets@co.pinellas.fl.us to ensure the vendor/subcontractor is paid timely. The invoices must be received in a timely manner in order to comply with Section 218.735, *Florida Statutes* "Local Government Prompt Payment Act". Design Builder should date and time stamp all direct purchases invoices.

ARTICLE 2

LUMP SUM PRICE

2.1 The Lump Sum Price for the Work, as defined in Section 3B of the Agreement, is _____ Dollars ($_____).

2.2 Monthly installment payment of the Lump Sum Price shall be based upon the percent completion of the designated portion of the Work for each particular month.

2.3 In order to efficiently and timely address certain Change Order situations that may arise during Phase 2, the parties have agreed to establish an Owner controlled contingency within the Lump Sum Price in the amount of _____ ($_____) ("Owner's Contingency"). The Design Builder acknowledges and agrees that any change work which is to be charged against the Owner's Contingency must be approved in advance in a Change Order or Construction Change Directive signed by _____. The Owner reserves the right, at its sole discretion, to withhold its consent on Owner's Contingency expenditures. Unused Owner's Contingency remaining at Substantial Completion will be deducted from the Lump Sum Price. Design Builder has no entitlement to any portion of any unused Owner's Contingency.

2.4 If the parties agree to establish Allowances within the Lump Sum Price, said Allowances items and amounts will be identified in Attachment 6. Design Builder shall not proceed with any portion of the Work associated with the aforesaid Allowances ("Allowance Work") without first obtaining Owner's express written authorization to proceed with said Allowance Work.

2.5 Design Builder recognizes that this Contract includes work for trench excavation in excess of five feet deep. Design Builder acknowledges the requirements set forth in Section 553.63 of the Florida Statutes titled Trench Safety Act. Design Builder certifies that the required trench safety standards will be in effect during the period of construction of the Project and Design Builder agrees to comply with all such required trench safety standards.

2.5.1 The amount of _____ dollars ($_____) has been separately identified in Attachment 2, Schedule of Values, for the cost of compliance with the required trench safety standards; said amount is included within the Lump Sum Price.

ARTICLE 3

CONTRACT TIME

3.1 The Phase 2 Commencement Date for the Work is _____. The total period of time beginning with the Phase 2 Commencement Date through the date required for Substantial Completion of the Work is _____ days ("Contract Time"). THE SUBSTANTIAL COMPLETION DATE IS THEREFORE ESTABLISHED AS _____.

3.2 Pursuant to this Agreement, the parties have established a liquidated damage rate for reasons stated therein, which the parties acknowledge and agree apply to this Amendment and Design Builder's responsibility to complete the Work within the Contract Time as stated herein. Accordingly, the liquidated damage rate established in this Agreement shall be assessed from Design Builder for each calendar day Design Builder fails to achieve Substantial Completion for the Designated Work within the Contract Time.

ARTICLE 4

MISCELLANEOUS

4.1 Except as expressly modified herein, the terms and conditions of the Agreement remain unchanged. In the event of a conflict between the terms of this Amendment and those of the Agreement, Owner and Design Builder agree that the terms of this Amendment shall prevail and control.

Owner	Design Builder
By: _____	By: _____
Print Name: _____	Print Name: _____
Its: _____	Its: _____
Date: _____	Date: _____

Attachment 1
List of Drawings, Specifications, and Addendums

(See Attached)

Attachment 2
Schedule of Values

(See Attached)

Attachment 3

Assumptions, Clarifications, & Exclusions

(See Attached)

Attachment 4

Completion Schedule

(See Attached)

Attachment 5
List of Subcontractors and Major Suppliers

(See Attached)

Attachment 6
Allowances

(See Attached)

EXHIBIT O

SCOPE OF SERVICES

SCOPE OF PHASE 1 SERVICES

1. DESCRIPTION OF PROJECT:

1.1. This Project is located at a one (1) acre m.o.l. parcel at 173rd Avenue East in North Redington Beach, Florida.

1.2. This Project consists of the design and construction of a Fire Station and Sewer Lift Station.

2. PROGRAM VERIFICATION:

2.1. Design Services: Design Builder shall, consistent with applicable state licensing laws, provide design services, including architectural, engineering and other design professional services, required by this Agreement. Such design services shall be provided through qualified, licensed design professionals who are either (i) employed by Design Builder, or (ii) procured by Design Builder from independent sources. Nothing in this Agreement is intended to create any legal or contractual relationship between Owner and any independent design professional.

2.2 Owner shall provide Design Builder with Owner's Project Criteria describing Owner's program requirements and objectives for the Project. Owner's Project Criteria shall include Owner's use, space, price, time, site, performance and expandability requirements. Owner's Project Criteria may include conceptual documents, design criteria, performance requirements and other technical materials and requirements prepared by or for Owner. Design Builder shall review and prepare a written evaluation of such criteria, including recommendations to Owner for different and innovative approaches to the design and construction of the Project. The parties shall meet to discuss Design Builder's written evaluation of Owner's Project Criteria. Design Builder shall continue at Owner's direction until a detailed Final Program has been completed and has been approved by the Owner.

2.3 Design Builder shall review the Owner's budget and any applicable cost estimates as compared to the Owner's Design Criteria Package and the Final Program. The Design Builder shall confirm in writing to the Owner whether the Project can be designed and successfully constructed within the limits of the Owner's budget and program constraints.

2.4 Design Builder shall submit a presentation of results of user interviews and building program update, including the following: description of building functions and unique activities

3. SCHEMATIC DESIGN:

3.1. Design Builder shall prepare three (3) Preliminary Conceptual Design Plans. The Schematic Design Documents will be based upon the Final Program. The Schematic Design Documents shall include design criteria, drawings, diagrams and specifications setting forth the requirements of the Project. The parties shall meet to discuss the Schematic Design Documents and agree upon what revisions, if any, should be made. Owner shall have final approval of such revisions, and Design Builder shall perform such revisions. Design Builder shall meet with Owner during Schematic Design as often as required until a Final Schematic Design has been completed and has been approved by the Owner. Design Builder shall certify that the Final Schematic Design totally complies with the Final Program except for such deviations that expressly have been brought to the Owner's attention and approved by Owner in writing. Design Builder shall prepare and include a statement with comments concerning constructability of the project and a cost estimate for construction in the Final Schematic Design.

3.2 Owner's acceptance of Schematic Design Documents in no way relieves Design Builder of its obligation to deliver complete and accurate documents necessary for successful construction of this Project.

3.3. Design Builder shall work with the Project Manager and other Users of the Project to meet design requirements and identify the areas within the facility design which offer the greatest potential for the elimination of unnecessary costs. The requirements of the Final Program shall not be eliminated as value engineering items, except with the Owner's express written approval.

3.4. Design Builder shall conduct a pre-submittal document review meeting with the Owner's Project Manager prior to submission of the Schematic Design Documents. Design Builder shall be required to conduct at least one formal presentation at completion of this phase to demonstrate how Owner's previously submitted comments have been incorporated into the design documents.

3.5 All Schematic Design Documents prepared by or for Design Builder are subject to Owner's review and approval. At completion of the Schematic Phase 1, Design Builder shall submit the Schematic Design Documents to the Project Manager for review and comment. Design Builder shall respond in writing to the review comments within 14 calendar days of receipt. Responses shall be forwarded directly to the Owner's Project Manager who will respond within 14 days of receipt. Design Builder shall revise the Schematic Design Documents as required by Owner in order to obtain Owner's written approval and authorization to proceed to the Design Development Phase.

3.6 As part of Phase 1 Services, Design Builder will be required to provide Owner with a cost estimate as part of the Schematic Design Documents, together with a written explanation for all variances between that cost estimate and Owner's approved Project budget. The cost estimate format shall be subject to Owner's approval and may require electronic submission of cost estimate information. If Design Builder's cost estimate or any other estimate prepared by or for Owner based upon the Schematic Design Documents indicate that costs will exceed Owner's approved Project budget, Design Builder shall revise the Schematic Design Documents to bring them within Owner's approved Project budget. Design Builder shall be solely responsible for all costs and expenses which it may incur in revising the Schematic Design Documents to bring them within Owner's approved Project budget. Design Builder shall also provide Owner with an updated Project Schedule.

4. DESIGN DEVELOPMENT PHASE:

After Owner's review and approval of the Schematic Design Documents and issuance of Owner's written authorization to proceed, Design Builder shall commence the Design Development services and perform the following:

4.1. Design Builder shall prepare Design Development Documents based on the final Schematic Design as approved by the Owner in Section 3 hereof. Design Development Documents shall further develop Schematic Design to a level of definitiveness and detail to fix and describe the size and character of the various Project components and each Project discipline and system as may be appropriate for this state of development including long lead and special order materials and equipment, which will permit determination of whether the facility can be satisfactorily constructed in all task areas by all disciplines.

4.2 Design Builder shall continue developing the civil, architectural, structural, mechanical, electrical, security, plumbing, and other discipline's responsibilities to establish a final scope and details for that discipline's work.

4.3 Design Builder shall perform materials research and prepare specifications specific to project requirements in draft form.

4.4 Design Builder shall identify and properly coordinate the requirements of the various utility services that have an impact upon the project design. Drainage investigations and drainage designs shall be coordinated with storm water management district having jurisdiction on the site.

4.5 Design Builder shall evaluate alternative ideas in terms of their feasibility to construct, time, and cost. Design Builder shall work with the Owner's Project Manager and other users of the Project to meet design requirements and identify the areas within the facility design, which offer the greatest potential for the elimination of unnecessary costs.

4.6 The parties shall meet to discuss the Design Development Documents and agree upon what revisions, if any, should be made. Design Builder shall perform such agreed-upon revisions. Design Builder shall meet with Owner during Design Development as often as required until a final set of Design Development Document have been completed by Design Builder and approved by Owner. Design Builder shall prepare and include a statement with comments concerning constructability of the Project and a Project cost estimate, all based upon the final set of Owner approved Design Development documents.

4.7 Design Builder will develop selected alternative ideas in detail with emphasis on their technical durability, constructability and life cycle cost.

4.8 Design Builder's final Design Development Documents submittal and presentation shall include, but not be limited to, the requirements found in the Final Program, except to the extent such requirements have been expressly waived by Owner in writing. Design Builder shall certify that the final approval of Design Development Documents fully comply with the Final Program except for such deviations that have been expressly approved in writing by Owner.

4.9 Design Builder shall conduct a pre-submittal document review meeting with the Owner's Project Manager prior to submission of the Design Development Documents. Design Builder, may be required, to conduct at least one presentation at completion of this phase to demonstrate how Owner's previously submitted comments were incorporated into the design documents.

4.10. All Design Development Documents prepared by or for Design Builder are subject to Owner's review and approval. At completion of the Design Development Phase, Design Builder shall submit the Design Development Documents to the Project Manager for review and comment. Design Builder shall respond in writing to the review comments within 14 calendar days of receipt. Responses shall be forwarded directly to the Owner's Project Manager who will respond within 14 days. Design Builder shall revise the Design Development Documents as required by Owner in order to obtain Owner's written approval and authorization to proceed to the Construction Documents Phase.

4.12. As part of Phase 1 Services, Design Builder will be required to further develop and update the cost estimate as part of the Design Development Documents and bring to Owner's attention in writing any variances between that updated cost estimate and Owner's approved Project budget. Cost estimate format shall be subject to Owner's approval and may require electronic submission of cost estimate information. If Design Builder's updated cost estimate or any other estimate prepared by or for Owner based upon the Design Development Documents indicate that costs will exceed Owner's approved Project budget, Owner may elect to modify its budget and/or require Design Builder to revise the Design Development Documents to bring them within Owner's approved Project budget. Design Builder shall be solely responsible for all costs and expenses which it may incur in revising the Design Development Documents to bring them within Owner's approved Project budget. Design Builder shall also update the Project Schedule.

5. CONSTRUCTION DOCUMENTS:

After Owner's review and approval of the Design Development Documents and issuance of Owner's written authorization to proceed, Design Builder shall commence the Construction Documents services and perform the following:

5.1. Design Builder shall prepare Construction Documents up to a 50% completion level based on the final Design Development Documents approved by the Owner in Section 4 hereof. Construction Documents shall include calculations and shall set forth each discipline's requirements in detail and into a cohesive and coordinated whole based upon the approved Design Development Documents, the Final Program and consultation with the Owner. The parties shall meet to discuss the 50% complete Construction Documents and agree upon what revisions, if any, should be made. Design Builder shall perform such agreed-upon revisions. Design Builder shall meet with Owner during Construction Documents as often as required until 50% complete Construction Documents have been approved by the Owner. The 50% complete Construction Documents will include 90% complete specifications in CSI format.

5.2 Proposal. Based on the 50% complete Construction Documents approved by the Owner in Section 5.1 hereof, and any other documents upon which the parties may agree, Design Builder shall submit a proposal to Owner (the "Proposal") within forty-five (45) days, which shall include the following unless the parties mutually agree otherwise:

1 a proposed Lump Sum Price for completion of the construction documents, all permitting, and construction of the Project.

2 an updated Project Schedule and date of Substantial Completion of the Project upon which the Lump Sum Price for the Project is based;

3 all other information necessary for the parties to enter into Phase 2, with the accompanying General Conditions of Contract; and

5.3 Review of Proposal. Design Builder and Owner shall meet to discuss and review the Proposal. If Owner has any comments regarding the Proposal, or finds any inconsistencies or inaccuracies in the information presented, it shall give written notice to Design Builder of such comments or findings. If Design Builder finds the revisions acceptable, Design Builder shall, upon receipt of Owner's notice, adjust the Proposal.

5.4 At the completion of the 50% Construction Documents, Design Builder will provide a certification from itself and its Design Professional 1) that the Construction Documents reflect a structure, including the roof structure, that has been designed in strict compliance with the latest jurisdictional codes and 2) that the Construction Documents comply with the Final Program except for such deviations that have been expressly approved in writing by Owner.

5.5 Completion of This Phase of the Agreement. Design Builder's services under this Phase 1 of the Agreement shall be deemed completed upon meeting with Owner to discuss the Proposal and making those revisions to the Proposal, if any, Design Builder finds acceptable.

EXHIBIT P

SCOPE OF PHASE 2 SERVICES

After Owner's review and approval of the 50% Construction Documents and upon the Parties' ability to reach agreement as to the Proposal evidenced by the Parties' execution of the Lump Sum Amendment, and Owner's written authorization to proceed, Design Builder shall provide the following:

1. COMPLETION OF CONSTRUCTION DOCUMENTS

1.1. Design-Builder shall prepare Construction Documents up to a 100% completion level based on the final 50% Construction Documents approved by the Owner in Section 5 hereof. Construction Documents shall include calculations and shall set forth each discipline's requirements in detail and into a cohesive and coordinated whole based upon the approved 50% Construction Documents, the Final Program and consultation with the Owner. The parties shall meet to discuss the 100% complete Construction Documents and agree upon what revisions, if any, should be made. Design Builder shall perform such agreed-upon revisions. Design Builder shall meet with Owner during completion of the Construction Documents as often as required until 100% complete Construction Documents have been approved by the Owner. The 100% complete Construction Documents will include 100% complete specifications in CSI format.

1.2 At the completion of the 100% Construction Documents, Design Builder will provide a certification of the structural standards to which the facility has been designed.

1.3 Design Builder shall furnish documents in type, format, version and quantities indicated in the Final Program. Design Builder shall provide Owner with reproducible copies of all design documents, including electronic copies if so required by the Owner.

2. BUILDING PERMIT PHASE

2.1 Design Builder is responsible for applying for and obtaining all necessary and required building permits and approvals for the Project.

2.2 As part of the building permit application package, the Design Builder shall provide the applicable building permit office with the number of complete sets of signed and sealed Construction Documents. Each of the drawings and the cover sheet of the Project Manual shall be signed, sealed, and dated by the Design Builder.

3. CONSTRUCTION

3.1. Design Builder shall provide the following services in addition to all other Phase 2 Services required by the terms of this Contract:

3.1.1. Prepare a list of required submittals for shop drawings, product data, samples, warrantees, and other submittals required by Contract Documents, in tabular form which will indicate specification section number and section name (CSI Format).

3.2. Process, review, respond and distribute in accordance with the terms of the Contract Documents shop drawings, product data, samples, substitutions and other submittals required by the Construction Documents within ten (10) business days.

3.3. Maintain a master file of all submittals, including submittal register. Owner's copy shall be in electronic/CD format and submitted at time of Substantial Completion.

3.3. Prepare, reproduce and distribute supplemental drawings, specifications and interpretations in response to requests for clarification by Owner or Subcontractors as required by construction exigencies. Design Builder's response to any such request must be received by Owner and the effected Subcontractor within ten (10) business days. Design Builder will review and respond to all submittals from Subcontractors, including but not limited to shop drawings, within a reasonable period of time so as not to delay the progress of the Work, but in no event, more than ten (10) business days, unless Owner expressly agrees otherwise in writing. Review of Design Builder's submittals by Owner is not conducted for the purpose of determining the accuracy and completeness of such submittals, such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of Design Builder as required by the Contract Documents. Owner's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences or procedures. Owner's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

3.4. Owner shall have authority to reject Work which does not conform to the Construction Documents. Whenever, in its reasonable opinion, Owner considers it necessary or advisable to insure the proper implementation or the intent of the Construction Documents, Owner will have authority to require special inspection or testing of any Work in accordance with the provisions of the Construction Documents whether or not such Work be then fabricated, installed or completed.

3.6. Design Builder shall submit to the applicable building permit office the number of sets of drawings and/or documents reflecting the approved changes in the Work as may be required by that office. Code compliance issues must be approved by the applicable building permit office prior to inspection of the subject Work.

3.7 Review the Work to confirm that the construction complies with the current applicable Florida Building Code, and maintain a copy of the current applicable Florida Building Code at its Project Site office for review by Design Builder. Report any discrepancies observed or noted to Owner.

3.8. Assist Owner in the training of the facility operation and maintenance personnel with respect to the proper operations, schedules, procedures and inventory controls for the various Project equipment and systems. Such assistance shall include assisting Owner in arranging for and coordinating the instruction and training on operations and maintenance of the Project's equipment and systems in conjunction with the various manufacturer representatives. Further, Design Builder is to attend all such training sessions, unless otherwise consented to by Owner in writing.

3.9. Review for compliance with Design Builder's obligation under the Contract Documents, all operation and maintenance manual submittals, prior to submittal to Owner.

3.10 Schedule and visit with Owner at the Project at six (6) and eleven (11) months after issuance of the Certificate of Substantial Completion. During each Project visit, Design Builder shall observe, troubleshoot and advise in the operation of building systems. This shall not relieve Design Builder of its obligation to make other visits to the Project based on need should specific issues arise.

3.11. Design Builder will revise the final approved Construction Documents to incorporate all "As-Built" information contained in the Design Builder's marked-up "As-Built" drawings and specifications, as well as to reflect all addenda, contract changes and field changes (sometimes referred to herein as the "Record Documents"). Design Builder shall provide Owner with one (1) electronic copy on compact disk (CD) of the Record Documents, two sets of the conformed, signed and sealed drawings and prints, and two sets of the conformed Project Manual/Specifications signed and sealed.

3.11.1 The electronic copy on CD of the Record Documents shall be provided in AutoCAD.dwg format, "purged and bound", and compatible with Owner's system.

3.11.2 Throughout Phase 2, Design Builder shall review its marked-up "As-Built" drawings and Project Manual/Specifications, on a daily basis, to reflect all "As-Built" conditions at the Site, maintaining such "As-Built" drawings and specifications is a condition precedent to Design Builder's entitlement to payment hereunder.

3.12 Consult with, and recommend solutions to, Owner during the duration of warranties in connection with inadequate performance of equipment, materials or systems under warranty.

3.13. Submit a facility and equipment review schedule to Owner at the time of Substantial Completion. Perform reviews of facilities and equipment prior to expiration of warranty period(s) to ascertain adequacy of performance, materials, systems and equipment. Submit a written report to Owner.

3.14 Document noted defects or deficiencies and assist Owner in confirming Design Builder's correction of such noted defects.

3.15 Design Builder shall arrange for all job-site facilities as required by Owner and otherwise necessary to enable Design Builder to perform its respective duties and to accommodate any representatives of Owner which Owner may choose to have present on the job, the description of such facilities to be finalized prior to the execution of the Lump Sum Amendment.

3.15.1. Tangible personal property, otherwise referred to as job-site facilities, include, but are not limited to such things as trailers, toilets, typewriters, computers and any other equipment necessary to carry on the Work. The method of acquiring such job-site facilities, which are planned to become the property of Owner at the conclusion of the Work, shall be evaluated based on their cost over the life of the Project. Owning versus leasing shall be considered by Design Builder, obtaining at least three (3) proposals for leasing and at least three (3) proposals for purchasing and then analyzing which is least expensive over the usable life of the item. Design Builder shall present its evaluation with recommendation to Owner for approval.

3.15.2. When Design Builder wishes to supply job-site facilities from its own equipment pool, it shall first evaluate buy versus lease as discussed in subparagraph 3.15.1 above. If leasing is found to be the least expensive approach, then it may lease such job-site facilities from its own equipment pool at a price not greater than the lowest of the three (3) lease proposals obtained.

3.15.3. For all such job-site facilities purchased, which may become the property of Owner at the conclusion of the Work, Design Builder shall maintain ownership responsibilities of such facilities until final acceptance of the Work. Reimbursement for cost of such equipment will be made at the conclusion of the Work at the documented purchase price. At that time, Design Builder shall provide Owner with a complete inventory for each unit of equipment. The inventory shall describe the equipment and identify the purchase price, serial number, model number and condition. Where said equipment has a title, said title shall be properly transferred to Owner or to its designee.

3.15.4. Design Builder is responsible for proper care and maintenance of all equipment while in its control. At the time of transfer to Owner, Owner may refuse acceptance of the equipment if Owner determines, in its sole discretion, that the equipment has not been properly cared for by Design Builder or that such acquisition would not otherwise be in the best interest of Owner. In such event, Design Builder will be reimbursed for such item in accordance with Section 3C to the Agreement.

3.16. Design Builder's administration of the Work shall include the following:

3.16.1. Maintain a log of daily activities, including manpower records, weather, delays, major decisions, etc.

3.16.2. Maintain a roster of companies on the Project with names and telephone numbers of key personnel.

3.16.3. Establish and enforce job rules governing parking, clean-up, use of facilities and worker discipline.

3.16.4. Provide labor relations management for a harmonious, productive Project.

3.17. Design Builder also shall provide job site administration functions during construction to assure proper documentation, including but not limited to the following:

3.17.1. Job Meetings: Design Builder shall attend meetings such as pre-construction conferences, progress meetings, job conferences, pre-closeout meetings, and other Project-related meetings, as may be directed by Owner. Design Builder's Design Professionals are also required to attend any such meetings as directed by Owner. Design Builder shall provide meeting minutes for these meetings. Conduct a preconstruction conference with each subcontractor after award of the subcontract and prior to the start of its portion of the Work. Hold weekly progress and coordination meetings, or more frequently if required by Work progress, to provide for the timely completion of the Work. In addition, Design Builder shall arrange and conduct regular monthly Project status meetings with Owner.

3.17.2. Design Builder shall use the job site meetings as a tool for the preplanning of Work and enforcing schedules, and for establishing procedures, responsibilities, and identification of authority for all parties to clearly understand. During these meetings, Design Builder shall identify the party or parties responsible for following up on any problems, delay items or questions, and Design Builder shall note the action to be taken by such party or parties. Design Builder shall revisit each pending item at each subsequent meeting until resolution is achieved. Design Builder shall attempt to obtain from all present any problems or delaying event known to them for appropriate attention and resolution.

3.17.3. Shop Drawing Submittals/Approvals: Provide staff to review and approve shop drawings and other submittals and to implement procedures for transmittal to Owner of such submittals for action, and closely monitor their review process. Owner reserves the right to review the shop drawings and other submittals and require Design Professional's approval on such shop drawings and other submittals.

3.17.4. Material and Equipment Expediting: Provide staff to closely monitor material and equipment deliveries, check and follow-up on supplier commitments for all subcontractors and maintain a material and equipment expediting log.

3.17.5. Payments to Subcontractors: Develop and implement a procedure for the review, processing and payment of applications by subcontractors for progress and final payments.

3.17.6. Document Interpretation: Promptly respond to all questions for interpretation of the Contract Documents made by subcontractors and copy Owner on all such responses.

3.17.7. Reports and Project Site Documents: Record the progress of the Work. Submit written progress reports to Owner, including information on subcontractors' Work, and the percentage of completion. Keep a daily log available to Owner and any permitting authority inspectors.

3.17.8. Subcontractors Progress: Prepare periodic punch lists for subcontractors' work including unsatisfactory or incomplete items and schedules for their completion.

3.17.9. Substantial Completion: Pursuant to the provisions of Paragraph 23.1 of the General Terms and Conditions, notify Owner in writing when the Work or designated portions thereof are ready for the Substantial Completion inspections. From the punch lists of incomplete or unsatisfactory items prepared by Design Builder and reviewed and supplemented by Owner, prepare a schedule for their completion indicating completion dates for Owner's review and approval. At Substantial Completion, Design Builder will provide a certification from itself and its Design Professional that the building was constructed in accordance with the approved Construction Documents.

3.17.10. Final Completion: Monitor the subcontractors' performance on the completion of the Work and provide notice to Owner when the Work is ready for final inspection. Secure, review and certify compliance with the Contract Documents, then transmit to Owner all required guarantees, warranties, affidavits, releases, bonds, waivers, manuals, record drawings, and maintenance books.

3.17.11. Start-Up: With Owner's personnel, direct the check-out of utilities, operations, systems and equipment for readiness and assist in their initial start-up and testing by the subcontractors.

3.17.12. Record Drawings: Pursuant to the terms of Paragraph 8.2 of the General Terms and Conditions, Design Builder shall monitor the progress of its own forces and its subcontractors on marked up field prints which shall be developed by Design Builder into the final record drawings.

3.18. Design Builder shall maintain at the Project site, originals or copies of, on a current basis, all Project files and records, including, but not limited to, the following administrative records:

3.18.1. Subcontracts and Purchase Orders
3.18.2. Shop Drawing Submittal/Approval Logs
3.18.3. Equipment Purchase/Delivery Logs
3.18.4. Contract Drawings and Specifications with Addenda
3.18.5. Warranties and Guarantees
3.18.6. Cost Accounting Records
3.18.7. Labor Costs
3.18.8. Material Costs
3.18.9. Equipment Costs
3.18.10. Cost Proposal Request
3.18.11. Payment Request Records
3.18.12. Meeting Minutes
3.18.13. Cost-Estimates
3.18.14. Bulletin Quotations
3.18.15. Lab Test Reports
3.18.16. Insurance Certificates and Bonds
3.18.17. Contract Changes
3.18.18. Permits
3.18.19. Material Purchase Delivery Logs
3.18.20. Technical Standards
3.18.21. Design Handbooks
3.18.22. "As-Built" Marked Prints
3.18.23. Operating & Maintenance Instruction
3.18.24. Daily Progress Reports
3.18.25. Monthly Progress Reports
3.18.26. Correspondence Files
3.18.27. Transmittal Records
3.18.28. Inspection Reports
3.18.29. Bid/Award Information
3.18.30. Bid Analysis and Negotiations
3.18.31. Punch Lists
3.18.32. Schedule and Updates
3.18.33. Suspense (Tickler) Files of Outstanding Requirements
3.18.34. Policy and Procedure Manual
3.18.35 Subcontractor licenses
3.18.36 Final Program

The Project files and records shall be available at all times to Owner or its designees for reference, review or copying.

3.19. Design Builder shall provide the following services with respect to the Work, to facilitate the smooth, successful and timely occupancy of the Project by Owner:

3.19.1. Design Builder shall provide consultation and Project management to facilitate Owner's occupancy of the Project and provide transitional services to place the Work "on line" in such conditions as will satisfy Owner's operations requirements. The services include Design Builder's coordination of the delivery of Owner supplied furniture, fixtures and equipment for the Project.

3.19.2. Design Builder shall catalog operational and maintenance requirements of equipment to be operated by maintenance personnel and convey these to Owner in such a manner as to promote their usability. Design Builder shall provide Owner's operations and maintenance personnel with operations and maintenance training with respect to the equipment and systems being provided as part of the Work. This training may be recorded by Owner for subsequent presentation to Owner's operations and maintenance personnel.

3.19.3. Design Builder shall secure required guarantees and warranties, and shall assemble and deliver same to Owner in the manner required by Owner

EXHIBIT Q

PHASE 1 COMPENSATION SCHEDULE

Fire Station

Task 1	**Programming Services**	**$36,806.00**
Task 2	**Schematic Design**	**$59,704.00**
Task 3	**Design Development**	**$92,741.00**
Task 4	**50% Construction Documents**	**$85,361.00**
Task 5	**Lump Sum Cost Estimate**	**$23,570.00**
Task 6	**Allowances**	**$37,446.00**
Task 7	**Miscellaneous Expenses**	**$0.00**
Task 8	**Insurance**	**$1,577.00**
Task 9	**Contingency**	**$40,465.00**
TOTAL		**$377.669.00**

EXHIBIT Q

PHASE 1 COMPENSATION SCHEDULE

Lift Station

Task 1	**Programming Services**	**$19,957.00**
Task 2	**Schematic Design**	**$0.00**
Task 3	**Design Development**	**$36,026.00**
Task 4	**50% Construction Documents**	**$34,645.00**
Task 5	**Lump Sum Cost Estimate**	**$17,330.00**
Task 6	**Allowances**	**$25,445.00**
Task 7	**Miscellaneous Expenses**	**$0.00**
Task 8	**Insurance**	**$627.00**
Task 9	**Contingency**	**$16,084.00**
TOTAL		**$150,114.00**

EXHIBIT R

TRUTH-IN-NEGOTIATION CERTIFICATE

In compliance with the Consultants' Competitive Negotiation Act, Section 287.055, Florida Statutes, Warton-Smith. Inc. hereby certifies that wage rates and other factual unit costs supporting the compensation for the design and construction management services of DESIGN BUILDER to be provided under this Agreement, concerning Professional Design Build Services – North Redington Beach Fire Station and Lift Station Replacement (the Project) are accurate, complete and current as of the time of contracting.

DESIGN BUILDER: Wharton-Smith, Inc.

By: _____

Print Name: Ronald F. Davoli

Title: President / CEO

Date: 9/1/20

EXHIBIT S

DESIGN BUILDER'S KEY PERSONNEL

Fire Station

Contractor:	**Wharton-Smith, Inc.**
Project Executive	Todd O'Donnell
Senior Project Developer	Tom Iarossi
Contracting Manager	William Logan
Project Manager	Carolyn Bonaventura
General Contractor:	**Wharton-Smith, Inc.**
Project Executive	Todd O'Donnell
Project Superintendent	TBD as approved by the County
Mechanical Contractor:	**Wharton-Smith, Inc.**
Project Executive	Todd O'Donnell
Project Superintendent	TBD as approved by the County
Design Manager:	**Wilder Architecture, Inc.**
Project Executive	John W. Thompson
Project Manager	John W. Thompson
Architect & Designer	John W. Thompson
Civil & Environmental Engineer:	**Kimley-Horn and Associates**
Project Executive & Manager	Wayne Wright
Structural Engineer:	Wilder Architecture, Inc.
Project Executive	John W. Thompson
Mechanical, Electrical, Plumbing & Fire Protection:	**Wilder Architecture, Inc.**
Project Executive & Manager	John W. Thompson

EXHIBIT S

DESIGN BUILDER'S KEY PERSONNEL

Lift Station

Contractor:	**Wharton-Smith, Inc.**
Project Executive	Todd O'Donnell
Senior Project Developer	Tom Iarossi
Contracting Manager	William Logan
Project Manager	Carolyn Bonaventura
General Contractor:	**Wharton-Smith, Inc.**
Project Executive	Todd O'Donnell
Project Superintendent	TBD as approved by the County
Mechanical Contractor:	**Wharton-Smith, Inc.**
Project Executive	Todd O'Donnell
Project Superintendent	TBD as approved by the County
Design Review:	**Kimley-Horn and Associates**
Project Executive	Wayne Wright
Project Manager	Mike Semago
Architect & Designer	Kevin Gursuny

EXHIBIT T

STORED MATERIALS RECORD

Stored Materials Record

Formula: A + B - C - D = E

				A	B	C	D	E
Date	**Description**	**Supplier**	**Invoice Number**	**Previously Received**	**Received This Period**	**Previously Installed**	**Installed This Period**	**Balance To Install**
TOTAL								

EXHIBIT U

GENERAL CONDITIONS CATEGORIES

Anticipated Duration(s)	Description	Supplier

APPENDIX 1 – SCOPE OF SERVICES

Fire Station

SCOPE OF SERVICES
Professional Design-Build Services

North Redington Beach Fire Station
Contract No. 189-0190-NC(SS)

PROJECT OBJECTIVE

The attached Design Criterial package prepared by Pinellas County Utilities, along with Canerday, Belfsky, Arroyo Architects, Inc. (CBAA) provides the basis for project development. The Design Build (DB) Firm will be responsible for design, permitting, construction and startup of the new fire station. The overall objective of the project is to construct a fire station.

PROJECT BACKGROUND

Pinellas County desires to build a new fire station facility to serve North Redington Beach and surrounding beach communities. The site includes and existing town hall and an ancillary structure housing storage, a community meeting room and two (2) offices. The town hall will remain, but the ancillary building will be demolished, and its functions incorporated into the new fire station. A County Utility lift station is also present at the site. Additionally, the Town of Redington Shores will provide a land parcel for fire truck routing into the new station. The parcel currently contains a storage building which will be demolished. The land will then be developed for a fire truck access drive and additional parking.

The Design Build (DB) firm will validate the recommendations and will determine the most cost-effective design and construction arrangement of the new fire station.

GENERAL SCOPE OF WORK

Phase 1 Activities

- Completing all preliminary design activities, and preparation of 50% complete construction documents for items generally described below.
- Preparation of 90% specifications for items generally described below.
- Preparation of a Technical Memorandum.
- Competitively bid out all work packages for construction of the items generally described below and as shown in the 50% construction documents.
- Preparation and submission of the Lump Sum Guaranteed Maximum Price (GMP), based on the 50% complete construction documents, for the completion of all construction documents, all permitting and construction of the project.
- Preparation of an updated project schedule and date for Substantial Completion of the Project upon which the Lump Sum Guaranteed Maximum Price (GMP) for the project is based.

DETAILED SCOPE OF SERVICES FOR PHASE 1 SERVICES

General

- The Project is located at 190 173rd Avenue East, North Redington Beach, FL.

- The Project consists of the design and construction of a new fire station facility.

- Design Build (DB) firm will conduct project meeting workshops. It is anticipated that a kick-off meeting and four (4) project review workshops will be conducted to present a summary of the Project findings. These workshops are:
    - Project Validation Workshop
    - Design Development Workshop
    - Construction Document Workshop
    - GMP Review Workshop

- Design Build (DB) firm will perform various quality management (QM) activities throughout Phase 1. Specific components of QM will include identification of project personnel responsible for detailed checks; schedule of milestones and review dates; and project standards and design calculations management. Efforts will include review of the applicable design criteria, conditions and assumptions; design calculations; preliminary equipment data sheets; and an updated equipment and instrumentation list.

  The QM checks will include a review of the plans, specifications and typical details for conformity with the local, state and federal guidelines; internal coordination between the disciplines (structural, mechanical, electrical, HVAC, fire protection and I&C) drawings and specifications; as well as external coordination to incorporate Pinellas County comments accordingly.

- The Design Build (DB) firm will maintain a Design Trend Log, to be stored electrically at commonly accessible locations. This Log will be used to identify any new/additional design tasks that are a result of the Workshops or critical design meetings and are outside the original scope. The Design Build (DB) firm will be responsible for estimating the impact of the changes in the Log.

Task 1 – Programming Services

1.1 General Statement – Design Services: Design Build (DB) firm shall, consistent with applicable state licensing laws, provide design services, including architectural, engineering and other design professional services, required by this Agreement. Such design services shall be provided through qualified, licensed design professionals who are either (i) employed by the Design Build (DB) firm, or (ii) procured by the Design Build (DB) firm from independent sources. Nothing in this Agreement is intended to create any legal or contractual relationship(s) between Owner and any independent design professional(s).

1.2 Review and Evaluate Owner's Project Criteria: Owner shall provide Design Build (DB) firm with Owner's Project Criteria describing Owner's program requirements and objectives for the Project. Owner's Project Criteria shall include Owner's use, space, price, time, site, performance and expandability requirements. Owner's Project Criteria may include conceptual documents, design criteria, performance requirements and other technical materials and requirements prepared by or for Owner. Design Build (DB) firm shall meet with Owner to discuss and review Owner's criteria.

- Onsite validation of existing technology and equipment
- Prepare a written evaluation of the Owner's criteria. Design Build (DB) firm shall meet with Owner to discuss evaluations and recommendations.
- Develop Detailed Final Program. Design Build (DB) firm shall meet with Owner to discuss and review proposed Final Program.
- Complete Detailed Final Program with all revisions from meetings. Design Build (DB) firm shall meet with Owner to perform final review of Final Program.

As part of the Program Validation Task, the design consultant(s) will evaluate and verify the recommendations described in the DCP prepared by CBAA for the fire station. This evaluation will consist of validating the equipment selection based on the design criteria presented in the various documents included in the RFP, additional information collected in the field, and anecdotal information from Pinellas County staff.

The Program Verification for the Fire Station will include:

- Evaluation of the conceptual documents and design criteria
- Evaluation of the existing stormwater model
- Evaluation of the existing permits and their requirements
- Evaluation of all record drawings and as-built drawings
- Evaluation of County GIS files

1.3 Program Verification Technical Memorandum: The Design Build (DB) firm will prepare and submit a Draft Program Verification Technical Memorandum summarizing the evaluation completed in Task 2.2 for the County to review. The County will setup a Program Verification Workshop within 14 days of receiving the Draft Program Verification Technical Memorandum. The Design Build (DB) firm will participate in one Program Verification Workshop with the County to discuss the findings and recommendations. A final Program Verification Technical Memorandum will be submitted no later than 14 days after the Program Verification Workshop.

1.4 Budget Feasibility Studies: The Design Build (DB) firm shall review the Owner's budget and any applicable cost estimated as compared to the Owner's Design Criteria Package and the Final Program. The Owner will provide the Design Build (DB) firm with the detailed Opinion of Probable Construction Cost (OPCC) developed by engineer/architect during preparation of the Evaluation Study. The Design Build (DB) firm shall prepare a statement and confirm in writing to the Owner whether the Program can be designed and successfully constructed within the limits of the Owner's budget and program constraints.

1.5 Design Build (DB) Firm Presentation of Results for Final Program:

- User interviews
- Description of building functions and unique activities
- Space requirements and functions
- General description outlining project components
- Updated project schedule

1.6 Design Build (DB) firm will prepare a parking study on the existing site plan to analyze if the number of parking spaces requested by stakeholders is achievable. Once the study is completed, the Design Build (DB) team will prepare a written narrative in the form of a Tech Memo that will include the approach and potential alternatives to achieve the desired parking.

Task 2 – Schematic Design

2.1 Schematic Design Documents: Design Build (DB) firm shall prepare three (3) Preliminary Conceptual Design Plans. The Schematic Design Documents will be based on the Final Program. The Schematic Design Documents shall include design criteria, drawings, diagrams and specifications setting forth the requirements of the Project.

2.2 Schematic Design Process: The Owner will setup a Schematic Design Workshop within 14 days of receiving the Draft Schematic Design Documents and Preliminary Conceptual Design Plans. The Design Build (DB) firm will participate in one Schematic Design Workshop with the Owner to discuss the documents. The Draft Preliminary Conceptual Design Plans will be updated and include a written narrative of how the Owner's comments have been incorporated. The Final Preliminary Conceptual Design Plans will be developed and include one (1) round of revisions.

2.3 Value Engineering Analysis: The Design Build (DB) firm will work with the Owner and the project's users to meet design requirements and identify areas within the design that offer the greatest potential for elimination of unnecessary costs. The requirements of the Final Program shall not be eliminated as value engineering items, except with the Owner's express written approval.

2.4 Cost Estimate: The Design Build (DB) firm will provide the Owner with a cost estimate based on the Final Schematic Design Documents, together with a written explanation of all variances between the estimate the and Budget. If the estimate indicates costs will exceed the Budget, the Design Build (DB) firm shall revise the Schematic Design Documents to bring them within the Budget.

2.5 Schedule: The Design Build (DB) firm will provide the Owner with a project schedule along with a written explanation of how the firm intends to construct the facilities.

Task 3 – Design Development

3.1 After Owner's review and final approval of the Schematic Design Documents and issuance of Owner's written authorization to proceed, Design Build (DB) firm shall commence the Design Development services.

- Design Build (DB) firm will identify long lead and special-order materials and equipment.

3.2 Design Development Documents: Design Build (DB) firm shall prepare the Design Development Documents based on the Final Schematic Design and develop the design to a level of definitiveness and detail to fix and describe the size and character of the components, equipment, building and processes. This phase will consist of a multi-discipline design effort that includes, but is not limited to: demolition, civil/site work, structural, process/mechanical, geotechnical, electrical, I&C, architectural, communication, fire protection, plumbing, and HVAC. The Design Build (DB) firm will identify long lead items, special order materials, and/or equipment. This task includes a signalization warranty analysis at the Fire Station ingress/egress. It is not anticipated that a signal will be warranted, so this proposal does not include the signalization design.

3.3 Design Build (DB) firm shall perform material research and prepare specifications specific to project requirements in draft form.

3.4 Value Engineering Analysis: The Design Build (DB) firm will work with the Owner and the project's users to meet design requirements and identify areas within the design that offer the greatest potential for elimination of unnecessary costs. The requirements of the Final Program shall not be eliminated as value engineering items, except with the Owner's express written approval.

3.5 Constructability Review: Design Build (DB) firm will perform a constructability review to evaluate alternate ideas in terms of their feasibility to constructability, time impact and cost. The DESIGN CONSULTANT will assist the DB firm in completing the constructability review and value analysis. The review and analysis will yield ideas for alternate materials of construction and any other ideas that will potentially reduce the overall construction cost of the ongoing design. The DESIGN CONSULTANT will also participate in a Constructability Review and Analysis meeting with the County to discuss ideas.

- Substitutes and alternates will be evaluated by all parties on a case by case basis.
- A market analysis will not be provided during Phase 1 services.

3.6 Design Development Process: The Design Build (DB) firm shall meet with Owner to review and discuss the Design Development Documents and agree upon what revisions, if any, should be made.

- Design Build (DB) firm shall perform modifications to the Design Development Documents.
- Design Build (DB) firm shall provide a statement concerning the constructability of the project.
- Design Build (DB) firm shall provide revised cost estimate based upon the final set of Owner approved Design Development Documents.

3.7 Design Build (DB) firm will develop selected alternate ideas with the emphasis on their technical durability, constructability and life cycle cost.

3.8 Design Build (DB) firm shall prepare, submit and present the Final Design Development Documents. Submittal and presentation shall include:

- All requirements found in the Final Program, except to the extent such requirements have been expressly waived by Owner in writing.
- Design Build (DB) firm shall certify that the final approval of Design Development Documents fully complies with the Final Program except for such deviations that have been expressly approved in writing by Owner.
- Demonstrate how Owner's previously submitted comments were incorporated into the design documents.

3.9 Design Build (DB) firm shall submit the Final Design Documents to the Project Manager for review and comment. Design Builder shall respond in writing to the review comments within 14 calendar days of receipt. Responses shall be forwarded directly to the Owner's Project Manager who will respond within 14 days. Design Builder shall revise the Design Development Documents as required by Owner to obtain Owner's written approval and authorization to proceed to the Construction Documents Phase.

3.10 Cost Estimate: The Design Build (DB) firm will provide the Owner with a cost estimate based on the Final Design Development Documents, together with a written explanation of all variances between the estimate and the Budget. If the estimate indicates costs will exceed the Budget, the Design Build (DB) firm shall revise the Design Development Documents to bring them within the Budget.

3.11 Schedule: The Design Build (DB) firm will provide the Owner with a project schedule along with a written explanation of how the firm intends to construct the facilities.

Task 4 – Construction Documents

4.1 Construction Documents Process: Design Build (DB) firm shall prepare Construction Documents up to a 50% completion level (Drawings) and 90% completion level (Specifications) based on the final Design Development Documents approved by the Owner in Section 4 hereof.

- Parties will meet to discuss the 50%/90% complete Construction Documents and agree upon what revisions, if any, should be made.
- Design Build (DB) firm shall perform modifications and revisions as agreed-upon.
- Design Build (DB) firm shall meet with owner until the 50%/90% complete Construction Documents have been approved by the Owner.
- The 50% complete Construction Documents will include 90% complete specifications in the CSI format.

4.2 Certification: Design Build (DB) firm will provide a certification from itself and the Design Professional(s) that:

- The Construction Documents reflect a structure, including roof structure, that has been designed in strict compliance with the latest jurisdictional codes
- The Construction Documents comply with the Final Program except for such deviations that have been expressly approved in writing by Owner.

Task 5 – Lump Sum Cost Estimate/GMP Proposal

5.1 Prepare and submit Construction Proposal based on the 50%/90% complete Construction Documents approved by the Owner in Section 5.1 hereof, and any other documents upon which the parties may agree, Design Builder shall submit a GMP proposal to Owner (the "Proposal") within thirty (30) days after approval. Design Build (DB) firm will provide open book estimates for all work packages the Design Build (DB) firm intends to self-perform. The work packages will be reviewed and negotiated as part of the GMP Proposal Other subcontractor and work packages will be prepared and provided to a minimum of three (3) qualified bidders for evaluation and inclusion into the Final Proposal. GMP Proposal shall include the following unless the parties mutually agree otherwise:

- A proposed Lump Sum Price for completion of the construction documents, all permitting, and construction of the Project.
- An Updated Project Schedule and date of Substantial Completion of the Project upon which the Lump sum Price for the Project is based.
- All other additional information necessary for the parties to enter into the Phase 2 Agreement.

5.3 Review of GMP Proposal: Design Build (DB) firm shall meet with the Owner to review and discuss the GMP Proposal. Design Build (DB) firm shall review the Proposal as agreed int the meeting and resubmit.

5.3 Completion of This Phase of the Agreement: Design Build (DB) firm's services under this Phase 1 of the Agreement shall be deemed completed upon meeting with Owner to discuss the Proposal and making those revisions to the Proposal, if any, Design Build (DB) firm finds acceptable.

Task 6 – Allowances

6.1 The following allowances are included in Phase 1. All unused allowance will be returned to the County.

6.2 Public Relations and Community Outreach

6.2.1 Provide a public outreach campaign to inform the neighboring communities about the project and provide them with a platform to identify and address any neighborhood concerns about construction activities.

6.2.2 Provide a campaign to attract and engage local and disadvantaged subcontractors and suppliers.

Task 7 – Miscellaneous Costs

7.1 Not Applicable.

Schedule of the Milestones and Deliverables for Phase 1

Fire Station

Deliverable/Milestone	Approximate Calendar Weeks from Phase 1 NTP
Phase 1 Kickoff Meeting	1
Task 2 – Program Verification Completion and Presentation of Results for Final Program	4
Task 3 – Schematic Design Completion	8
Task 4 – Final Design Development Completion	8
Task 5 – Construction Documents Completion	12
Task 5 – GMP Proposal Submission	6
Completion of Phase 1 Activities – Approval of GMP Proposal and Execution of Lump Sum Amendment	39
Issuance of NTP for Phase 2 – Start of Design Completion and Construction	

APPENDIX 1 – SCOPE OF SERVICES

Assumptions & Clarifications

Fire Station

1. It is assumed that the parcels in which the Project will be constructed are already adequately zoned by the authorizing jurisdiction, for the type of work to be installed and operated.
2. It is assumed that all easement acquisitions that may be necessary to commence the construction work prior to the first Task 5 submitted (the Lift Station is assumed to go first).
3. It is assumed that all agencies with jurisdiction will grant permits without substantial redesign.
4. It is assumed that the location of the Lift Station will not deviate from what is shown in the documents and design criteria package provided by the County during the RFP Phase. The Fire Station exact location may be shifted depending on needs of the County stakeholders and results of the parking study.
5. It is assumed that the County will provide all available data needed during Programming Services, including but not limited to existing stormwater models, existing permits, record drawings, as-builts, and County GIS files.
6. It is assumed that CAD files of documents and design criteria packages provided by the County during the RFP phase will be submitted to the Design Build (DB) team.
7. County Furniture, Fixtures and Equipment (FF&E) is not included in this scope of work.

Pinellas County
North Redington Beach Fire Station and Lift Station Replacement
Fire Station Portion Only
Wharton-Smith, Inc. Design Build Team - Phase 1 Services Cost Summary

TASK	Wharton-Smith	Wilder Architecture	Task Sub - Totals
Task 1 - Programming Services	$18,490	$18,316	$36,806
Task 2 - Schematic Design	$16,860	$42,844	$59,704
Task 3 - Design Development	$20,080	$72,661	$92,741
Task 4 - Construction Documents	$6,710	$78,651	$85,361
Task 5 - Lump Sum Cost Estimate	$18,070	$5,500	$23,570
Task 6 - Allowances	$12,945	$24,501	$37,446
Task 7 - Miscellaneous Expenses	$0	$0	$0
Sub Totals	$93,155	$242,472	$335,627
Task 8 - Insurance	0.47%		$1,577
Sub Totals			$337,204
Task 9 - Phase 1 Services Contingency	12% Contingency		$40,465

Grand Total All Costs - Fire Station Only	$377,669

Pinellas County
North Redington Beach Fire Station
Wharton-Smith, Inc.
Scope of Phase 1 Services - Fire Station Only

			Project Management						Estimating		Field			Other			
Task ID		PIC	DB Manager	Precon Mgr	Sr. PM	PM	Assistant PM	Admin	Chief Estimator	Estimators	Super	Manager	QAQC	MTRL & SUB	Labor Hours	GC Cost	Total Cost
	Hourly Rate	$250.00	$210.00	$195.00	$195.00	$175.00	$150.00	$75.00	$185.00	$155.00	$210.00	$195.00	$195.00	$1.00			
	A. Scope of Services																
	1 - Programming Services																
1.1	General Statement - Design Services														0.0		$0
1.2	Owner provided Project Criteria - Review & Evaluate Owner's Project Criteria		2.0	6.0	3.0	1.0					2.0				14.0		$2,770
	Meeting 1 - Discuss and review Owner's Project Criteria		1.0	1.0	1.0						1.0				4.0		$810
1.2.a	Parking Study		1.0	3.0	3.0										7.0		$1,380
1.2.b	Prepare written evaluation of Owner's criteria			2.0		2.0									4.0		$740
	Meeting 2 - Discuss D/B Evaluation and recommendations		1.0	1.0	1.0										3.0		$600
1.2.c	Develop Detailed Final Program		1.0	1.0											2.0		$405
	Meeting 3 - Review & Discuss Final Program Recommendation		1.0	1.0	1.0										3.0		$600
1.2.d	Complete Detailed Final Program with revisions			1.0	1.0										2.0		$390
	Meeting 4 - Final Review of Final Program		1.0	1.0	1.0										3.0		$600
1.3	Budget Feasibility Study														0.0		$0
	Statement of Constructability, costs, material selections	1.0	1.0	3.0	3.0				8.0	25.0	1.0				42.0		$7,195
1.4	Presentation of Results for Final Program			3.0				1.0							4.0		$660
	Conduct "User" Interviews			1.0	1.0										2.0		$390
	Presentation of Results and Building Program Update			1.0	1.0										2.0		$390
	Building Functions and unique activities			1.0	1.0										2.0		$390
	Space Requirements and function			1.0	1.0										2.0		$390
	Gen Des. Outlining project components			1.0	1.0										2.0		$390
	Provide updated Project Schedule			1.0	1.0										2.0		$390
	Subtotal - Programming Services	1.0	9.0	29.0	20.0	3.0	0.0	1.0	8.0	25.0	4.0	0.0	0.0	0.0	100.0	$0	$18,490
	2 - Schematic Design - One Preliminary Design Concepts																
2.1	Prepare Preliminary Conceptual Design Plan		1.0	1.0	1.0	1.0									4.0		$775
	Design Camps/Meetings		2.0	2.0	2.0						2.0				8.0		$1,620
	Signalization Study		1.0	3.0	3.0										7.0		$1,380
	Meeting 1 - Discuss Schematic Design Documents		1.0	1.0	1.0										3.0		$600
	Meeting 2 - Discuss Changes to "selected" Schematic Design		1.0	1.0	1.0										3.0		$600
	Meeting 3 - Discuss Final Schematic Design Document		1.0	1.0	1.0										3.0		$600
	Provide Constructability Statement and Cost Estimate			2.0	1.0				2.0	1.0					6.0		$1,110
	Evaluate Condition of Exiting Equipment to be Reused														0.0		$0
2.2	N/A														0.0		$0
2.3	Value Engineering - Identify Areas of Possible Cost Reduction			1.0	1.0				1.0						3.0		$575
	Meeting 1 - Discuss VE and Cost Reduction Ideas														0.0		$0
2.4	Pre-Submittal Document Review Meeting														0.0		$0
	Meeting 1 - Formal Presentation of Findings		1.0	1.0	1.0										3.0		$600
2.5	Prepare & Submit Phase 1 Schematic Design Documents for Final Review			1.0											1.0		$195
	Modify Schematic Design Docs Following Review			1.0											1.0		$195

Pinellas County
North Redington Beach Fire Station
Wharton-Smith, Inc.
Scope of Phase 1 Services - Fire Station Only

			Project Management						Estimating		Field			Other			
		PIC	DB Manager	Precon Mgr	Sr. PM	PM	Assistant PM	Admin	Chief Estimator	Estimators	Super	Manager	QAQC	MTRL & SUB	Labor Hours	GC Cost	Total Cost
	Hourly Rate	$250.00	$210.00	$195.00	$195.00	$175.00	$150.00	$75.00	$185.00	$155.00	$210.00	$195.00	$195.00	$1.00			
Task ID	**A. Scope of Services**																
	Meeting 1 - Review Revised Schematic Design Documents		1.0	1.0	1.0										3.0		$600
2.6	Cost Estimate Based on Final Schematic Design Docs		1.0	4.0	3.0			1.0	8.0	25.0	1.0				43.0		$7,215
	Updated Schedule Based on Final Schematic Design Docs			1.0	2.0						1.0				4.0		$795
2.7	**Schematic Design - Deliverables**														0.0		$0
	Drawings for Design Concept														0.0		$0
	Civil Site Plan														0.0		$0
	Plumbing - Single Drawing														0.0		$0
	Structural - Single Drawing Per Structure														0.0		$0
	Electrical - Single Drawing														0.0		$0
	I&C - Single Drawing Including Proposed Fiber Path														0.0		$0
	3D - Provide 3D Rendering of All Above Drawings														0.0		$0
	Project Cost														0.0		$0
	Concept #1 Cost														0.0		$0
	Preliminary Project Schedule														0.0		$0
	Subtotal - Schematic Design	0.0	10.0	21.0	18.0	1.0	0.0	1.0	11.0	26.0	4.0	0.0	0.0	0.0	92.0	$0	$16,860
	3 - Design Development Phase for Selected Design Concept																
	Owner approval of Final Schematic Design Docs and Issuance of Authorization to Proceed																
3.1	Prepare Design Development Docs		1.0	1.0	1.0										3.0		$600
	Identify Long-Lead or Special Order Items				1.0										1.0		$195
	Permit Determinations			4.0	4.0						2.0				10.0		$1,980
3.2	Detailed Design Development			2.0	2.0										4.0		$780
	Civil														0.0		$0
	Architectural														0.0		$0
	Structural														0.0		$0
	Electrical														0.0		$0
	Mechanical														0.0		$0
	Geotechnical														0.0		$0
	Existing Structural Evaluation														0.0		$0
	Interim Meetings to Review Design Development Docs		1.0	1.0	1.0						1.0				4.0		$810
3.3	Perform Material Research & Prepare Draft Specifications			1.0	1.0										2.0		$390
3.4	Identify & Coordinate Utility Service Design Req's			2.0	2.0						2.0				6.0		$1,200
	On site existing piping and utilities investigations as authorized under Design Contingency														0.0		$0
	On site drainage system investigations														0.0		$0
	Drainage designs														0.0		$0
	Coordinate with storm water management district having jurisdiction														0.0		$0
3.5	Evaluate Alternative Ideas		1.0	1.0	1.0				1.0		1.0				5.0		$995
	Meeting to review alternative with Owner and "users"		1.0	1.0	1.0										3.0		$600
3.6	*Meeting to Review Design Development Docs*		1.0	1.0	1.0										3.0		$600

Pinellas County
North Redington Beach Fire Station
Wharton-Smith, Inc.
Scope of Phase 1 Services - Fire Station Only

			Project Management						Estimating		Field			Other			
		PIC	DB Manager	Precon Mgr	Sr. PM	PM	Assistant PM	Admin	Chief Estimator	Estimators	Super	Manager	QAQC	MTRL & SUB	Labor Hours	GC Cost	Total Cost
	Hourly Rate	$250.00	$210.00	$195.00	$195.00	$175.00	$150.00	$75.00	$185.00	$155.00	$210.00	$195.00	$195.00	$1.00			
Task ID	**A. Scope of Services**																
	Modify Design Development Docs following Review														0.0		$0
	Prepare constructability statement		1.0	1.0	1.0				1.0		1.0				5.0		$995
	Provide project cost estimate			1.0					1.0						2.0		$380
3.7	Develop Selected Alternative Ideas			1.0											1.0		$195
3.8	Prepare Final Design Development Docs for Review			1.0											1.0		$195
	Presentation of Final Design Development Docs			1.0											1.0		$195
3.9	Included with 4.8 above														0.0		$0
3.10	Modify Design Development Docs following Owner Review			1.0											1.0		$195
3.11	Prepare Cost Estimate based on Final Design Development Docs	1.0	2.0	6.0	6.0				8.0	25.0	1.0				49.0		$8,575
	Update Schedule based on Final Design Development Docs		1.0	1.0	2.0						1.0				5.0		$1,005
3.12	**Design Development Phase - Deliverables**			1.0											1.0		$195
	Complete 70% Drawings sufficient detail to provide GMP														0.0		$0
	Cover sheet														0.0		$0
	Index of Drawings														0.0		$0
	Civil Site Plans and piping/utilities														0.0		$0
	Plumbing - Single drawing														0.0		$0
	Structural - Five drawings per structure														0.0		$0
	Electrical - Signel Drawing														0.0		$0
	I&C - Single Drawing Including Proposed Fiber Path														0.0		$0
	3D - Provide 3D Rendering of All Above Drawings														0.0		$0
	Project cost														0.0		$0
	Updated Project Schedule														0.0		$0
	Subtotal - Design Development Phase	1.0	9.0	28.0	24.0	0.0	0.0	0.0	11.0	25.0	9.0	0.0	0.0	0.0	107.0	$0	$20,080
	4 - Construction Documents																
	Owner approval of Final Design Development Docs and Issuance of Authorization to Proceed																
4.1	Prepare Construction Documents (50%) and Specifications (90%) for Review		2.0	4.0	2.0										8.0		$1,590
	Meeting to review construction doc		1.0	1.0	1.0										3.0		$600
	Modify Construction Documents following Review			1.0											1.0		$195
	Permit review (Fees in Phase 2)			3.0	2.0	2.0					2.0				9.0		$1,745
4.2	Prepare and submit Construction Proposal (Task 5)														0.0		$0
4.2.1	Lump Sum Pricing														0.0		$0
4.2.2	Update Project Schedule														0.0		$0
4.2.3	Add'l Info Required for Phase 2 Agreement														0.0		$0
4.3	*Meeting to Review Construction Proposal*														0.0		$0
	Modify Construction Proposal following Meeting														0.0		$0
4.4	Provide Certification of Construction Docs		1.0	1.0									1.0		3.0		$600
4.5	Completion of Phase 1 activities Meeting (above)														0.0		$0
4.6	**Construction Documents - Deliverables**														0.0		$0

Pinellas County
North Redington Beach Fire Station
Wharton-Smith, Inc.
Scope of Phase 1 Services - Fire Station Only

	Project Management							Estimating		Field			Other			
	PIC	DB Manager	Precon Mgr	Sr. PM	PM	Assistant PM	Admin	Chief Estimator	Estimators	Super	Manager	QAQC	MTRL & SUB	Labor Hours	GC Cost	Total Cost
Hourly Rate	$250.00	$210.00	$195.00	$195.00	$175.00	$150.00	$75.00	$185.00	$155.00	$210.00	$195.00	$195.00	$1.00			

Task ID	A. Scope of Services																
	Complete 70% Drawings sufficient detail to provide GMP														0.0		$0
	Cover Sheet														0.0		$0
	Index of Drawings														0.0		$0
	Detail Sheets with sufficient details to accompany plans														0.0		$0
	Civil & Site Plans														0.0		$0
	Existing site plans and demolition plans														0.0		$0
	Grading and drainage plans and details														0.0		$0
	Yard piping plans - 3 sheets minimum														0.0		$0
	Plumbing - Single drawing for each structure														0.0		$0
	Structural - Five drawings per structure wih all details and sections, elevations														0.0		$0
	Electrical														0.0		$0
	Service requirements														0.0		$0
	One line diagrams														0.0		$0
	ductbanks														0.0		$0
	Floor plans														0.0		$0
	Lighting plans														0.0		$0
	Conduit layouts/schedules														0.0		$0
	I & C - 4 drawings minmum														0.0		$0
	Tagged field instruments														0.0		$0
	Control panels														0.0		$0
	PLC's														0.0		$0
	Fiber path														0.0		$0
	SCADA														0.0		$0
	General instrumentation														0.0		$0
	Complete specifications including but not limited to:														0.0		$0
	All equipment														0.0		$0
	Piping and Valves														0.0		$0
	Instrumentation														0.0		$0
	Electrical														0.0		$0
	Summary of work														0.0		$0
	General instrumentation														0.0		$0
	3D - Provide 3D rendering of all above drawings														0.0		$0
	Project Cost														0.0		$0
	GMP for Phase II (Task 5)														0.0		$0
	Monthly Cash flow charts for invoicing Phase II			1.0	1.0										2.0		$390
	Schedule of Values for Phase II Billings			1.0	1.0										2.0		$390
	Project Schedule for Phase II Construction Activities - Minimum 200 activities		1.0	1.0	3.0					1.0					6.0		$1,200
	Subtotal - Construction Documents	0.0	5.0	13.0	10.0	2.0	0.0	0.0	0.0	0.0	3.0	0.0	1.0	0.0	34.0	$0	$6,710

5 - Lump Sum Cost Estimate																

Pinellas County
North Redington Beach Fire Station
Wharton-Smith, Inc.
Scope of Phase 1 Services - Fire Station Only

		Project Management							Estimating		Field			Other			
		PIC	DB Manager	Precon Mgr	Sr. PM	PM	Assistant PM	Admin	Chief Estimator	Estimators	Super	Manager	QAQC	MTRL & SUB	Labor Hours	GC Cost	Total Cost
	Hourly Rate	$250.00	$210.00	$195.00	$195.00	$175.00	$150.00	$75.00	$185.00	$155.00	$210.00	$195.00	$195.00	$1.00			
Task ID	**A. Scope of Services**																
5.1	Prepare and submit Construction Proposal														0.0		$0
5.2.1	Lump Sum Pricing	2.0	4.0	16.0	14.0			2.0	16.0	36.0	2.0	1.0	1.0		94.0		$16,690
5.2.2	Update Project Schedule			1.0	1.0										2.0		$390
5.3.3	Add'l Info Required for Phase 2 Agreement			1.0											1.0		$195
5.3	*Meeting to Review Construction Proposal*		1.0	1.0	1.0										3.0		$600
	Modify Construction Proposal following Meeting			1.0											1.0		$195
	Subtotal - Lump Sum Cost Estimate	2.0	5.0	20.0	16.0	0.0	0.0	2.0	16.0	36.0	2.0	1.0	1.0	0.0	101.0	0.0	$18,070
	6 - Allowances																
	Subcontractors and Subconsultants not listed elsewhere																
6.1	Dialogue - PR and Community Outreach													12945.0	12945.0		$12,945
															0.0		$0
	Subtotal - Allowances	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12945.0	12945.0	0.0	$12,945
	7 - Miscellaneous Expenses																
	printing, travel, express courier,																
															0.0		$0
															0.0		$0
	Subtotal - Phase 1 Contingency	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Phase 1 Services All Tasks Total (Fire Station)	4.0	38.0	111.0	88.0	6.0	0.0	4.0	46.0	112.0	22.0	1.0	2.0	12945.0	13379.0	0.0	93155.0

APPENDIX 1 – SCOPE OF SERVICES

Subconsultant Proposals

Fire Station

WILDERARCHITECTURE, INC.
1315 Seventh Avenue
Suite Number 106
Tampa, Florida 33605
Telephone 813.242.6677
Facsimile 813.242.6683

May 8, 2020

Todd O'Donnell
Wharton-Smith, Inc.
4912 W La Salle St, Tampa
FL 33607

Re: **North Redington Beach FS– DESIGN – FIRE STATION – RFP NO. 2019000323**
Fee Proposal

Dear Mr. O'Donnell,

WILDERARCHITECTURE appreciates the opportunity to submit our proposal for the North Redington Beach Fire Station. The budget for Fire Station (building and FF&E) is initially set at $2,500,000. If the amount fluctuates in the final amount submitted to the Owner at the end of Phase 1, the Architect will have the opportunity adjust Phase 2 fees to reflect the scope change commensurate with the total scope/budget of the project. Our Task 1 proposal includes:

1. Programming Services for the Fire Station (including civil structural, mechanical, electrical, plumbing, and fire protection engineering).
2. Schematic Design (including civil, structural, mechanical, electrical, plumbing, and fire protection engineering).
3. Design Development and outline Specifications (including civil, structural, mechanical, electrical, plumbing, and fire protection engineering) – with Design Calculations
4. Construction Documents (50%) and complete Specifications (including civil, structural, mechanical, electrical, plumbing, and fire protection engineering).
5. Lump Sum Cost Estimate support for the Design Builder.

Phase 1 Services included in addition to our design services identified in Exhibit Q:

1. Geotechnical Reporting/Analysis/subsurface recommendations
2. Surveying

Services beyond the scope proposed are available in the Phase 2 proposal or at our hourly rates (schedule attached). The following are excluded from our proposal and will be provided by WAI or others as needed:

1. Lift Station engineering and review services.
2. Construction Document Completion to 100% for Permitting. Sign and Sealed documents provided at Phase 2.
3. Subsurface Foundation Design. Should the Geotech require additional engineering the EOR will address in the Phase 2 documents. The Geotechnical Engineering report shall be used to determine the value of the proposed subsurface improvements (if needed) in the Phase 1 scope.
4. Civil Engineering – Phase 2 Services (100% Completion)
5. Landscape Architecture – Phase 2 Services (100% Completion).
6. Environmental Reporting.
7. Rezoning services.
8. Close Out/Record Documents.
9. Traffic Signalization.
10. Permitting fees.
11. Solar Panel System design.
12. Geothermal System design.

We propose Lump Sum amounts billed monthly on a percent complete basis as follows:

North Redington Beach
FIRE STATION

RFP 189-01900-NC (SS)
Services Summary - Fire Station
Phase 1 Fee Proposal

1	**Programming**	**$18,315.60**
2	**Schematic Design**	**$42,843.90**
3	**Design Development**	**$72,660.80**
4	**50% Construction Documents**	**$78,650.70**
5	**Lump Sum Cost Estimate**	**$5,500.00**

Services to be provided through Allowances - Phase 1:

Civil Engineering Included in Phase 1 fees above	
Geotechnical Allowance (NTE) by MC Squared	**$19,751.00**
Surveying by Hyatt Surveyor	**$4,750.00**
Landscape Architecture Included in Phase 1 fees above	**$0.00**
Traffic Study Allowance Included in Phase 1 fees above	**$0.00**
Environmental Reporting Allowance (NTE) NIC	**$0.00**
Rezoning Allowance Not Required	**$0.00**
Close-out/Record Documents Not a Phase 1 Service	**$0.00**
Traffic Signalization Design Not a Phase 1 Service	**$0.00**
Reimbursable Expenses Included in Phase 1 fees above	**$0.00**
Subtotal Allowances	**$24,501.00**

Total - Phase 1 Professional Services Proposal	**$242,472.00**

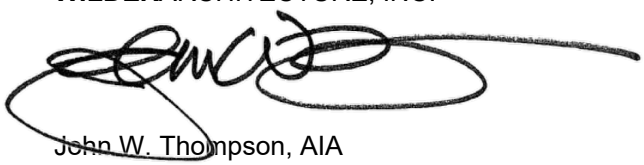
Based on the Owner's Scope of Services (Phase 1), we propose the following schedule for the project:

Programming	30 days
Schematic Design	60 days
Design Development	60 days
Construction Documents (50%)	90 days

Please provide a Notice To Proceed based on this proposal. An Agreement will be prepared by Wharton-Smith, Inc. based on the DBIA 540 agreement. Thank you for the opportunity to provide professional design services.

Sincerely,

WILDERARCHITECTURE, INC.



John W. Thompson, AIA
Partner

NORTH REDINGTON BEACH FIRE STATION

May 8, 2020

PROJECT BACKGROUND:

As part of the Request for Proposal (RFP) 189-0190-NC, Kimley-Horn and Associates (Consultant) is providing this scope of services to Wilder Architecture (Architect) for the North Redington Beach Fire Station and Lift Station project. The project includes the replacement of Pump Station 079 and the construction of a Fire Station, as described in Design Criteria Package in RFP 189-0190-NC. This Work Assignment contains the professional engineering services associated with the design and construction services for the Fire Station as detailed below:

PHASE I SERVICES

TASK 1.0 – PROGRAM VERIFICATION

A. Attend and participate in a project kick-off meeting with the key project team members and stakeholders from the County. Establish primary points of contact between the Architect, County, and Consultant. Discuss project goals and desired outcomes for each task.

B. Consultant will coordinate with Architect and County to obtain the required information to validate the design parameters for the Fire Station. This information may include, but not be limited to the following:

- Conceptual Documents,
- Design Criteria,
- Existing Stormwater Model,
- Existing Permits,
- FEMA Flood Information,
- Record Drawings or As-Builts,
- County GIS files,

C. Consultant will prepare a parking study of the existing site plan to analyze if the number of parking spaces requested by stakeholders is achievable. Up to two (2) exhibits will be provided with various parking configurations in an effort to maximize spaces on-site.

D. Based on meeting with Architect, Consultant shall prepare an initial Opinion of Probable Cost (OPC) based on the existing site plan, to compare to County's budgetary numbers.

TASK 2.0 – SCHEMATIC DESIGN

A. Consultant shall prepare Schematic Design Documents based on site plan approved during program verification. Documents will consist of single-line drawings of proposed building location, site improvements and piping distribution layout of all proposed facilities to be served. Once completed, Consultant shall submit to the Architect for review and comment.

B. Consultant shall schedule and attend one (1) pre-application meeting with Southwest Florida Water Management District (SWFWMD) to discuss permitting requirements for project.

C. Consultant will meet with the project team to review the "Final" Schematic Design Documents. From this review meeting, Consultant will make up to one (1) round of revisions to the "Final" Schematic Design Document and submit to the Architect. This task includes up to two (2) meetings, one (1) with the project team and one (1) with the Architect.

D. Consultant shall assist the Architect to certify that the Final Schematic Design totally complies with the Final Program except for such deviations that expressly have been brought to the Owner's attention and approved by Owner in writing.

E. Consultant will assist the Architect in their preparation of a cost estimate for construction in the Final Schematic Design and a written explanation for all variances between that cost estimate and Owner's approved Project budget.

TASK 3.0 – DESIGN DEVELOPMENT

A. Consultant shall prepare Design Development Documents based on the final Schematic Design as approved by the County as part of Task 2.

Design Development Documents shall include:

- Location Plan
- Existing Site Plan
- Site Plan
- Grading and Drainage Plan
- Utility Plan

a. Task 3.0A includes a signalization warrant analysis. It is not anticipated that a signal will be warranted based on the location of the Fire Station ingress/egress. Therefore, a signalization design is not included in these scope of services.

B. Consultant shall coordinate with the Architect to evaluate alternative ideas in terms of feasibility for construction, time, and cost. Consultant shall work with the Architect and project team to meet design requirements and identify the areas within the facility design, which offer the greatest potential for the elimination of unnecessary costs. This task includes up to two (2) meetings with the project team to review alternative ideas.

C. Consultant shall submit "Draft" Design Development Documents to the Architect for review and comment. Consultant will meet with the Architect to discuss and review the documents.

D. Consultant will prepare the "Final" Design Development Documents based on the comments received from the Architect and County.

E. Consultant will assist the Architect in their preparation of a cost estimate for construction based on the "Final" Design Development Documents and assist with a written explanation for all variances between that cost estimate and Owner's approved Project budget.

TASK 4.0 – CONSTRUCTION DOCUMENTS

A. Consultant shall prepare "Draft" Construction Documents, including all calculations up to a 50% completion level based on the final Design Development Documents approved by the County. The "Draft" Construction Documents will be submitted to the Architect for review and comment.

B. Consultant shall additionally prepare "Draft" Code Minimum Landscape Documents up to a 50% completion level based on the final Design Development Documents approved by the County. These documents will include plant type/location and irrigation notes, but will exclude product specifications, full construction details, and irrigation design; these items will be included with Phase 2.

C. Consultant shall prepare preliminary stormwater design calculations to verify the stormwater facilities can accommodate proposed fire station. These calculations assume the layout is locked in; significant design changes due to value engineering will be an additional service.

D. Consultant shall attend a review meeting with the Architect to discuss the "Draft" Construction Documents.

E. Consultant shall make any changes to the "Draft" Construction Documents from the review meeting with the project team and submit revised Construction Documents to the Architect. This task includes up to two (2) coordination and review meetings with the Architect and team.

F. Once the County has accepted the 50% Construction Documents, Consultant shall provide a certification to the Architect that the Construction Documents comply with the Final Program except for such deviations that have been expressly approved in writing by Owner.

Services beyond the scope proposed are excluded and can be included in the future Phase 2 proposal. The following are excluded from our Phase 1 proposal:

- 100% Construction Documents
- Signalization Design
- Irrigation Design
- Permitting of Construction Documents
- Construction Phase Services

COMPENSATION TO THE CONSULTANT

Description	**Compensation**
Task 1.0-Programming Services for Fire Station	$6,196.00
Task 2.0-Schematic Design Services for Fire Station	$8,149.00
Task 3.0-Design Development Services for Fire Station	$23,828.00
Task 4.0-Construction Documents for Fire Station	$20,937.00
Total	**$59,110.00**

For the Scope of Services described Consultant shall be compensated a Lump Sum of $59,110.00 in accordance with the terms of the agreement.

Project Name: North Redington Beach Pump Station & Fire Station - Phase I
Date Prepared: 5/8/2020
Estimated By: Ryan Hoppe

KHA Task # Subtask ID Number	KHA Task Name Subtask Name/Description	Chief Engineer $256	Senior PM $226	Project Manager $198	Senior PE $199	Senior Env Sci $233	PE II $170	PE I $137	Engineer Intern $115	Senior Designer $137	Designer / Eng Tech $125	Drafter $94	Sr Land Arch $246	Land Arch $174	Land Int $114	Const Engineer $174	Const Inspector $141	Admin $77	KHA Labor Total	Sub Cons Expense ($)
1.0	**Program Verification**																			
	Kick-Off Meeting			2					2											
	Data Collection & Review			2				4	12									2		
	Parking Study			2					10											
	OPC			2					10											
	Task 1.0 Total (Hours)	0	0	8	0	0	0	4	34	0	0	0	0	0	0	0	0	2	-	-
	Task 1.0 Total (Dollars)	**$0**	**$0**	**$1,584**	**$0**	**$0**	**$0**	**$548**	**$3,910**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$154**	**$6,196**	**$0.00**
2.0	**Schematic Design**																			
	Draft Schematic Design Documents			4					10	5										
	SWFWMD Pre-Application Meeting			3					3									2		
	Review Meeting & Finalize Schematic Documents			4					10	5										
	Final Program Certification			4																
	OPC Assistance			2					4									2		
	Task 2.0 Total (Hours)	0	0	17	0	0	0	0	27	10	0	0	0	0	0	0	0	4	-	-
	Task 2.0 Total (Dollars)	**$0**	**$0**	**$3,366**	**$0**	**$0**	**$0**	**$0**	**$3,105**	**$1,370**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$308**	**$8,149**	**$0.00**
3.0	**Design Development**																			
	Draft Design Development Documents		2	10				2	25	15		15						2		
	Signalization Warrant Analysis			4				36	36											
	Value Engineering Meetings			4																
	Review Meeting with Architect			4																
	Final Design Development Documents			2				4	12											
	OPC Assistance			2					4											
	Task 3.0 Total (Hours)	0	2	26	0	0	0	42	77	15	0	15	0	0	0	0	0	2	-	-
	Task 3.0 Total (Dollars)	**$0**	**$452**	**$5,148**	**$0**	**$0**	**$0**	**$5,754**	**$8,855**	**$2,055**	**$0**	**$1,410**	**$0**	**$0**	**$0**	**$0**	**$0**	**$154**	**$23,828**	**$0.00**
4.0	**50% Construction Documents**																			
	Draft 50% Construction Documents		4	4				4	25	10		8						2		
	Stormwater Management			10					20											
	Code Minimum Landscape Documents		4	2					30		2									
	Review Meeting with Architect			4																
	Final 50% Construction Documents		2	4				2	6			5								
	Program Certification			4																
	Task 4.0 Total (Hours)	0	10	28	0	0	0	6	81	10	2	13	0	0	0	0	0	2	-	-
	Task 4.0 Total (Dollars)	**$0**	**$2,260**	**$5,544**	**$0**	**$0**	**$0**	**$822**	**$9,315**	**$1,370**	**$250**	**$1,222**	**$0**	**$0**	**$0**	**$0**	**$0**	**$154**	**$20,937**	**$0.00**

KHA Labor	$59,110.00	
Subconsultant Expense		$0.00
Base Project Total (Dollars) Task 1-4	**$59,110.00**	

GEOTECHNICAL • ENVIRONMENTAL
MATERIALS TESTING

May 7th, 2020

Mr. John W. Thompson, AIA
Wilder Architecture, Inc.
1315 E. Seventh Ave. Suite 106
Tampa, FL 33605

Subject: Proposal for Geotechnical Engineering Services
North Redington Beach Fire Station
Pinellas County, Florida
MC^2 Proposal No. T101906.215

Dear Mr. Thompson:

MC Squared, Inc. (MC^2) is pleased to present this proposal for geotechnical engineering services associated with the North Redington Beach Fire Station located at 190 173rd Avenue East, North Redington Beach, Pinellas County, Florida. This proposal outlines the services we propose to offer on this project, our estimated fees and the schedule that would apply.

PROJECT AND SITE INFORMATION

Project information has been provided by Mr. Wade Wood, PE of **Kimley-Horn** and John Thompson, AIA, LEED AP of **Wilder Architecture** through e-mailed and phone communications. Based on our understanding, a fire station, pump station and storm water pond are being proposed at the subject property.

MC^2 performed three (3) Standard Penetration Test (SPT) borings on July 25, 2017, to aid in the design of Pump Station 079 as a part of **MC^2** Project No. **T101604.196** at this same site. Based on these borings, very dense/hard subsurface soil conditions are likely to be encountered at a depth of approximately 30-ft. below the ground surface.

For this project, **MC^2** has been requested to provide recommendations for the design and construction of the proposed fire station, pump station and stormwater pond(s). Recommendations for the construction of the proposed asphalt driveway and parking area are also required.

PROPOSED SERVICES

MC² would provide the following services to support the design of the project:

1. Review readily available site subsurface information from previous geotechnical studies performed by **MC²**, as well as by others that may be provided to us by **Kimley-Horn**.

2. Conduct a visual reconnaissance of the proposed improvement site to identify areas with possible access issues for drilling equipment and personnel.

3. Locate existing utilities – we have included in the fee estimate, the cost of hiring a private utility locator to mark any underground utilities in the area of the proposed SPT borings. The cost for this service is $800.00. Please note that if this is not approved, and **MC²** is instructed to use the Sunshine 811 services only, then **MC²** cannot be held liable if any unmarked utilities are damaged during the drilling of the SPT borings, since they are on private property. Alternatively, **Kimley-Horn** may wish to undertake the marking of the utilities itself.

4. It is assumed that permits are not required to perform the requested SPT and Hand-Auger (HA) borings. **Kimley-Horn** would also assist in coordinating access to the site, as needed.

5. Perform a total of six (6) SPT borings in general accordance with ASTM D1586, as detailed below. A hand-auger (HA) boring would be performed in the upper 4-ft. of the SPT borings to avoid potentially unmarked utilities. Additionally, the HA borings would be used to gauge the seasonal high-water table.

    - Two (2) SPT borings to 35-ft. below the ground surface (bgs) and one (1) SPT boring to 50-ft. bgs within the footprint of the proposed fire station.
    - One (1) SPT boring to 50-ft. bgs at the newly proposed location of Pump Station 079.
    - Two (2) SPT borings to 15-ft. bgs, one (1) within each proposed stormwater pond.

    NOTE: All boring locations would be approved by **Kimley-Horn** personnel prior to performing the drilling operations.

6. Perform a total of two (2) additional HA borings to 5-ft. bgs or until borehole collapses, whichever comes first. These HA borings would be performed within the proposed northern paved parking area.

7. Perform a total of two (2) Double-Ring Infiltration (DRI) Tests within the footprints of the proposed stormwater ponds. The DRI tests would be performed in the depth range of zero to 1.5-ft. bgs, at locations requested by **Kimley-Horn**.

8. Measure and record the depth to groundwater, if encountered, and before drill slurry is utilized in the drilling process.

9. Upon completion of the drilling operation, the boreholes would be backfilled using bentonite pellets and soil cuttings, as required.

10. Visually examine all recovered soil samples in the laboratory and performing laboratory tests on selected representative samples to characterize the subsurface soil profile. Description of the soil samples would be in accordance with the Unified Soil Classification System (USCS), as appropriate. The laboratory classification testing would likely include percent passing the U.S. No. 200 sieve, Atterberg Limits tests, organic content and natural moisture content determinations.

The information and data gathered from our field and laboratory tasks would be presented in our geotechnical report and would include the following:

1. General assessment of area geology based on published literature, experience and boring information.

2. General location and description of potentially deleterious materials encountered in the boring, which may interfere with the proposed construction or performance, including existing fills, plastic clays, surficial organics, etc.

3. Critical design and/or construction considerations based on the soil and groundwater conditions developed from the borings.

4. Groundwater level in the boring, if encountered, and estimate of the seasonal high groundwater level, and infiltration rate(s) to be used for pond design support.

5. Recommendations for allowable soil bearing capacity for shallow foundations and estimate of total and differential settlements.

6. Preliminary deep foundation design parameters and approximate capacity ranges would be provided if shallow foundations cannot be used based on boring conditions encountered and provided anticipated structural loads. If further detailed analyses of deep foundations are later required, an additional fee of 15 to 20% of the geotechnical estimate should be allocated for budgeting purposes if these services are determined necessary.

One of our qualified staff engineers or geologists would observe and document the field activities. The field work and report preparation would be overseen by one of our State of Florida licensed professional geotechnical engineers.

ESTIMATED SCHEDULE

We anticipate that we could begin our services within five (5) business days of receiving written authorization to proceed and access to the property. Utility clearance tickets and/or private utility location is estimated to take five (5) business days to mobilize and complete. The fieldwork is then expected to take three (3) business days to complete, assuming no delays such as access issues or inclement weather conditions. We would strive to mobilize as quickly as possible after completion of marked utilities.

Laboratory testing is expected to take up to five (5) business days to complete once all fieldwork is completed. We further estimate that we would complete and issue an electronic version of our Report approximately three (3) weeks after completion of the laboratory testing. A final geotechnical report could be submitted about one (1) week after receipt of one (1) round of coordinated review comments by the design team. Three (3) hard copies of the report could be submitted, if requested, along with an electronic copy.

ESTIMATED FEE

MC² would provide the above scope of services for an estimated fee of **$19,751.00** in accordance with **Attachment A**. Please note that this fee includes the amount of $800 for private utility locate service. If such service is eliminated, then the total fee would be $18,951.00.

Any additional work required beyond the scope of services included in this proposal (e.g., additional analyses/testing or other factors beyond **MC²** control) would be invoiced on a time and expense basis in accordance with the Attached Schedule of Fees. However, additional work would not be performed without your prior written authorization.

EXCLUSIONS

This proposal does not include any environmental services. Also, this proposal does not address any issues related to sinkholes. If we encounter during our field explorations conditions that warrants sinkhole assessment, then we would notify you accordingly and prepare a budgetary estimate for the additional services. Our fees do not include surveying of the SPT boring locations and elevations.

MC² appreciates being considered for this project and looks forward to working with you. Please do not hesitate to call if you have any questions.

Respectfully submitted,
MC Squared, Inc.

Thomas G. Ali, PE
Vice President

Attachments: Attachment A - Schedule of Fees

Attachment A
SCHEDULE OF FEES
North Redington Beach Fire Station
Pinellas County, Florida
MC^2 Proposal No. T101906.215
October 11, 2019

	Quantity	Unit		Unit Rate		Total Cost
I. FIELD EXPLORATION						
1. Mobilization of Men & Equipment (drilling)	1	Trip	$	475.00	$	475.00
2. Support Vehicle (stakeout/borings/DRITs/recon.)	6	Trip	$	187.00	$	1,122.00
3. Standard Penetration Test (SPT) borings (2 at 15', 2 at 35' & 2 at 50' = 200')						
0 to 50 Feet Deep	200	L. F.	$	14.50	$	2,900.00
50 to 100 Feet Deep	0	L. F.	$	17.50	$	0.00
4. Seal Boreholes with Cement/Bentonite						
0 to 50 Feet Deep	200	L. F.	$	6.50	$	1,300.00
50 to 100 Feet Deep	0	L. F.	$	7.50	$	0.00
5. Casing (if required)						
0 to 50 Feet Deep	0	L. F.	$	9.00	$	0.00
50 to 100 Feet Deep	0	L. F.	$	11.00	$	0.00
6. Hand-Auger Borings (2 at 5' = 10'; Proposed Paved Areas)	10	L. F.	$	10.50	$	105.00
7. Double-Ring Infiltration Tests (DRIT, 0-1.5' bgs.)	2	Each	$	513.00	$	1,026.00
8. Pavement Core (if required)	0	Each	$	200.00	$	0.00
9. Private Utility Location Service	1	Each	$	800.00	$	800.00
10. Stakeout/Clear Utilities/Log Borings (Sr. Technician)	24	Hour	$	78.00	$	1,872.00
	SUBTOTAL FIELD EXPLORATION					***$ 9,600.00***
II. LABORATORY TESTING (additional for new scope)						
1. Visual Classification (1 Set = 5 ft.)	40	Set	$	8.00	$	320.00
2. Natural Moisture Content	10	Each Test	$	10.50	$	105.00
3. Grain Size Analysis (Single Sieve)	10	Each Test	$	70.00	$	700.00
4. Grain Size (Full Sieve)	0	Each Test	$	85.00	$	0.00
5. Organic Content Tests	2	Each Test	$	45.00	$	90.00
6. Atterberg Limit Tests	5	Each Test	$	120.00	$	600.00
	SUBTOTAL LABORATORY TESTING					***$ 1,815.00***
III. ENGINEERING SERVICES						
1. Project Manager	7	Hour	$	195.00	$	1,365.00
2. Chief Engineer	3	Hour	$	225.00	$	675.00
3. Project Engineer	15	Hour	$	141.60	$	2,124.00
4. Engineer	20	Hour	$	135.00	$	2,700.00
4. Senior Technician	0	Hour	$	78.00	$	0.00
5. CADD Technician	12	Hour	$	78.00	$	936.00
6. Clerical	8	Hour	$	67.00	$	536.00
	SUBTOTAL ENGINEERING SERVICES					***$ 8,335.25***
	SUBTOTAL FIELD AND LABORATORY SERVICES					$ 11,415.00
	TOTAL ALL SERVICES					**$ 19,751.00**

Notes:

1. Quantities of borings and testing are estimates and may be adjusted based on field conditions. Actual costs will be based on amount used.

May 8, 2019

John W. Thompson, AIA
Wilder Architecture, Inc.
1315 Seventh Avenue, Suite 106
Tampa, FL. 33605

Re: Proposal for Professional Surveying Services
N. Reddington Beach Pump Station & Fire Station:
ALTA/NSPS Boundary & Topographic Survey (1.8 Ac. +/-)
Brandon, Florida

Dear Mr. Wood:

Pursuant to the information you have provided, Hyatt Survey Services, Inc. is pleased to submit this proposal for the following professional surveying services required on the above-referenced project:

SCOPE OF SERVICES

I. **ALTA/NSPS Land Title Survey:**

A. Hyatt Survey will perform an ALTA/ACSM Land Title Survey of the property referenced above. (See attached exhibit) This survey will include the mapping of any visible aboveground encroachments either way across boundary lines. All work will be performed in accordance with Items 1 – 5, 5, 6b, 7(a, b1 & c), 8, 9, 11, 13, 14, 16 - 18 & 20 from Table "A" of the "2016 Minimum Standard Detail Requirements for Land Title Surveys as adopted by ALTA/NSPS and the "Table A Supplement" as attached hereto.

B. A current title report will be required before commencement of the survey in order to identify the deed legal description and any right-of-way takings, easements, conveyances, restrictions, and/or other matters of survey in the Public Records that may affect subject property.

C. Hyatt Survey will locate visible aboveground site improvements, utilities and appurtenances. Underground utilities will be graphically depicted on the survey drawing(s) in accordance with visible appurtenances. Hyatt Survey Services, Inc. will assume NO responsibility for the completeness and/or accuracy of any subsurface data represented on the survey drawing(s) from information provided by others.

D. Hyatt Survey will determine site elevations on a maximum fifty (50') grid, at grade breaks, at changes in direction on curbing/paving, extending to the far edge of pavement of adjacent streets or rights-of-way and to 10 feet off site (where accessible) on other sides not fronting a street/right-of-way. No elevations will be determined within wetland areas or ponds / lakes.

E. All elevations will be referenced to existing NGS/County Vertical Control benchmarks.

F. Hyatt Survey will locate living trees of 4" or greater DBH. No trees will be located within wetland areas.

G. Hyatt Survey will provide the survey drawing in AutoCAD format prepared to the client's CAD/layer specifications and six (6) signed and sealed hard copies of the survey.

H. Hyatt Survey will require no more than forty-five (45) days to complete this survey.

Hyatt Survey proposes to provide these services for the lump sum fees as follows:

1. ALTA/NSPS Boundary & Topographic Survey: **$ 4,750.00**

All work will be performed in accordance with the standards of practice outlined in Chapter 5J-17 of the Florida Administrative Code, pursuant to Section 472.027, Florida Statutes.

If you have any questions or comments, please do not hesitate to contact me at 941-748-4693. I look forward to working with you on this project.

Sincerely,
HYATT SURVEY SERVICES, INC.

Pamela A. Hyatt

Pamela A. Hyatt, P.S.M.
President

Dialogue
public relations for water / construction / conservation

Pinellas County
Redington Beach Fire Station & Lift Station
Community Outreach Scope & Fee – Lump Sum
Pre-Construction/Design Phase Only – DRAFT 5.1.20

These scopes are for public information and outreach services during the pre-construction phase of both the Redington Beach Fire Station and Lift Station projects. Both scopes based on the following assumptions:

- Information will be posted on Pinellas County's website to minimize the need for printing.
- Community meetings will use Pinellas County's Zoom license.
- Pinellas County will help publicize project-related news on Nextdoor.
- Any resident questions or concerns will be directed to Pinellas County customer service or to the Pinellas County app.

Fire Station – Pre-Construction (12 months)

Task 1: Project Coordination, Direct Support & Coordination
Task includes time for public information consultant to attend up to 10 meetings with the project team, management of the public outreach element of the project, preparation of monthly invoices, and miscellaneous communications.

Task 2: Public Information Materials

- Draft, lay out and finalize an 8.5" x 11" project fact sheet. Fact sheet will include project overview, building rendering, benefits and schedule. Includes printing up to 100 color copies, 2-sided, no bleeds.
- Draft and finalize FAQs (Frequently Asked Questions) on the project for use on the County's project web page.
- Draft, finalize and mail via first class mail a one-page letter on Pinellas County letterhead to up to 100 residents in the project vicinity. The letter and #10 envelopes will be provided by Pinellas County. The purpose of the letter is to ensure residents are apprised of the fire station construction, invite residents to a Zoom community meeting, and direct residents to a County web page for more information.
- Create up to four (4) social media posts and one (1) news release for Pinellas County, North Redington Beach or Redington Shores dissemination (social media channels, web sites, local media, etc.).

Task 3: Public/Stakeholder Involvement

- Plan and implement, with Pinellas County staff, one (1) Zoom virtual community meeting. This meeting will be held prior to construction to introduce the project to the community, discuss the project need and benefits, and present the fire station design. Residents' comments and questions will be answered in the virtual forum after a brief presentation.
    - Assumes using Pinellas County's Zoom license. Pinellas County will determine on which platforms to stream the meeting (e.g., Facebook, YouTube, etc.).
    - Produce and place up to four (4) corrugated plastic yard signs on H-frames to promote the virtual meetings. The signs feature the project name and the date, time and other meeting details.
    - Work with the project team to produce one (1) PowerPoint presentation for the meeting. Assumes using Pinellas County PowerPoint template.
    - Review and compile meeting input and develop a meeting summary after each meeting.

Fire Station – Pre-Construction Total: $12,945

Redington Beach Fire Station Pre-Construction
Public Information & Involvement
12-Month Timeframe

	Dialogue PR				
	Senior PR Consultant	**Public Relations Specialist**	**Graphic Artist**	**Direct Costs**	**Totals**
	$225.00	**$160.00**	**$120.00**		
Task 1 - Project Management	14				
	$3,150.00				$3,150.00
Task 2- Public Information					
Overall project fact sheet, FAQs, web content/social media	15	4			
	$3,375.00	$640.00			$4,015.00
Task 2- Public Information					
Project PowerPoint; Zoom meeting coordination, attendance, summary; direct mail, yard signs	16	6	3.5	$800.00	
	$3,600.00	$960.00	$420.00	$800.00	$5,780.00
Hours Subtotal	45	10			
Totals	**$10,125.00**	**$1,600.00**	**$420.00**	**$800.00**	**$12,945.00**

APPENDIX 1 – SCOPE OF SERVICES

Lift Station

SCOPE OF SERVICES
Professional Design-Build Services

North Redington Beach Fire Lift Station Replacement
Contract No. 189-0190-NC(SS)

PROJECT OBJECTIVE

The attached Design Criteria package prepared by Pinellas County Utilities, along with Tetra Tech, Inc. (DESIGN CONSULTANT) provides the basis for project development. In a separate contract with Pinellas County, DESIGN CONSULTANT will be responsible for turn-key design and permitting of the lift station. Wharton-Smith and all consultants, subcontractors, and agents take no design responsibility for the lift station contract documents. Wharton-Smith will be responsible for reviewing the documents produced by DESIGN CONSULTANT, construction and startup of the sanitary sewer lift station relocation and replacement. The overall objective of the project is to replace the existing sanitary sewer lift station on the same site as a fire station.

PROJECT BACKGROUND

The existing Pump Station 079 is to be located on site with a new fire station. The infrastructure is aging, and the lift station needs to be replaced to serve the community. The project will incorporate a new lift station and its associated equipment in a new location coordinated with the fire station.

GENERAL SCOPE OF WORK

Phase 1 Activities

- Review of the contract documents produced by DESIGN CONSULTANT, including constructability, value engineering, cost estimates, and schedule.
- Competitively bid out all work packages for construction of the items generally described below and as shown in the updated construction documents.
- Preparation and submission of the Lump Sum Guaranteed Maximum Price (GMP), based on the updated construction documents, and construction of the project.
- Preparation of an updated project schedule and date for Substantial Completion of the Project upon which the Lump Sum Guaranteed Maximum Price (GMP) for the project is based.

DETAILED SCOPE OF SERVICES FOR PHASE 1 SERVICES

General

- The Project is located at 190 173rd Avenue East, North Redington Beach, FL.
- The Project consist of the design and construction of a new fire station facility, and the relocation and replacement of a sanitary sewer lift station.

Task 1 – Programming Services

1.1 Review and Evaluate Owner's Project Criteria: Owner shall provide Design Build (DB) firm with Owner's Project Criteria describing Owner's program requirements and objectives for the Project, including all County standards and requirements. Project Criteria may include conceptual documents, design criteria, performance requirements and other technical materials and requirements prepared by or for Owner. Design Build (DB) firm shall meet with Owner to discuss and review Owner's criteria.

- Prepare a written evaluation of the Owner's criteria. Design Build (DB) firm shall meet with Owner to discuss evaluations and recommendations.

1.2 Cost Estimate: The Design Build (DB) firm shall review the Owner's budget and any applicable cost estimated as compared to the Owner's Design Criteria Package. Owner will provide the Design Build (DB) firm with the detailed Opinion of Probable Construction Cost (OPCC) developed by engineer/architect during preparation of the Evaluation Study.

1.3 The Design Build (DB) firm shall provide a project schedule based on the Owner's Design Criteria Package documents.

1.4 Value Engineering Analysis: The Design Build (DB) firm will work with the Owner and the project's users to meet design requirements and identify areas within the design that offer the greatest potential for elimination of unnecessary costs.

Task 2 – Schematic Design/Updated

Omitted from scope of work at request of County

Task 3 – Design Development/Updated Contract Documents

3.1 After receipt of the Updated Contract Documents, the Design Build (DB) firm will identify long lead and special-order materials and equipment.

3.2 Value Engineering Analysis: The Design Build (DB) firm will work with the Owner and the project's users to meet design requirements and identify areas within the design that offer the greatest potential for elimination of unnecessary costs. The requirements of the Final Program shall not be eliminated as value engineering items, except with the Owner's express written approval.

3.2 Constructability Review: Design Build (DB) firm will perform a constructability review to evaluate alternate ideas in terms of their feasibility to constructability, time impact and cost. The DESIGN CONSULTANT will assist the Design Build (DB) firm in completing the constructability review and value analysis. The review and analysis will yield ideas for alternate materials of construction and any other ideas that will potentially reduce the overall construction cost of the ongoing design. The DESIGN CONSULTANT will also participate in a Constructability Review and Analysis meeting with the County to discuss ideas.

- Substitutes and alternates will be evaluated by all parties on a case by case basis.
- A market analysis will not be provided during Phase 1 services.

3.4 Cost Estimate: The Design Build (DB) firm will provide the Owner with a cost estimate based on the Updated Contract Documents, together with a written explanation of all variances between the estimate and the Budget.

3.5 Schedule: The Design Build (DB) firm will provide the Owner with a project schedule along with a written explanation of how the firm intends to construct the facilities.

Task 4 – Construction Documents/Issued for Construction Documents

4.1 Upon receipt of the Construction Documents, the Design Build (DB) team will conduct a review of the following items.

4.2 Value Engineering Analysis: The Design Build (DB) firm will work with the Owner and the project's users to meet design requirements and identify areas within the design that offer the greatest potential for elimination of unnecessary costs. The requirements of the Final Program shall not be eliminated as value engineering items, except with the Owner's express written approval.

4.3 Constructability Review: Design Build (DB) firm will perform a constructability review to evaluate alternate ideas in terms of their feasibility to constructability, time impact and cost. Kimley-Horn will assist the Design Build (DB) firm in completing the constructability review and value analysis. The review and analysis will yield ideas for alternate materials of construction and any other ideas that will potentially reduce the overall construction cost of the ongoing design. The Kimley-Horn will also participate in a Constructability Review and Analysis meeting with the County to discuss ideas.

- Substitutes and alternates will be evaluated by all parties on a case by case basis.
- A market analysis will not be provided during Phase 1 services.

4.4 Schedule: The Design Build (DB) firm will provide the Owner with a project schedule along with a written explanation of how the firm intends to construct the facilities.

Task 5 – Lump Sum Cost Estimate/GMP Proposal

5.1 Prepare and submit Construction Proposal based on the Issued for Construction Documents approved by the Owner in Section 5.1 hereof, and any other documents upon which the parties may agree, Design Builder shall submit a GMP proposal to Owner (the "Proposal") within thirty (30) days after approval. Design Build (DB) firm will provide open book estimates for all work packages the Design Build (DB) firm intends to self-perform. The work packages will be reviewed and negotiated as part of the GMP Proposal Other subcontractor and work packages will be prepared and provided to a minimum of three (3) qualified bidders for evaluation and inclusion into the Final Proposal. GMP Proposal shall include the following unless the parties mutually agree otherwise:

- A proposed Lump Sum Price for completion of the construction documents, all permitting, and construction of the Project.
- An Updated Project Schedule and date of Substantial Completion of the Project upon which the Lump sum Price for the Project is based.
- All other additional information necessary for the parties to enter into the Phase 2 Agreement.

5.2 Review of GMP Proposal: Design Build (DB) firm shall meet with the Owner to review and discuss the GMP Proposal. Design Build (DB) firm shall review the Proposal as agreed in the meeting and resubmit.

5.3 Completion of this Phase of the Agreement: Design Build (DB) firm's services under this Phase 1 of the Agreement shall be deemed completed upon meeting with Owner to discuss the Proposal and making those revisions to the Proposal, if any, the Design Build (DB) firm finds acceptable.

Task 6 – Allowances

6.1 The following allowances are included in Phase 1. All unused allowance will be returned to the County.

6.2 Public Relations and Community Outreach

6.2.1 Provide a public outreach campaign to inform the neighboring communities about the project and provide them with a platform to identify and address any neighborhood concerns about construction activities.

6.2.2 Provide a campaign to attract and engage local and disadvantaged subcontractors and suppliers.

6.3 Subsurface Utility Designation

6.3.1 Provide underground utility investigation as necessary for design.

6.4 OHC Asbestos and Lead Study

6.3.1 Provide study to see if there is lead and/or asbestos present that need to be mitigated during construction.

Task 7 – Miscellaneous Costs

7.1 Not Applicable

Schedule of the Milestones and Deliverables for Phase 1

Lift Station

Deliverable/Milestone	Approximate Calendar Weeks from Phase 1 NTP
Phase 1 Kickoff Meeting	1
Task 2 – Program Verification/DCP Review	5 after Kickoff
Task 3 – Schematic Design Completion	Omitted
Task 4 – Final Design Development/Updated Contract Documents	5 after receipt of documents
Task 5 – Issued for Construction Documents and GMP Proposal Submission	6 after receipt of documents
Completion of Phase 1 Activities – Approval of GMP Proposal and Execution of Lump Sum Amendment	17
Issuance of NTP for Phase 2 – Start of Construction	

Pinellas County
North Redington Beach Fire Station and Lift Station Replacement
Lift Station Portion Only
Wharton-Smith, Inc. Design Build Team - Phase 1 Services Cost Summary

TASK	Wharton-Smith	Kimley Horn	Task Sub - Totals
Task 1 - Programming Services	$10,005	$9,952	$19,957
Task 2 - Schematic Design	$0	$0	$0
Task 3 - Design Development	$13,700	$22,326	$36,026
Task 4 - Construction Documents	$8,130	$26,515	$34,645
Task 5 - Lump Sum Cost Estimate	$17,330	$0	$17,330
Task 6 - Allowances	$25,445	$0	$25,445
Task 7 - Miscellaneous Expenses	$0	$0	$0
Sub Totals	$74,610	$58,793	$133,403
Task 8 - Insurance	0.47%		$627
Sub Totals			$134,030
Task 9 - Phase 1 Services Contingency	12% Contingency		$16,084
	Grand Total All Costs - Lift Station Only		$150,114

Pinellas County

North Redington Beach Lift Station Replacement

Wharton-Smith, Inc.
Scope of Phase 1 Services - Lift Station Only

	Project Management							Estimating		Field				Other			
	PIC	DB Manager	Precon Mgr	Sr. PM	PM	Assistant PM	Admin	Chief Estimator	Estimators	Super	Field Crew	Manager	QAQC	MTRL & SUB	Labor Hours	GC Cost	Total Cost
Hourly Rate	$250.00	$210.00	$195.00	$195.00	$175.00	$150.00	$75.00	$185.00	$155.00	$210.00	$415.00	$195.00	$195.00	$1.00			
Task ID	**A. Scope of Services**																
1 - Programming Services																	
1.1	General Statement - Design Services														0.0		$0
1.2	Owner provided Project Criteria - Review & Evaluate Owner's Project Criteria		2.0	4.0	4.0			1.0		2.0					13.0		$2,585
	Meeting 1 - Discuss and review Owner's Project Criteria														0.0		$0
1.2.a	Onsite Validation of existing Technology														0.0		$0
1.2.b	Prepare written evaluation of Owner's criteria			2.0											2.0		$390
	Meeting 2 - Discuss D/B Evaluation and recommendations		1.0	1.0	1.0					1.0					4.0		$810
1.2.c	Develop Detailed Final Program														0.0		$0
	Meeting 3 - Review & Discuss Final Program Recommendation														0.0		$0
1.2.d	Complete Detailed Final Program with revisions														0.0		$0
	Meeting 4 - Final Review of Final Program														0.0		$0
1.3	Budget Feasibility Study														0.0		$0
	Statement of Constructability, costs, material selections	1.0	1.0	3.0	2.0			4.0	12.0	1.0					24.0		$4,245
1.4	Presentation of Results for Final Program														0.0		$0
	Conduct "User" Interviews														0.0		$0
	Presentation of Results and Building Program Update														0.0		$0
	Building Functions and unique activities														0.0		$0
	Space Requirements and function														0.0		$0
	Gen Des. Outlining project components														0.0		$0
	Provide updated Project Schedule		1.0	2.0	4.0	1.0				2.0					10.0		$1,975
	Subtotal - Programming Services	1.0	5.0	12.0	11.0	1.0	0.0	0.0	5.0	12.0	6.0	0.0	0.0	0.0	0.0	53.0	$0	$10,005
2 - Schematic Design - One Preliminary Design Concepts																	
2.1	Prepare Preliminary Conceptual Design Plan														0.0		$0
	Design Camps/Meetings														0.0		$0
	Odor Control Study														0.0		$0
	Meeting 1 - Discuss Schematic Design Documents														0.0		$0
	Meeting 2 - Discuss Changes to "selected" Schematic Design														0.0		$0
	Meeting 3 - Discuss Final Schematic Design Document														0.0		$0
	Provide Constructability Statement and Cost Estimate														0.0		$0
	Evaluate Condition of Exiting Equipment to be Reused														0.0		$0
2.2	N/A														0.0		$0
2.3	Value Engineering - Identify Areas of Possible Cost Reduction														0.0		$0
	Meeting 1 - Discuss VE and Cost Reduction Ideas														0.0		$0
2.4	Pre-Submittal Document Review Meeting														0.0		$0

Pinellas County

North Redington Beach Lift Station Replacement

Wharton-Smith, Inc.
Scope of Phase 1 Services - Lift Station Only

		Project Management							Estimating		Field				Other			
Task ID		PIC	DB Manager	Precon Mgr	Sr. PM	PM	Assistant PM	Admin	Chief Estimator	Estimators	Super	Field Crew	Manager	QAQC	MTRL & SUB	Labor Hours	GC Cost	Total Cost
	Hourly Rate	$250.00	$210.00	$195.00	$195.00	$175.00	$150.00	$75.00	$185.00	$155.00	$210.00	$415.00	$195.00	$195.00	$1.00			
	A. Scope of Services																	
	Meeting 1 - Formal Presentation of Findings															0.0		$0
2.5	Prepare & Submit Phase 1 Schematic Design Documents for Final Review															0.0		$0
	Modify Schematic Design Docs Following Review															0.0		$0
	Meeting 1 - Review Revised Schematic Design Documents															0.0		$0
2.6	Cost Estimate Based on Final Schematic Design Docs															0.0		$0
	Updated Schedule Based on Final Schematic Design Docs															0.0		$0
2.7	**Schematic Design - Deliverables**															0.0		$0
	Drawings for Design Concept															0.0		$0
	Civil Site Plan															0.0		$0
	Plumbing - Single Drawing															0.0		$0
	Structural - Single Drawing Per Structure															0.0		$0
	Electrical - Single Drawing															0.0		$0
	I&C - Single Drawing Including Proposed Fiber Path															0.0		$0
	3D - Provide 3D Rendering of All Above Drawings															0.0		$0
	Project Cost															0.0		$0
	Concept #1 Cost															0.0		$0
	Preliminary Project Schedule															0.0		$0
	Subtotal - Schematic Design	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	$0	$0
	3 - Design Development Phase for Selected Design Concept																	
	Owner approval of Final Schematic Design Docs and Issuance of Authorization to Proceed																	
3.1	Prepare Design Development Docs															0.0		$0
	Identify Long-Lead or Special Order Items				1.0											1.0		$195
	Permit Determinations															0.0		$0
3.2	Detailed Design Development															0.0		$0
	Civil															0.0		$0
	Architectural															0.0		$0
	Structural															0.0		$0
	Electrical															0.0		$0
	Mechanical															0.0		$0
	Geotechnical															0.0		$0
	Existing Structural Evaluation															0.0		$0
	Interim Meetings to Review Design Development Docs															0.0		$0
3.3	Perform Material Research & Prepare Draft Specifications															0.0		$0
3.4	Identify & Coordinate Utility Service Design Req's		1.0	1.0	1.0						1.0					4.0		$810
	On site existing piping and utilities investigations as authorized under Design Contingency															0.0		$0
	On site drainage system investigations															0.0		$0
	Drainage designs															0.0		$0

Pinellas County

North Redington Beach Lift Station Replacement

Wharton-Smith, Inc.
Scope of Phase 1 Services - Lift Station Only

		Project Management							Estimating		Field				Other			
		PIC	DB Manager	Precon Mgr	Sr. PM	PM	Assistant PM	Admin	Chief Estimator	Estimators	Super	Field Crew	Manager	QAQC	MTRL & SUB	Labor Hours	GC Cost	Total Cost
	Hourly Rate	$250.00	$210.00	$195.00	$195.00	$175.00	$150.00	$75.00	$185.00	$155.00	$210.00	$415.00	$195.00	$195.00	$1.00			
Task ID	**A. Scope of Services**																	
	Coordinate with storm water management district having jurisdiction				1.0						1.0					2.0		$405
3.5	Evaluate Alternative Ideas		1.0	2.0	1.0				1.0		1.0					6.0		$1,190
	Meeting to review alternative with Owner and "users"		1.0	1.0	1.0											3.0		$600
3.6	*Meeting to Review Design Development Docs*		1.0	1.0	1.0											3.0		$600
	Modify Design Development Docs following Review															0.0		$0
	Prepare constructability statement	1.0	1.0	3.0	2.0						1.0					8.0		$1,645
	Provide project cost estimate															0.0		$0
3.7	Develop Selected Alternative Ideas															0.0		$0
3.8	Prepare Final Design Development Docs for Review															0.0		$0
	Presentation of Final Design Development Docs		1.0	1.0	1.0											3.0		$600
3.9	Included with 4.8 above															0.0		$0
3.10	Modify Design Development Docs following Owner Review															0.0		$0
3.11	Prepare Cost Estimate based on Final Design Development Docs	1.0	2.0	4.0	3.0				4.0	20.0	1.0					35.0		$6,085
	Update Schedule based on Final Design Development Docs		1.0	2.0	3.0	1.0					1.0					8.0		$1,570
3.12	**Design Development Phase - Deliverables**															0.0		$0
	Complete 70% Drawings sufficient detail to provide GMP															0.0		$0
	Cover sheet															0.0		$0
	Index of Drawings															0.0		$0
	Civil Site Plans and piping/utilities															0.0		$0
	Plumbing - Single drawing															0.0		$0
	Structural - Five drawings per structure															0.0		$0
	Electrical - Signel Drawing															0.0		$0
	I&C - Single Drawing Including Proposed Fiber Path															0.0		$0
	3D - Provide 3D Rendering of All Above Drawings															0.0		$0
	Project cost															0.0		$0
	Updated Project Scheudle															0.0		$0
	Subtotal - Design Development Phase	2.0	9.0	15.0	15.0	1.0	0.0	0.0	5.0	20.0	6.0	0.0	0.0	0.0	0.0	73.0	$0	$13,700
	4 - Construction Documents																	
	Owner approval of Final Design Development Docs and Issuance of Authorization to Proceed																	
4.1	Prepare Construction Documents (50%) and Specifications (90%) for Review - REVIEW ONLY		2.0	2.0	4.0				1.0		1.0					10.0		$1,985
	Meeting to review construction doc		1.0	1.0	1.0											3.0		$600
	Modify Construction Documents following Review															0.0		$0
	Permit review (Fees in Phase 2)		1.0	1.0	2.0						1.0					5.0		$1,005
4.2	Prepare and submit Construction Proposal (Task 5)															0.0		$0
4.2.1	Lump Sum Pricing															0.0		$0

Pinellas County

North Redington Beach Lift Station Replacement

Wharton-Smith, Inc.
Scope of Phase 1 Services - Lift Station Only

			Project Management							Estimating		Field				Other			
			PIC	DB Manager	Precon Mgr	Sr. PM	PM	Assistant PM	Admin	Chief Estimator	Estimators	Super	Field Crew	Manager	QAQC	MTRL & SUB	Labor Hours	GC Cost	Total Cost
		Hourly Rate	$250.00	$210.00	$195.00	$195.00	$175.00	$150.00	$75.00	$185.00	$155.00	$210.00	$415.00	$195.00	$195.00	$1.00			
Task ID	**A. Scope of Services**																		
4.2.2	Update Project Schedule																0.0		$0
4.2.3	Add'l Info Required for Phase 2 Agreement																0.0		$0
4.3	*Meeting to Review Construction Proposal*																0.0		$0
	Modify Construction Proposal following Meeting																0.0		$0
4.4	Provide Certification of Construction Docs																0.0		$0
4.5	Completion of Phase 1 activities Meeting (above)			1.0	1.0	1.0											3.0		$600
4.6	**Construction Documents - Deliverables**																0.0		$0
	Complete 70% Drawings sufficient detail to provide GMP																0.0		$0
	Cover Sheet																0.0		$0
	Index of Drawings																0.0		$0
	Detail Sheets with sufficient details to accompany plans																0.0		$0
	Civil & Site Plans																0.0		$0
	Existing site plans and demolition plans																0.0		$0
	Grading and drainage plans and details																0.0		$0
	Yard piping plans - 3 sheets minimum																0.0		$0
	Plumbing - Single drawing for each structure																0.0		$0
	Structural - Five drawings per structure wih all details and sections, elevations																0.0		$0
	Electrical																0.0		$0
	Service requirements																0.0		$0
	One line diagrams																0.0		$0
	ductbanks																0.0		$0
	Floor plans																0.0		$0
	Lighting plans																0.0		$0
	Conduit layouts/schedules																0.0		$0
	I & C - 4 drawings minmum																0.0		$0
	Tagged field instruments																0.0		$0
	Control panels																0.0		$0
	PLC's																0.0		$0
	Fiber path																0.0		$0
	SCADA																0.0		$0
	General instrumentation																0.0		$0
	Complete specifications including but not limited to:																0.0		$0
	All equipment																0.0		$0
	Piping and Valves																0.0		$0
	Instrumentation																0.0		$0
	Electrical																0.0		$0
	Summary of work																0.0		$0
	General instrumentation																0.0		$0

Pinellas County

North Redington Beach Lift Station Replacement

Wharton-Smith, Inc.
Scope of Phase 1 Services - Lift Station Only

		Project Management							Estimating		Field				Other			
		PIC	DB Manager	Precon Mgr	Sr. PM	PM	Assistant PM	Admin	Chief Estimator	Estimators	Super	Field Crew	Manager	QAQC	MTRL & SUB	Labor Hours	GC Cost	Total Cost
	Hourly Rate	$250.00	$210.00	$195.00	$195.00	$175.00	$150.00	$75.00	$185.00	$155.00	$210.00	$415.00	$195.00	$195.00	$1.00			
Task ID	**A. Scope of Services**																	
	3D - Provide 3D rendering of all above drawings															0.0		$0
	Project Cost															0.0		$0
	GMP for Phase II (Task 5)															0.0		$0
	Monthly Cash flow charts for invoicing Phase II			2.0	2.0											4.0		$780
	Schedule of Values for Phase II Billings			2.0	2.0											4.0		$780
	Project Schedule for Phase II Construction Activities - Minimum 200 activities		2.0	3.0	4.0	1.0					2.0					12.0		$2,380
	Subtotal - Construction Documents	0.0	7.0	12.0	16.0	1.0	0.0	0.0	1.0	0.0	4.0	0.0	0.0	0.0	0.0	41.0	$0	$8,130
	5 - Lump Sum Cost Estimate																	
5.1	Prepare and submit Construction Proposal															0.0		$0
5.2.1	Lump Sum Pricing	1.0	4.0	12.0	12.0			2.0	18.0	38.0	2.0		1.0	1.0		91.0		$15,950
5.2.2	Update Project Schedule			1.0	1.0											2.0		$390
5.3.3	Add'l Info Required for Phase 2 Agreement			1.0												1.0		$195
5.3	*Meeting to Review Construction Proposal*		1.0	1.0	1.0											3.0		$600
	Modify Construction Proposal following Meeting			1.0												1.0		$195
	Subtotal - Lump Sum Cost Estimate	1.0	5.0	16.0	14.0	0.0	0.0	2.0	18.0	38.0	2.0	0.0	1.0	1.0	0.0	98.0	0.0	$17,330
	6 - Allowances																	
	Subcontractors and Subconsultants not listed elsewhere																	
6.1	Dialogue - PR and Community Outreach														11135.0	11135.0		$11,135
6.2	WSI - Subsurface Utility Designation										16.0	16.0				32.0		$10,000
6.3	OHC - Lead and Asbestos Survey														4310.0	4310.0		$4,310
	Subtotal - Allowances	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.0	16.0	0.0	0.0	15445.0	15477.0	0.0	$25,445
	7 - Miscellaneous Expenses																	
	printing, travel, express courier,																	
																0.0		$0
																0.0		$0
	Subtotal - Phase 1 Contingency	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Phase 1 Services All Tasks Total (Fire Station)	4.0	26.0	55.0	56.0	3.0	0.0	2.0	29.0	70.0	34.0	16.0	1.0	1.0	15445.0	15742.0	0.0	74610.0

APPENDIX 1 – SCOPE OF SERVICES

Subconsultant Proposals

Lift Station

NORTH REDINGTON BEACH FIRE LIFT STATION

(PUMP STATION 079)

May 26, 2020

PROJECT BACKGROUND:

As part of the Request for Proposal (RFP) 189-0190-NC, Kimley-Horn and Associates (Consultant) is providing this scope of services to Wharton-Smith, Inc. (Design Builder) for the North Redington Beach Fire Station and Lift Station project. The project includes the replacement of Pump Station 079 and the construction of a Fire Station, as described in Design Criteria Package in RFP 189-0190-NC. This Work Assignment contains the professional engineering services associated with the design and construction services as detailed below:

PHASE I SERVICES

TASK 1.0 – PROGRAM VERIFICATION

A. Consultant will attend a kick-off meeting with the project team.

B. Consultant shall review the design criteria package related to the current design of the lift station and identify aspects of the design that do meet the County's current pump station standards. Deficiencies will be documented and provided to the Design Builder for distribution to the County.

TASK 2.0 – SCHEMATIC DESIGN

- N/A

TASK 3.0 – DESIGN DEVELOPMENT

A. Consultant will review the pump station design (to be completed by others) for consistency with the County's current pump station standards and evaluate the design for value engineering options. The Consultant's review will be documented and provided to the Design Builder for review.

B. Consultant will meet with the Design Builder to review and discuss the deficiencies and value engineering options observed.

C. Following the meeting with the Design Builder, Consultant will finalize the review of the pump station plans and provide a final list of deficiencies and value engineering options to the Design Builder for distribution to the County.

D. Consultant will meet with the project team following the submittal to the County to review and discuss the observed deficiencies and value engineering options.

TASK 4.0 – CONSTRUCTION DOCUMENTS

E. Consultant will review the pump station design (to be completed by others) for consistency with the County's current pump station standards and evaluate the design for value engineering options. The Consultant's review will be documented and provided to the Design Builder for review.

F. Consultant will meet with the Design Builder to review and discuss the deficiencies and value engineering options observed.

G. Following the meeting with the Design Builder, Consultant will finalize the review of the pump station plans and provide a final list of deficiencies and value engineering options to the Design Builder for distribution to the County.

H. Consultant will meet with the project team following the submittal to the County to review and discuss the observed deficiencies and value engineering options.

COMPENSATION TO THE CONSULTANT

Description	Compensation
Task 1.0-Programming Services for Pump Station	$9,952.00
Task 2.0-Schematic Design Services for Pump Station	$0.00
Task 3.0-Design Development Services for Pump Station	$22,326.00
Task 4.0-Construction Documents for Pump Station	$26,515.00
Total	**$58,793.00**

For the Scope of Services described Consultant shall be compensated a Lump Sum of $58,793.00 in accordance with the terms of the agreement.

Disclaimers ·

It is understood that the County is hiring a separate consultant to redesign Pump Station 079; therefore, Kimley-Horn and Associates is not responsible for any aspects of the design and cannot be held liable. This contract is to provide assistance to Wharton-Smith to ensure the pump station design meets the County's current standards and requirements.

Project Name: North Redington Beach Pump Station
Date Prepared: 4/28/2020
Estimated By: Wayne White-Jordan Walker

KHA Task # Subtask ID Number	KHA Task Name Subtask Name/Description	Chief Engineer $256	Senior PM $226	Project Manager $198	Senior PE $199	Senior Env Sci $233	PE II $170	PE I $137	Engineer Intern $115	Senior Designer $137	Designer / Eng Tech $125	Drafter $94	Sr Land Arch $246	Land Arch $174	Land Int $114	Const Engineer $174	Const Inspector $141	Admin $77	KHA Labor Total	Sub Cons Expense ($)
1.0	**Program Verification**																			
	Kick-Off Meeting		4	4					4											
	DCP Review		8	8				12	24											
	Task 1.0 Total (Hours)	0	12	12	0	0	0	12	28	0	0	0	0	0	0	0	0	0	-	-
	Task 1.0 Total (Dollars)	**$0**	**$2,712**	**$2,376**	**$0**	**$0**	**$0**	**$1,644**	**$3,220**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$9,952**	**$0.00**
2.0	**Schematic Design**																			
	Task 2.0 Total (Hours)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	-
	Task 2.0 Total (Dollars)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0.00**
3.0	**Design Development**																			
	Pump Station Design Review	2	4	12				18	20											
	Meeting with DB		8	8					10											
	Pump Station Design Review	2	4	4				8	12											
	Project Team Review Meeting		8	8					10											
	Task 3.0 Total (Hours)	4	24	32	0	0	0	26	52	0	0	0	0	0	0	0	0	0	-	-
	Task 3.0 Total (Dollars)	**$1,024**	**$5,424**	**$6,336**	**$0**	**$0**	**$0**	**$3,562**	**$5,980**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$22,326**	**$0.00**
4.0	**Construction Documents**																			
	Pump Station Design Review	2	8	12				32	33											
	Meeting with DB		8	8					8											
	Pump Station Design Review	2	4	8				8	8											
	Project Team Review Meeting		8	8					8											
	Task 4.1 Total (Hours)	4	28	36	0	0	0	40	57	0	0	0	0	0	0	0	0	0	-	-
	Task 4.1 Total (Dollars)	**$1,024**	**$6,328**	**$7,128**	**$0**	**$0**	**$0**	**$5,480**	**$6,555**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$26,515**	**$0.00**

KHA Labor	$58,793.00	
Subconsultant Expense		$0.00
Miscellaneous Expenses for Pump Station		$0.00
Project Total (Dollars) Task 1-4	**$58,793.00**	

May 4, 2020

Carolyn Bonaventura, DBIA
Preconstruction Services Manager
Wharton-Smith, Inc.
750 Monroe Road
Sanford, FL 32771
cbonaventura@whartonsmith.com

RE: Proposal for Asbestos & Lead Survey
North Redington Beach Lift Station

Dear Ms. Bonaventura,

OHC Environmental Engineering, Inc. (OHC) is pleased to provide you this *not to exceed proposal* to conduct the following scope of services as outlined in this document. All work shall be performed in accordance with industry standards for work of this nature. OHC shall provide the appropriate personnel such as a Certified Industrial Hygienist (CIH), Florida Licensed Asbestos Consultant (FLAC), AHERA Certified Building Inspector, Project Manager, Industrial Hygienist and administrative support to conduct the work associated with the scope of services. Any changes to the scope of services must be provided in writing to the Operations/Project Manager.

1.0 ASBESTOS NESHAP SURVEY:

1.1 The scope of work includes the complete demolition of the ancillary structure for the development of a new fire station. The ancillary structure is used for housing storage, was built in 1958, measures approximately 2,644 SF and is located at 190 173rd Ave E. The adjacent storage building will also be demolished to develop an area for fire truck access and additional parking. The adjacent storage building was built in 1985, measures approximately 1,920 SF and is located at 155 174th Ave E. There is a lift station present at the site, which will be replaced with a new lift station. Only the 2 mentioned buildings and the lift station will be included in the scope of the survey for future demolition. The Town Hall building located at the site will not be included in this scope. Survey will require destructive sampling of all suspect building materials, including the roof. OHC will not be responsible for roof or building repairs following sample collection. A licensed roofing contractor is recommended to repair the roof following sample collection so that water intrusion does not occur.

1.2 An AHERA Certified Building Inspector(s) will conduct a thorough asbestos NESHAP inspection of all suspect materials to be disturbed. A representative number of bulk samples will be collected from each area to be affected and will be based on suspect materials, condition, potential for disturbance and square footage. Every twentieth sample shall be submitted to a separate laboratory for quality control purposes.

1.3 All samples collected will be submitted to an American Industrial Hygiene Association (AIHA) accredited laboratory participating in the National Voluntary Laboratory Accredited Program (NVLAP). The samples will be analyzed via Polarized Light Microscopy (PLM) **within 3 days** of receiving. Samples with a result of less than 1% asbestos will be analyzed for an additional charge via point count, as specified by NESHAP.

1.4 The location and quantity of each homogenous area within the affected area will be documented. Photographic documentation of each homogenous sample will also be provided. Marked drawings of the sampling locations may be provided, if necessary.

2.0 LEAD SURVEY

2.1 OHC will provide a Certified Lead Inspector and Risk Assessor to conduct a lead inspection of all suspect materials to be affected during the future project. The lead survey is to be performed simultaneously with the asbestos survey.

2.2 All paint chip samples collected will be submitted to an American Industrial Hygiene Association (AIHA) accredited laboratory in Environmental Lead. The samples will be analyzed via Flame Atomic Absorption Spectroscopy (FAAS) within **3 days** of receiving.

2.3 The location and quantity of each sample collected will be documented, along with photographic documentation. Drawings of the sampling locations may be provided, if necessary.

3.0 GENERAL SERVICES & LIMITATIONS

3.1 OHC is not responsible for repairs or repatching, following sample collection.

3.2 Access to all areas within the scope of this survey are to be provided by the client or client's representative.

3.3 A final report shall be produced inclusive of the following items: existing conditions, laboratory analyses, photographs of homogenous sampling area, site drawings (as needed) and recommendations, if required.

3.4 The survey shall be performed within **one (1) mobilization** and consist of **two (2) days** on site for sample collection and verification of positively identified hazardous materials.

4.0 FEE SCHEDULE:

Proposal includes travel, assessment, sample collection, sample analysis, report finalization, project management, and review of all work by a CIH. OHC can perform the task discussed within the text of this proposal for the following price(s):

Asbestos & Lead Survey.....$4,310.00

We appreciate the opportunity to provide you with this proposal. If you should have any questions or concerns, please do not hesitate to contact me at your convenience.

Sincerely,

Cristina Jones
Operations Manager
(813) 500-8564
cjones@ohcnet.com

Pinellas County
Redington Beach Fire Station & Lift Station
Community Outreach Scope & Fee – Lump Sum
Pre-Construction/Design Phase Only – DRAFT 5.1.20

These scopes are for public information and outreach services during the pre-construction phase of both the Redington Beach Fire Station and Lift Station projects. Both scopes based on the following assumptions:

- Information will be posted on Pinellas County's website to minimize the need for printing.
- Community meetings will use Pinellas County's Zoom license.
- Pinellas County will help publicize project-related news on Nextdoor.
- Any resident questions or concerns will be directed to Pinellas County customer service or to the Pinellas County app.

Lift Station – Pre-Construction (4 months)

Task 1: Project Coordination, Direct Support & Coordination

Task includes time for public information consultant to attend up to four (4) meetings with the project team, management of the public outreach element of the project, preparation of monthly invoices, and miscellaneous communications.

Task 2: Public Information Materials

- Draft, lay out and finalize an 8.5" x 11" project fact sheet for use on Pinellas County's project web page.
- Draft and finalize FAQs (Frequently Asked Questions) on the project for use on the County's project web page.
- Create up to four (4) social media posts and one (1) news release for Pinellas County, North Redington Beach or Redington Shores dissemination (social media channels, web sites, local media, etc.).

Task 3: Public/Stakeholder Involvement

- Plan and implement, with Pinellas County staff, one (1) Zoom virtual community meeting. This meeting will be held prior to construction to introduce the project to the community, discuss the project schedule and what residents can expect during construction (construction hours, days, noise, dust, maintenance of traffic, etc.).
    - Assumes using Pinellas County's Zoom license. Pinellas County will determine on which platforms to stream the meeting (e.g., Facebook, YouTube, etc.).
    - Produce and place up to four (4) corrugated plastic yard signs on H-frames to promote the virtual meetings. The signs feature the project name and the date, time and other meeting details.

- Work with the project team to produce one (1) PowerPoint presentation for the meeting. Assumes using Pinellas County PowerPoint template.
- Review and compile meeting input and develop a meeting summary after each meeting.

Lift Station – Pre-Construction Total: $11,135.00

Redington Beach Lift Station Pre-Construction
Public Information & Involvement Program
4-Month Timeframe

	Dialogue PR				
	Senior PR Consultant	**Public Relations Specialist**	**Graphic Artist**	**Direct Costs**	**Totals**
	$225.00	**$160.00**	**$120.00**		
Task 1 - Project Management	9				
	$2,025.00				$2,025.00
Task 2- Public Information					
Overall project fact sheet, FAQs, web content/social media	15	4			
	$3,375.00	$640.00			$4,015.00
Task 2- Public Information					
Project PowerPoint; Zoom meeting coordination, attendance, summary; direct mail, yard signs	15	5	3.5	$500.00	
	$3,375.00	$800.00	$420.00	$500.00	$5,095.00
Hours Subtotal	39	9	3.5		
Totals	**$8,775.00**	**$1,440.00**	**$420.00**	**$500.00**	**$11,135.00**

Attachment A

DESIGN-BUILD SERVICES DESIGN CRITERIA FOR:

THE NORTH REDINGTON BEACH FIRE STATION

190 -173rd Avenue East
North Redington Beach, Florida

April 23, 2018

INTRODUCTION

Pinellas County desires to build a new fire station facility in North Redington Beach, Florida. It will serve North Redington Beach and surrounding beach communities. The new fire station will be located at 190 – 173rd Avenue East. This site includes the existing town hall and an ancillary structure housing storage, a community meeting room and (2) offices. The town hall will remain, but the ancillary building will be demolished and its functions incorporated into the new fire station.

A County Utility lift station is also present at the site. The project will incorporate a new lift station and its associated equipment in a new location coordinated with the fire station.

Also, the adjacent Town of Redington Shores will provide a land parcel for fire truck routing into the new station. The parcel currently contains a storage building which will be demolished. The land will then be developed for a fire truck access drive and additional parking.

The following Project phasing is envisioned:

PHASE I – Construction of New Utility Lift Stations

a. Demolish existing North Redington Beach ancillary building
b. Construct new Utility lift stations and accessories
c. Demolish existing Utility lift stations

PHASE II – Construction of New Fire Station

a. Demolish existing Redington Shores storage building
b. Construct the new fire station and associated site work

The project budget is $2,500,000. for new utility work and $2,000,000. for the fire station and associated site work. The total project budget is $4,500,000

PHASE I - NEW LIFT STATIONS CRITERIA:

The existing triplex lift station serving the towns of North Redington Beach and Redington Shores requires relocation and replacement at 190 – 173rd Avenue East. Proposed plans and specifications for the lift station are included in Appendix "C". Any proposed changes to the initial plan as a result of an integrated construction approach for both the fire station facility and lift station is acceptable but must be reviewed by the County for approval.

Additionally, the Design-Build team shall prepare and submit a plan for the maintenance of lift station operations, such that sewer service is continuous throughout the project. The plan shall review the sequence of construction and identify tie-ins to existing facilities, monitoring and control, electrical systems, and specify when transfer of flows will occur.

PHASE II – NEW FIRE STATION CRITERIA

Site Criteria:

The project site is located at 190 173rd Avenue East within the Town of North Redington Beach, Florida. An additional parcel, to become part of this development, is located in the Town of Redington Shores. The entire site area, including both parcels, is approximately one acre.

The site is zoned PO (Public Ownership) in North Redington Beach and PI (Public Institutional) in Redington Shores. Most importantly, the site lies within Flood Zone AE with a base flood elevation (BFE) of 11 feet. The existing site elevation ranges between 4.5 feet and 5 feet. The flood elevation has a significant influence on the design of this project.

The existing site contains (21) parking spaces. The new plan retains (16) existing spaces in their original configuration, and adds (4) spaces underneath the new fire station plus (13) new spaces to the west of the fire station. The final total will be (33) parking spaces.

To meet current storm water management criteria, (2) dry ponds are proposed to the east of the existing town hall building. A swale along the north property line connects the ponds to west portion of the site.

Electric, water and sewer are available to the site.

Building Criteria:

1. Fire Department Requirements:

Garage – 880 SF

1. Accommodate a Class "A" firetruck in a semi-enclosed, secured structure
2. Provide a truck drive-through configuration
3. Flood vents required below flood elevation
4. Mechanical and electrical located above flood elevation
5. Glass sectional electric overhead doors
6. Mechanical ventilated non-conditioned space

Storage – 320 SF

1. (2) Secured storage rooms
2. Access from garage
3. Flood vents required below flood elevation
4. Mechanical and electrical required above flood elevation
5. Mechanically ventilated, non-conditioned space

Bunk Room Areas – 860 SF

(1) Officer's bunk room
   1. Secured, bunk & desk space, natural light
   2. VCT flooring, painted gyp. bd. walls, acoustical ceiling
   3. Conditioned space

(2) Firefighters bunk rooms
   1. Semi-private bunk space
   2. VCT flooring painted gyp. bd. walls, acoustical ceiling
   3. Conditioned space

(1) Common Room
1. Secured, lounge area, TV, natural light
2. VCT flooring, painted gyp. bd. walls, acoustical ceiling
3. Conditioned space
4. Good access to garage
5. Separate entrance from town functions

(2) Private Toilet Rooms
1. Accessible toilet, lavatory, shower
2. Tile flooring, tile walls, hard ceiling
3. Conditioned space

(1) Medical Supply Closet
1. Enhanced security
2. Conditioned space

Kitchen – 180 SF (shared with other City functions)

1. Non-cooking kitchen, (no range, no oven, no exhaust hood)
2. Microwave, refrigerator, ice maker, double sink, dishwasher
3. Base and upper cabinetry, plastic laminate finish
4. (4) individual secured storage units for firemen
5. Tile flooring, painted walls, tile backsplash, gyp. bd. ceiling
6. Counter space for eating
7. Conditioned space

2. Town Requirements:

Day Room (Meeting Area) – 680 SF

1. Meeting area for (30) persons
2. Room will be furnished with loose tables and chairs by the Owner
3. Projection screen
4. VCT flooring, painted gyp. bd. walls, acoustical ceiling
5. Conditioned space

Public Restrooms – 80 SF

1. Good access from meeting area and second floor offices
2. Tile flooring, tile walls, hard ceiling
3. Conditioned space

Records Office & Storage – 220 SF

1. Private secured office
2. VCT flooring, painted gyp. bd. walls, acoustical ceiling
3. Natural light
4. Conditioned space

Deputy Office – 220 SF

1. Private secured office
2. VCT flooring, painted gyp. bd. walls, acoustical ceiling
3. Natural light
4. Conditioned space

Public Works Office – 180 SF

1. Private secured office
2. VCT flooring, painted gyp. bd. walls, acoustical ceiling
3. Natural light
4. Conditioned space

Second Floor Lobby / Stair / Elevator

1. Functions as main circulation space through building
2. Tile flooring, painted gyp. bd. walls, acoustical ceiling
3. Conditioned space

First Floor Lobby / Stair / Elevator

1. Functions as main entrance with means to access the second floor
2. All building components must be water resilient
3. Flood proof elevator
4. Tile flooring, painted plaster walls, acoustical ceiling
5. Conditioned space
6. Mechanical and electrical located above flood elevation
7. Flood vents required

First Floor Restroom – 44 SF

1. Access for public and town field staff
2. All building components must be water resilient (below flood elevation)
3. Tile flooring, painted plaster walls, hard ceiling
4. Conditioned space
5. Mechanical and electrical located above flood elevation
6. Plumbing with cutoff valves for flood resistance
7. Flood vents required

First Floor Storage – 760 SF

1. (3) separate compartments
2. (1) compartment with garage door access
3. Sealed concrete floor, exposed painted block, exposed structure above
4. Electrical located above flood elevation
5. Flood vents required

Mechanical / Electrical / Elevator Equipment

1. Locate on second floor (above flood elevation)
2. Mechanical to be split system, VAV with (4) zones
3. Hydraulic elevator

Appendices:

A. Building Program Summary

B. Building Design Criteria Drawings

The attached drawings were developed with input from the various User groups as well as Building Code Authorities. They are the basis on which the architect should continue the design process into the Design Development Phase.

C. Lift Station Proposed Plans & Specifications

APPENDIX A

BUILDING PROGRAM SUMMARY

NORTH REDINGTON BEACH FIRE STATION

BUILDING PROGRAM SUMMARY

2/28/2018

FIRST FLOOR

	Area / SF	Quantity	Area / SF
Fire Dept. Garage	880	1	880
Fire Dept. Equipment Storage	160	2	320
Town Equipment Storage	290	2	580
Town General Storage	180	1	180
Building Lobby / Stair	400	1	400
First Floor Restroom	44	1	44
Elevator	50	2	100
TOTAL NET FIRST FLOOR:			2,504

First Floor Notes:
Provide flood vents in all enclosed spaces, electrical devices above flood elevation, all building materials to be water resilent, restroom plumbing to have cutoff valves, elevator to be equipped with flood proof provisions

SECOND FLOOR

	Area / SF	Quantity	Area / SF
Officer's Bunk Room	140	1	140
Bunk Room	70	2	140
General Bunk Room	380	1	380
Toilet / Shower Room	90	2	180
Medical Storage	20	1	20
Kitchen	180	1	180
Community Day Room	680	1	680
Community Restrooms	44	2	88
Community Lobby / Stair / Elevator	440	1	440
Offices	200	3	600
Mechanical / Electrical	200	1	200
TOTAL NET SECOND FLOOR:			3,048

Second Floor Notes:
Kitchen will not have cooking capacity

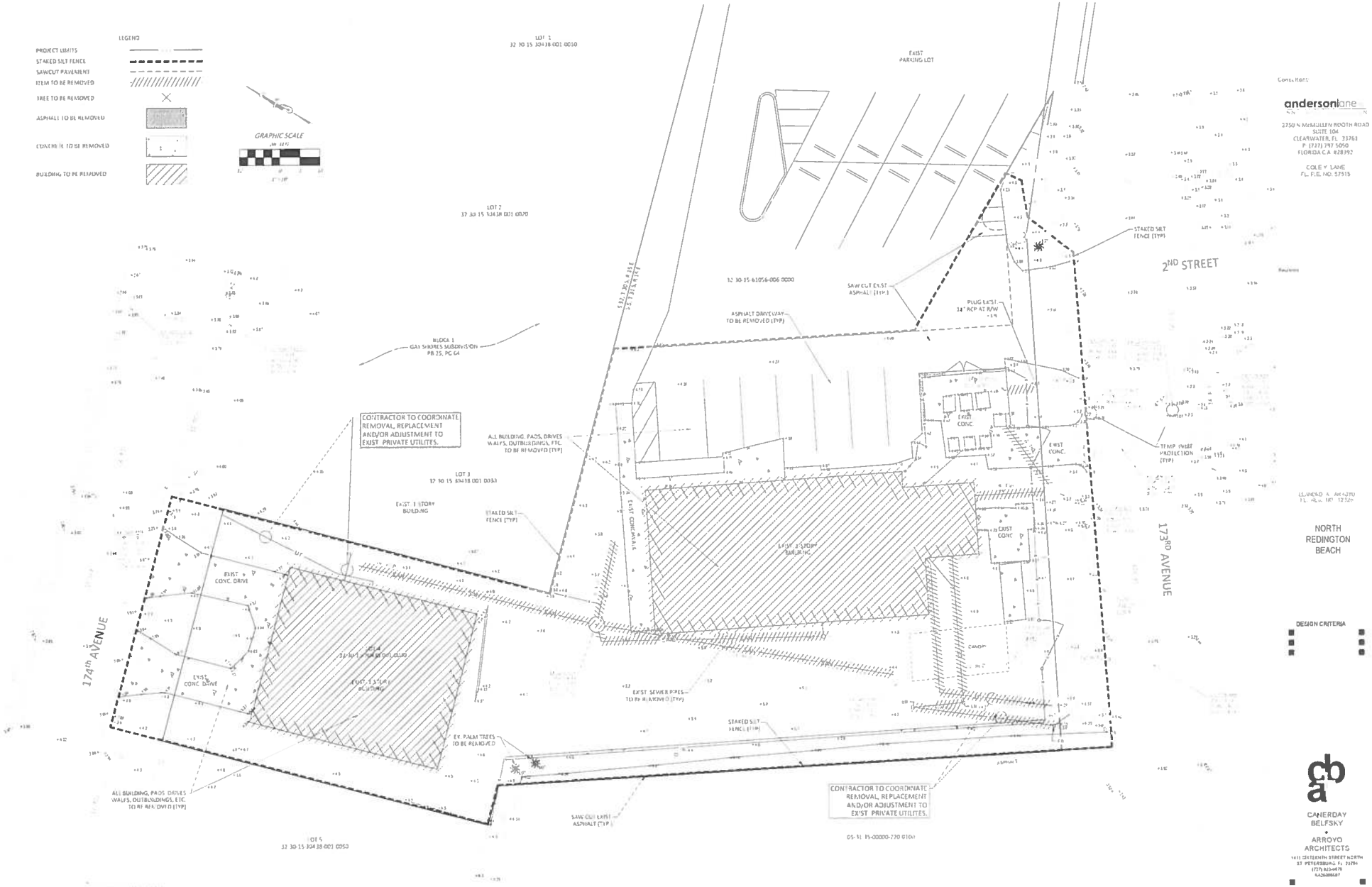
APPENDIX B

BUILDING DRAWINGS

C2.0 SURFACE DEMOLITION PLAN
C3.0 SITE PLAN (WEST SIDE)
C3.1 SITE PLAN (EAST SIDE)

A2.1 FIRST FLOOR PLAN
A2.2 SECOND FLOOR PLAN

A3.0 BUILDING ELEVATIONS
A3.1 BUILDING ELEVATIONS
A3.2 BUILDING SECTIONS
A3.3 BUILDING SECTIONS



Consultant:

andersonlane

2750 N McMULLEN BOOTH ROAD
SUITE 104
CLEARWATER, FL 33761
P: (727) 797 5050
FLORIDA C.A. #28392

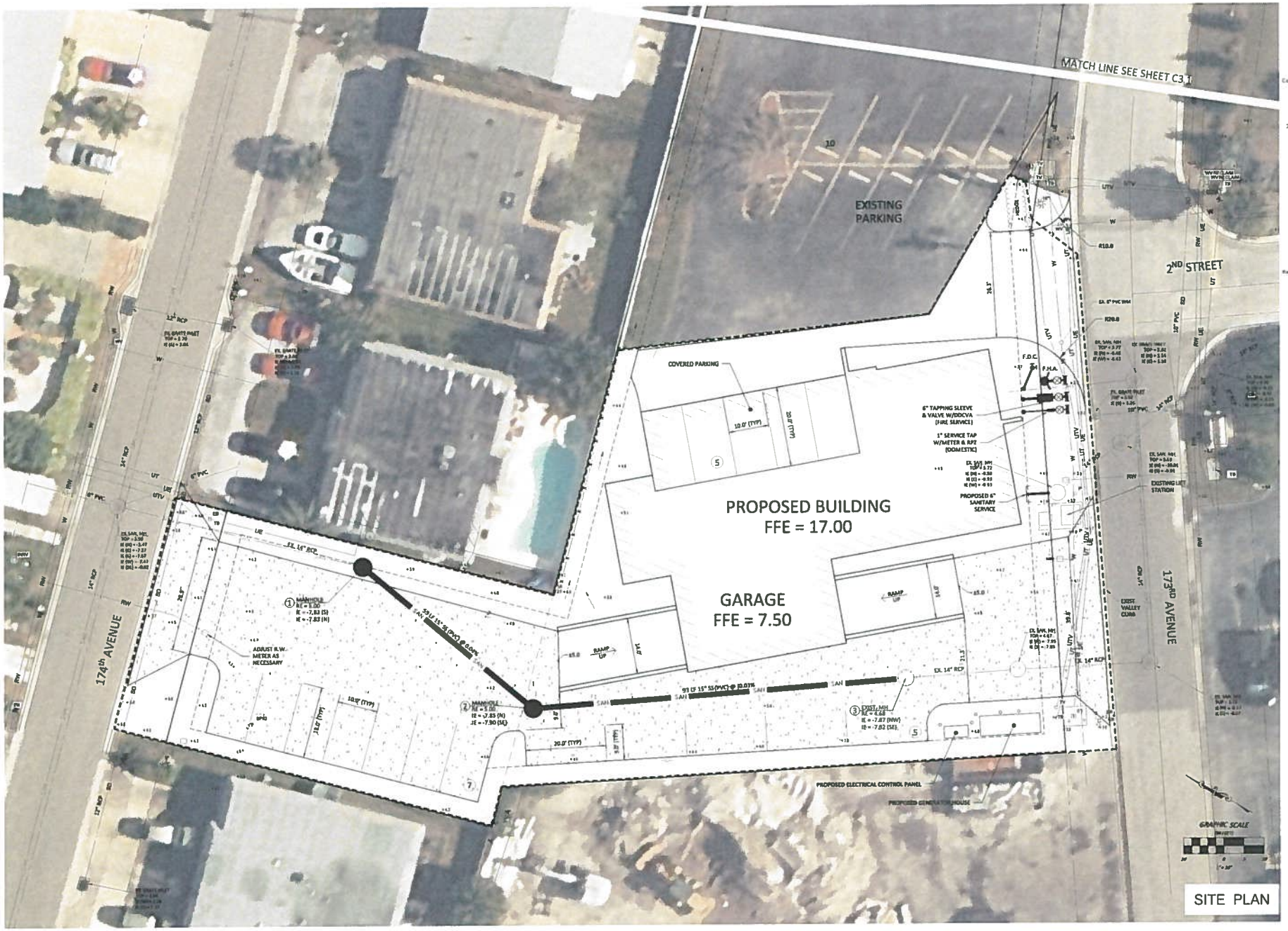
COLE V. LANE
FL. P.E. NO. 57515

CANERDAY BELFSKY + ARROYO ARCHITECTS

1611 SEVENTEENTH STREET NORTH
ST PETERSBURG, FL 33704
(727) 823-4679
AA26000687

SOIL EROSION, SURFACE DEMOLITION PLAN

C2.0



Consultant

andersonlane INC

2750 N McMULLEN BOOTH ROAD
SUITE 104
CLEARWATER, FL 33761
P: (727) 797 5050
FLORIDA C.A. #28392

COLE Y. LANE
FL P.E NO 57515

Revisions

LEANDRO A. ARROYO
FL. REG. NO. 12329

NORTH REDINGTON BEACH

DESIGN CRITERIA

CANERDAY BELFSKY + ARROYO ARCHITECTS
1411 EATENTH STREET NORTH
ST PETERSBURG, FL 33704
(727)423-8675
AA26000567

SITE PLAN

C3.0

Consultant

andersonlane inc

2750 N McMULLEN BOOTH ROAD
SUITE 104
CLEARWATER, FL 33761
P: (727) 797-5050
FLORIDA C.A. #28392

COLE Y. LANE
FL. P.E. NO. 57515

Revisions

LEANDRO A. ARROYO
FL. REG. NO. 12326

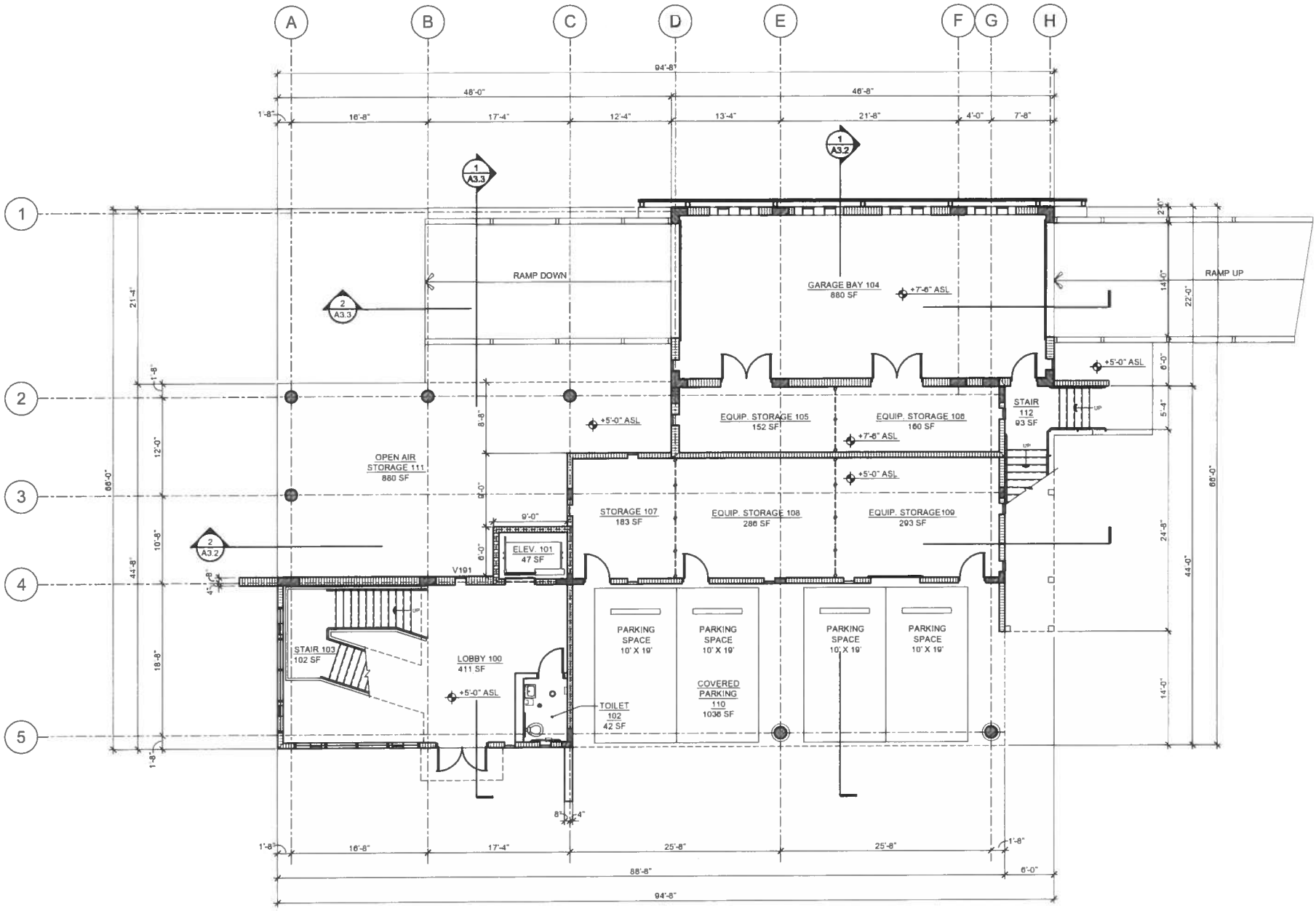
NORTH
REDINGTON
BEACH

DESIGN CRITERIA

CANERDAY
BELFSKY
+
ARROYO
ARCHITECTS
1411 SIXTEENTH STREET NORTH
ST. PETERSBURG, FL 33704
(727) 823-8676
AA26000647

SITE PLAN

C3.1



1 A2.1 FIRST FLOOR PLAN

SCALE 3/16" = 1'-0"

NORTH REDINGTON BEACH

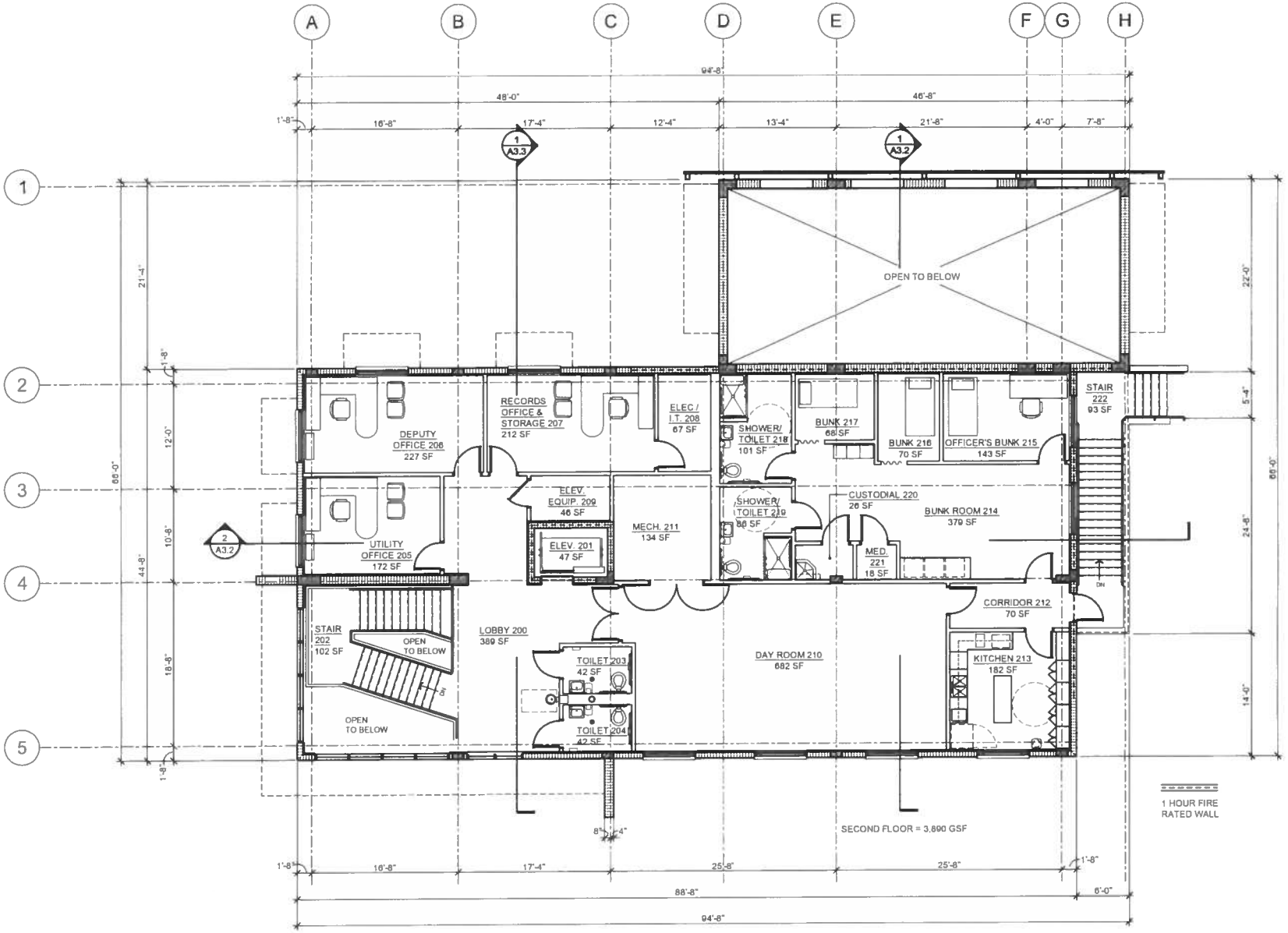
FIRE STATION

DESIGN CRITERIA DRAWINGS

02-28-2018
CB+A #1704

CANERDAY BELFSKY + ARROYO ARCHITECTS
1411 GATEWAY STREET NORTH
ST PETERSBURG FL 33704
(727) 823-0979
AA26000647

FIRST FLOOR PLAN A2.1



PLAN NORTH
ACTUAL NORTH

2 A2.1 SECOND FLOOR PLAN

SCALE: 3/16" = 1'-0"

NORTH REDINGTON BEACH

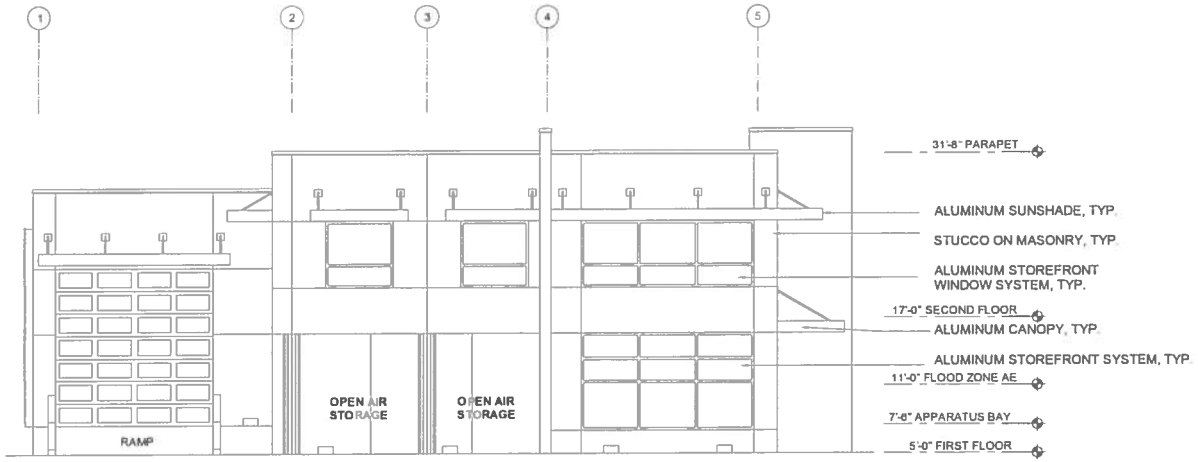
FIRE STATION

DESIGN CRITERIA DRAWINGS

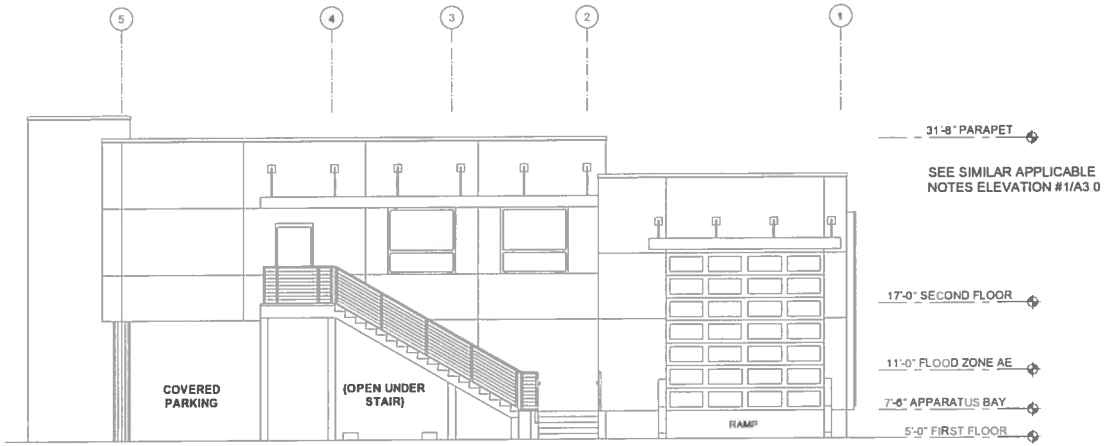
02-28-2018
CB•A #1704

CANERDAY BELFSKY + ARROYO ARCHITECTS
1401 SIXTEENTH STREET NORTH
ST PETERSBURG, FL 33704
(727) 823-0975
AA26000547

SECOND FLOOR PLAN A2.2



1 A3.0 SOUTH BUILDING ELEVATION



2 A3.0 NORTH BUILDING ELEVATION

NORTH REDINGTON BEACH

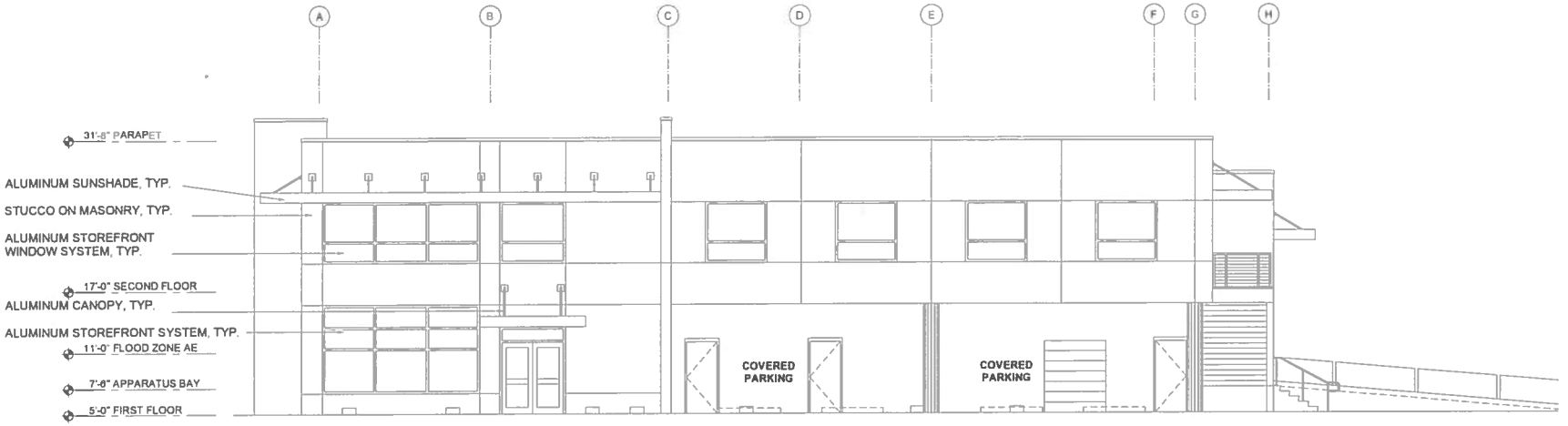
FIRE STATION

DESIGN CRITERIA DRAWINGS

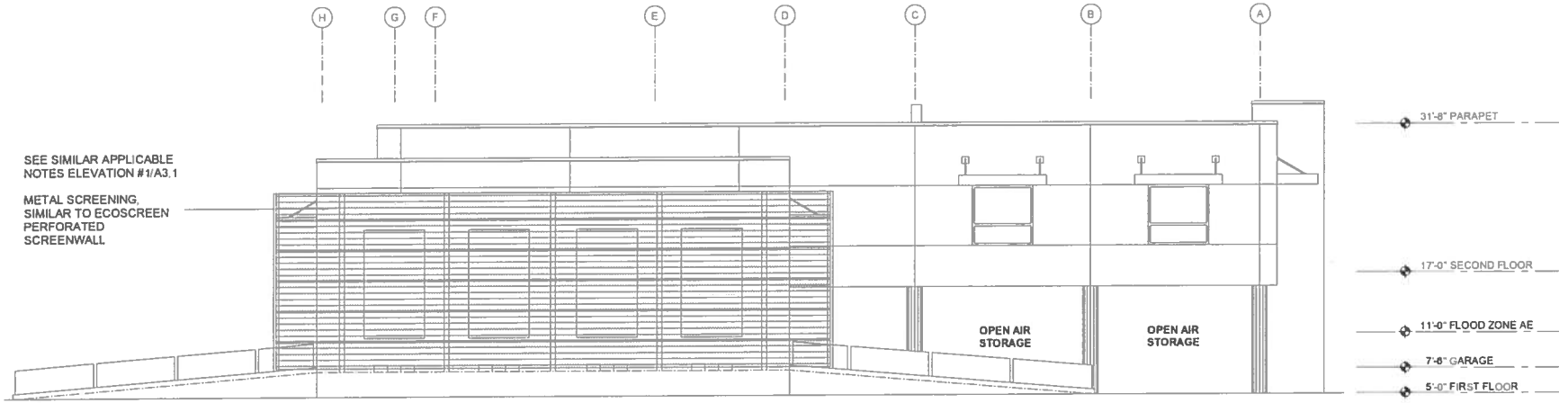
02-28-2018
CB+A #1704

CANERDAY BELFSKY + ARROYO ARCHITECTS
1411 SIXTEENTH STREET NORTH
ST PETERSBURG FL 33704
(727) 823-0873
AA26000647

BUILDING ELEVATIONS A3.0



1 / A3.1 EAST BUILDING ELEVATION



2 / A3.1 WEST BUILDING ELEVATION

NORTH REDINGTON BEACH

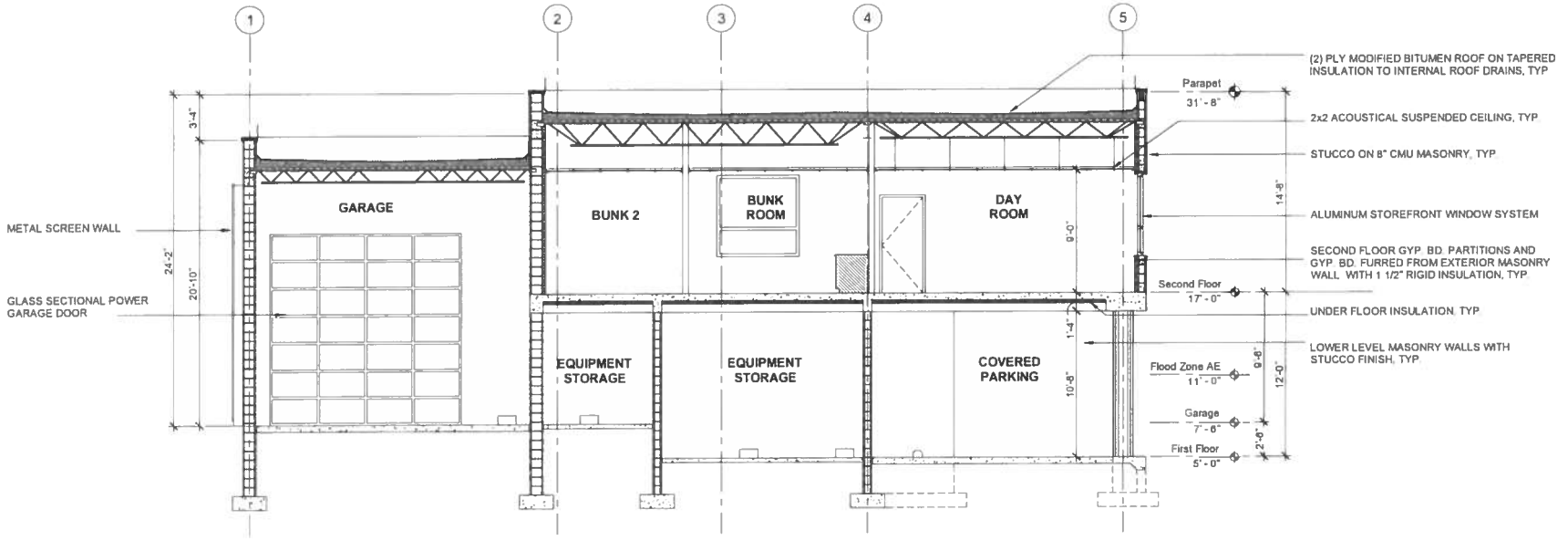
FIRE STATION

DESIGN CRITERIA DRAWINGS

02-28-2018
CB+A #1704

CANERDAY BELFSKY + ARROYO ARCHITECTS
1411 SIXTEENTH STREET NORTH
ST. PETERSBURG, FL 33704
(727) 823-0875
AA26000547

BUILDING ELEVATIONS A3.1



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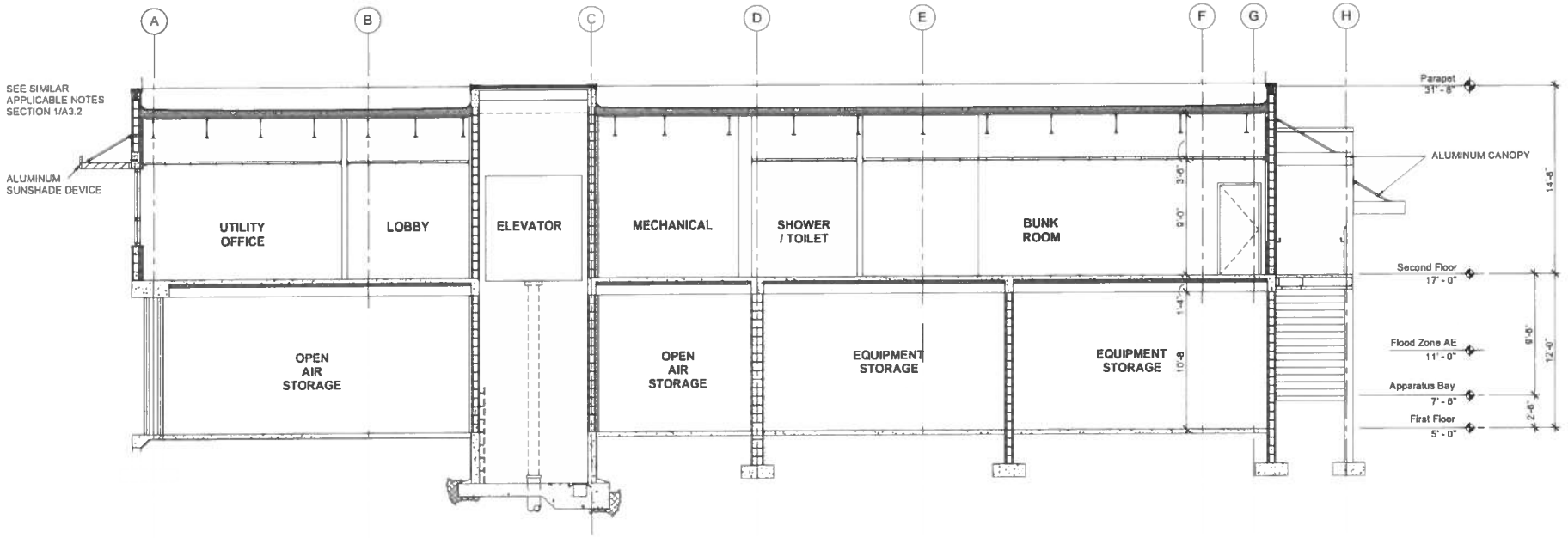

2 / A3.2 BUILDING SECTION

NORTH REDINGTON BEACH

FIRE STATION

DESIGN CRITERIA DRAWINGS

02-28-2018
CB+A #1704

CANERDAY BELFSKY + ARROYO ARCHITECTS
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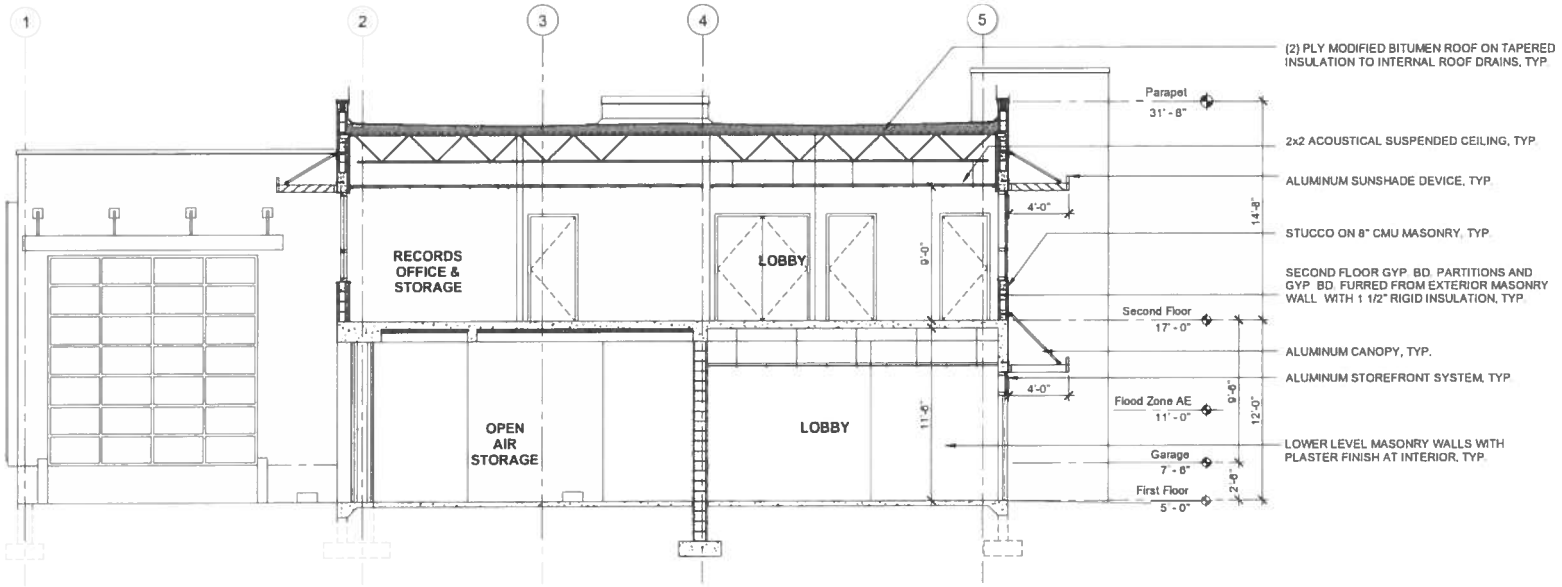
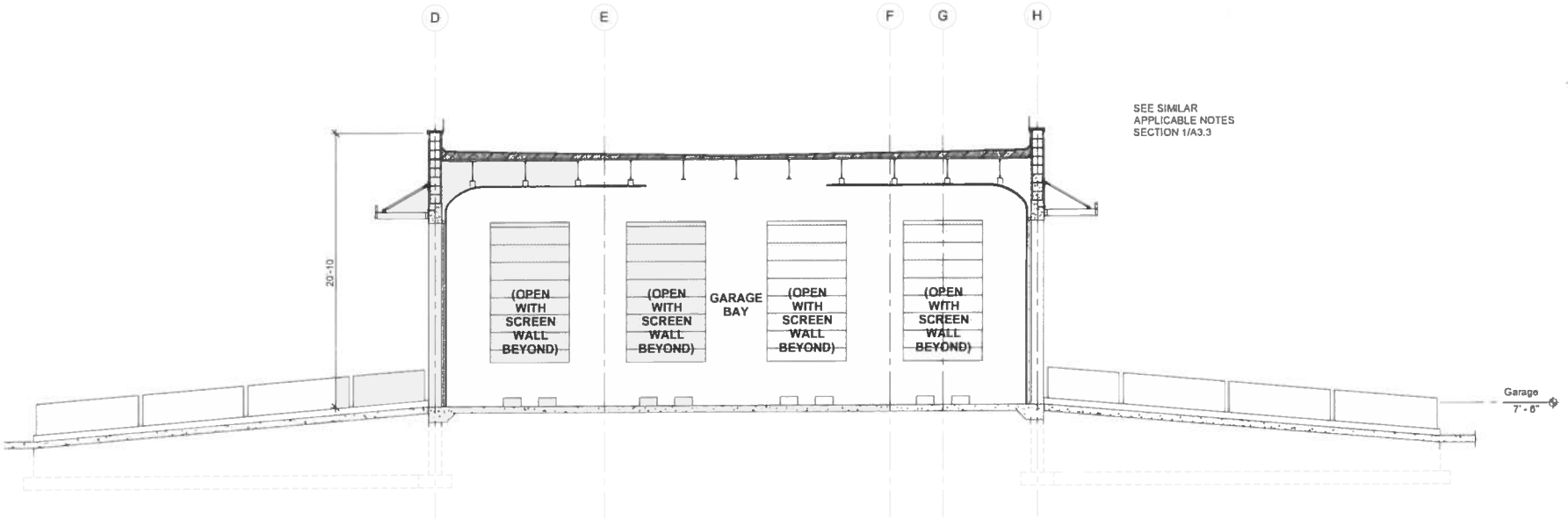
ST. PETERSBURG FL 33704
(727) 823-0875
AA26000587

BUILDING SECTIONS

A3.2



1 A3.3 BUILDING SECTION



2 A3.3 BUILDING SECTION

NORTH REDINGTON BEACH

FIRE STATION

DESIGN CRITERIA DRAWINGS

02-28-2018
CB•A #1704

CANERDAY BELFSKY + ARROYO ARCHITECTS
1411 SIXTEENTH STREET NORTH
ST PETERSBURG FL 33704
(727) 823-0975
AA26000687

BUILDING SECTIONS A3.3

APPENDIX C

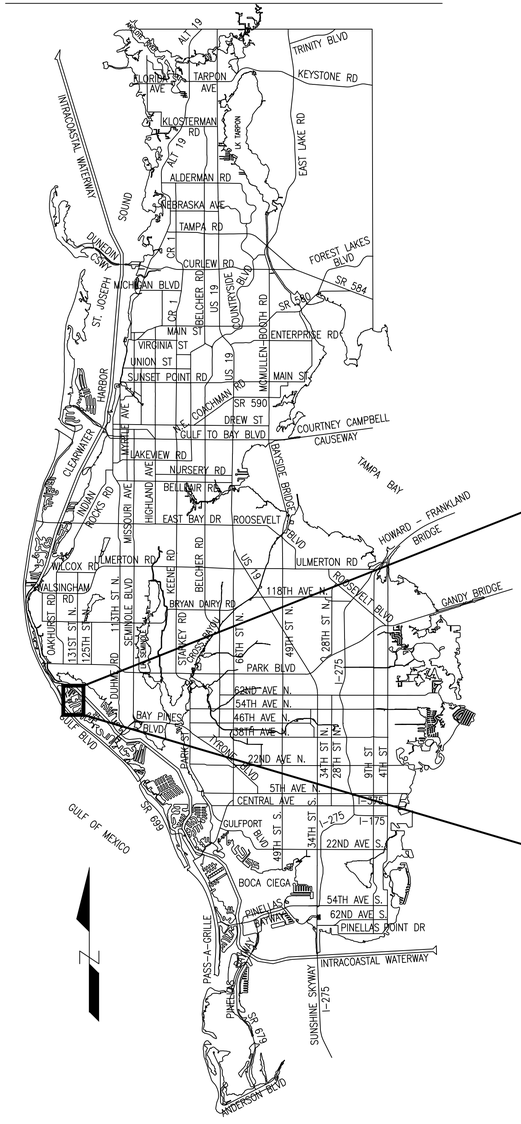
LIFT STATION PROPOSED PLANS & SPECIFICATIONS

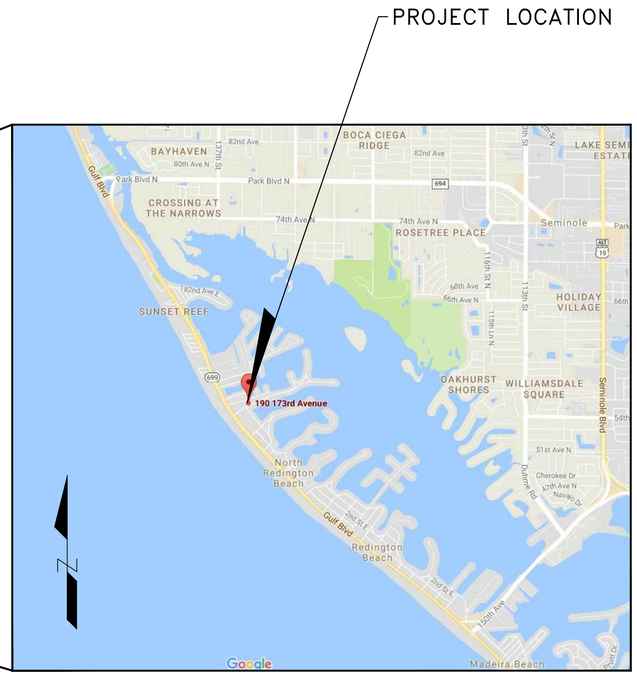
PINELLAS COUNTY
PUMP STATION 079
REPLACEMENT

PID 003205A

FINANCIAL PID 003205A

PINELLAS COUNTY
LOCATION MAP





PUMP STATION 079
190 173RD AVENUE NORTH,
NORTH REDINGTON BEACH, FL 33708

SECTION 32, TOWNSHIP 30 SOUTH, RANGE 15 EAST

KEY MAP
NOT TO SCALE

INDEX OF PLANS

PROJECT MANAGER:
Caryssa Joustra

PINELLAS COUNTY

14 SOUTH FORT HARRISON AVENUE
CLEARWATER, FLORIDA 33756
PHONE: (727)464-3588

PREPARED BY:

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

Thomas Brady Cross, P.E. No. 59868
ENGINEER OF RECORD

DATE

P:\IER\144726\200-144726-17002\CAD\sheetfiles\G-000 COVER.dwg, Jan 09, 2018 - 4:33pm

GENERAL NOTES

1. MINIMUM DISTANCE OF AT LEAST 3 FEET HORIZONTALLY SHALL SEPARATE ALL POTABLE WATER MAINS FROM RECLAIMED AND STORM WATER PIPES AND MINIMUM DISTANCE OF AT LEAST 6 FEET HORIZONTALLY FROM SANITARY SEWER PIPES OR FORCE MAINS. THE DISTANCE SHALL BE MEASURED FROM OUTSIDE EDGE TO OUTSIDE EDGE. WHERE IT IS NOT TECHNICALLY FEASIBLE TO COMPLY WITH THE ABOVE DISTANCES, INSTALL PIPING IN ACCORDANCE WITH F.A.C. RULE 62-555.314 AND WITH APPROVAL OF FDEP AND PINELLAS COUNTY.

2. WHERE POTABLE WATER PIPES CROSS FORCE MAIN AND GRAVITY SEWER PIPES, A MINIMUM VERTICAL SEPARATION OF 12 INCHES SHALL BE MAINTAINED BETWEEN THE BOTTOM OF THE UPPER PIPE AND THE TOP OF THE LOWER PIPE, WITH THE POTABLE WATER ON TOP. THE CROSSING SHALL BE ARRANGED SUCH THAT THE PIPE JOINT SHALL BE EQUIDISTANT AND CENTERED ON THE CROSSING. WHERE THE 12" SEPARATION IS NOT PRACTICAL, ALTERNATE CONSTRUCTION METHODS OR MATERIALS MAY BE USED IN ACCORDANCE WITH F.A.C. RULE 62-555.314 AND WITH APPROVAL OF FDEP AND PINELLAS COUNTY.

3. WHERE A RECLAIMED WATER PIPE CONFLICTS WITH AN EXISTING POTABLE WATER PIPE WITH LESS THAN 12 INCHES VERTICAL CLEARANCE, THEN THE RECLAIMED WATER PIPE SHALL BE DUCTILE IRON PIPE (DIP) AND THE RECLAIMED WATER PIPE SHALL BE ARRANGED TO MEET THE CROSSING REQUIREMENTS DESCRIBED ABOVE.

4. ALL PIPES SHALL HAVE A MINIMUM OF THIRTY-SIX (36) INCHES OF COVER, UNLESS OTHERWISE DIRECTED BY PINELLAS COUNTY.

5. CONTRACTOR SHALL INSURE THAT ALL REQUIRED PERMITS ARE IN-HAND BEFORE BEGINNING ANY CONSTRUCTION.

6. ALL CONSTRUCTION SHALL MEET CURRENT REQUIREMENTS OF FDEP, AWWA, PINELLAS COUNTY MATERIAL SPECIFICATION MANUAL FOR MATERIALS OF CONSTRUCTION, DESIGN, AND INSTALLATION.

7. ALL EXISTING UNDERGROUND UTILITIES THAT ARE ACTIVE SHALL REMAIN IN PLACE UNTIL THE NEW FACILITIES ARE OPERATIONAL.

8. UNDER NO CIRCUMSTANCES SHALL THE ACTIVITIES OF THE CONTRACTOR OR HIS SUBCONTRACTORS CAUSE ANY INTERRUPTIONS TO THE SERVICE OPERATION OF EXISTING UTILITIES WITHOUT WRITTEN AUTHORIZATION FROM THE AUTHORIZED REPRESENTATIVE.

9. CONTRACTOR SHALL NOTIFY THE VARIOUS UTILITIES AND TO MAKE THE NECESSARY ARRANGEMENTS FOR ANY RELOCATION OF THESE UTILITIES, WITH THE OWNER OF THE UTILITY, PRIOR TO THE START OF ANY CONSTRUCTION ACTIVITY. THE CONTRACTOR SHALL INSURE THAT THE UTILITY OWNERS AND PINELLAS COUNTY PROJECT MANAGER ARE PROPERLY NOTIFIED OF ANY TEMPORARY DISRUPTION OF SERVICE AT LEAST 1 WEEK IN ADVANCE.

10. AT LEAST 14 DAYS BEFORE CONSTRUCTION, THE CONTRACTOR SHALL, VERIFY ALL EXISTING PUBLIC AND PRIVATE UTILITY LOCATIONS IN THREE DIMENSIONS AT EACH PROJECT SITE. THE CONTRACTOR SHALL UTILIZE MANUAL OR NONDESTRUCTIVE (E.G., VACUUM EXCAVATION) METHODS TO PHYSICALLY EXPOSE UTILITIES FOR MEASUREMENT AND DATA RECORDING. ACCURACIES SHALL BE TO ONE HALF (0.5) INCH VERTICAL AND TO APPLICABLE HORIZONTAL SURVEY AND MAPPING ACCURACY. EXCAVATE TEST HOLES EXPOSING THE UTILITY TO BE MEASURED IN SUCH A MANNER THAT PROTECTS THE INTEGRITY OF THE UTILITY TO BE MEASURED. COMPLY WITH APPLICABLE UTILITY DAMAGE PREVENTION LAWS, PERMITS, AND SPECIFICATIONS AND COORDINATE WITH UTILITY AND OTHER INSPECTORS, AS REQUIRED. DETERMINE (A) THE HORIZONTAL AND VERTICAL LOCATION OF THE TOP AND/OR BOTTOM OF THE UTILITY; (B) THE ELEVATION OF THE EXISTING GRADE OVER THE UTILITY AT A TEST HOLE; (C) THE OUTSIDE DIAMETER OF THE UTILITY AND CONFIGURATION OF NON-ENCASED, MULTI-CONDUIT SYSTEMS; (D) THE UTILITY STRUCTURE MATERIAL COMPOSITION, WHEN REASONABLY ASCERTAINABLE; (E) THE BENCHMARKS AND/OR PROJECT SURVEY DATA USED TO DETERMINE ELEVATIONS; (F) THE PAVING THICKNESS AND TYPE, WHERE APPLICABLE; (G) THE GENERAL SOIL TYPE AND SITE CONDITIONS; AND (H) SUCH OTHER PERTINENT INFORMATION AS IS REASONABLY ASCERTAINABLE FROM EACH TEST HOLE SITE. IF THERE IS A POTENTIAL CONFLICT, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY. ANY DAMAGE TO UTILITIES, STRUCTURES AND/OR SERVICES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE IN A MANNER APPROVED BY AND COORDINATED WITH THE UTILITY OWNER.

11. FOR CONNECTIONS TO AN EXISTING PIPE, THE CONTRACTOR SHALL EXCAVATE THE CONNECTION SITE TO VERIFY THE PIPE TYPE, ELEVATION, SIZE AND CONDITION, AND CHECK FOR OBSTRUCTIONS AND JOINT LOCATIONS PRIOR TO ORDERING MATERIALS AND INSTALLATION OF THE NEW PIPELINE.

12. THE CONTRACTOR HAS THE OPTION TO MOVE/RELOCATE THE ALIGNMENT (HORIZONTAL OR VERTICAL) TO AVOID CONFLICT WITH EXISTING UTILITIES OR FOR EASE OF WORK, SUBJECT TO APPROVAL FROM THE COUNTY. IF THE CONTRACTOR CHANGES THE VERTICAL ALIGNMENT, THE CONTRACTOR SHALL INSTALL ALL NECESSARY AIR RELEASE VALVES AND FITTINGS AT HIS EXPENSE.

13. ALL PRIVATE AND PUBLIC PROPERTY AFFECTED BY THIS WORK SHALL BE RESTORED TO A CONDITION EQUAL TO OR BETTER THAN THE CONDITION EXISTING BEFORE COMMENCING CONSTRUCTION WORK.

14. WHEN ENCOUNTERED, UNSUITABLE MATERIALS AS DEFINED BY THE ATTACHED GEOTECHNICAL REPORT DATED AUGUST 11, 2017, SHALL BE REMOVED FROM THE EXCAVATED MATERIALS AND BACKFILLED WITH SUITABLE MATERIALS. UNSUITABLE MATERIALS SHALL BE REMOVED FROM THE JOB SITE AND DISPOSED OF IN A TIMELY AND LEGAL MANNER AND APPROVED BY THE COUNTY.

15. INLETS AND CATCH BASINS SHALL BE PROTECTED FROM SEDIMENT UNTIL THE COMPLETION OF ALL CONSTRUCTION OPERATIONS. EROSION CONTROL AT ALL INLET DRAINAGE STRUCTURES DURING CONSTRUCTION SHALL BE DONE IN ACCORDANCE WITH COUNTY STANDARDS.

16. CONTRACTOR SHALL DEVELOP A STORMWATER PLAN APPROVED BY THE COUNTY THAT PROVIDES, MAINTAINS AND REMOVES TEMPORARY EROSION AND SEDIMENTATION CONTROLS AND IS RESPONSIBLE FOR KEEPING THE STORMWATER PLAN AT THE PROJECT SITE AT ALL TIMES. DAILY INSPECTIONS SHALL BE MADE BY THE CONTRACTOR TO DETERMINE THE EFFECTIVENESS OF EROSION AND SEDIMENT CONTROL EFFORTS. ANY NECESSARY REMEDIES SHALL BE PERFORMED IMMEDIATELY. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY REQUIRED CHANGES AND MODIFY THE STORMWATER PLAN ACCORDINGLY SUBJECT TO COUNTY APPROVAL.

17. THE STORMWATER PLAN SHALL INCLUDE TEMPORARY CONTROLS TO PREVENT SOIL EROSION FROM THE PROJECT SITE CAUSED BY STORMWATER RUNOFF, SOIL TRACKING BY EQUIPMENT, AND/OR WIND. BEST MANAGEMENT PRACTICES (BMPS) INCLUDED IN THE STORMWATER PLAN SUCH AS INSTALLATION OF SILT FENCE, MEASURES AT CONSTRUCTION ENTRANCES AND EXITS THAT PREVENT SOIL TRACKING, DUST CONTROL, AND STABILIZING OF STOCKPILES SHALL BE INSTALLED AND MAINTAINED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING ANY ADDITIONAL BMPS THAT ARE NECESSARY TO COMPLY WITH FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS AT NO ADDITIONAL COST TO THE COUNTY.

18. THE STORMWATER PLAN SHALL PREVENT TURBID STORMWATER RUNOFF GREATER THAN 29 NEPHELOMETRIC TURBIDITY UNITS (NTU) TURBIDITY FROM LEAVING THE PROJECT SITE. BMPS SHALL BE INSTALLED AND MAINTAINED BY THE CONTRACTOR ACCORDING TO THE STORMWATER PLAN. NO HAY BALES SHALL BE USED.

19. CONTRACTOR SHALL CLEAN DEBRIS AND SOIL FROM ALL NEW AND EXISTING STORM SEWER PIPES, INLETS, CATCH BASINS, AND STRUCTURES WITHIN THE PROJECT SITE AFTER THE CONSTRUCTION IS COMPLETE AND FROM ALL EXISTING STORM SEWER PIPES AND STRUCTURES OUTSIDE THE PROJECT SITE IF THESE MATERIALS ORIGINATED FROM THE PROJECT SITE. THE CONTRACTOR SHALL REMOVE ANY SOIL DEPOSITS AT OUTFALLS FROM PIPES IN LAKES OR PONDS THAT WERE CAUSED BY THE CONSTRUCTION. THE CONTRACTOR SHALL REMOVE ALL EROSION CONTROL EQUIPMENT AFTER THE PROJECT SITE IS STABILIZED AND STORM SYSTEM IS CLEANED.

20. PRIOR TO BEGINNING ANY CLEARING ACTIVITIES ON COUNTY PROPERTY, THE CONTRACTOR SHALL GET APPROVAL AND REQUIRED PERMITS FROM THE PINELLAS COUNTY DEPARTMENT OF ENVIRONMENTAL MANAGEMENT AND LOCAL ORDINANCES FOR TREE REMOVAL, THEN CLEARLY MARK WITH FLAGGING TAPE OR OTHER APPROVED METHOD, ALL EXISTING TREES TO REMAIN ON THE PROJECT SITE. ALL TREES TO BE REMOVED SHALL BE MARKED WITH SPRAY PAINT OR OTHER APPROVED METHOD SO THAT DURING CLEARING, THERE ARE NO MISUNDERSTANDING AS TO WHICH TREES ARE TO BE REMOVED AND WHICH ARE TO REMAIN.

21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPLACEMENT OF DAMAGED TREES WITH TREES OF SIMILAR QUALITIES, SIZE AND SPECIES AT NO COST TO THE COUNTY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE OF NEWLY PLANTED GRASS OR VEGETATION UNTIL THE WORK HAS BEEN ACCEPTED BY THE COUNTY.

22. DEWATERING SYSTEM SHALL BE UTILIZED BY THE CONTRACTOR IN ACCORDANCE WITH GOOD STANDARD PRACTICES AND MUST BE SUFFICIENT ENOUGH TO LOWER THE WATER LEVEL IN ADVANCE OF EXCAVATION TO KEEP THE TRENCH BOTTOM AND SIDES FIRM AND DRY, AT LEAST 3' MINIMUM BELOW THE TRENCH BOTTOM, ADDITIONAL DEWATERING REQUIREMENTS ARE IN SPECIFICATION 02140 AND THE ATTACHED GEOTECHNICAL REPORT DATED AUGUST 11, 2017. POLLUTED WATER SHALL NOT BE DISCHARGED INTO SANITARY SEWER, STORM SYSTEM RETENTION POND, OR BODIES OF WATER. ANY DISCHARGE INTO SANITARY SEWER SYSTEM SHALL BE PRE-APPROVED BY THE WASTEWATER DIVISION. DEWATERED LIQUID MUST BE TESTED FOR CONTAMINANTS PRIOR TO DISCHARGE. IF COUNTY APPROVES DISCHARGE TO SANITARY SEWER, COUNTY HAS RIGHT TO CHARGE WASTEWATER FEES BASED ON CURRENT RATES. CONTAINMENT TESTING TO BE PAID FOR BY CONTRACTOR.

23. EXCAVATIONS SHALL CONFORM TO THE REQUIREMENTS OF THE OSHA TRENCH SAFETY ACT. THE DISPOSAL OF EXCESS EARTHWORK MATERIALS SHALL BE THE RESPONSIBILITY/PROPERTY OF THE CONTRACTOR.

24. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE STABILITY OF EMBANKMENTS AND SHALL REPLACE ANY PORTION WHICH HAS BECOME DISPLACED DUE TO EROSION OR DUE TO CARELESSNESS OR NEGLIGENCE ON THE PART OF THE CONTRACTOR.

25. TEMPORARY DRAINAGE SHALL BE PROVIDED DURING CONSTRUCTION TO ELIMINATE ANY FLOODING OF PRIVATE PROPERTY AND EXISTING ROADWAYS CAUSED BY CONSTRUCTION ACTIVITIES. CONTRACTOR SHALL PROVIDE ADDITIONAL DRAINAGE AT NO EXTRA COST TO THE OWNER.

26. HYDROSTATIC PRESSURE AND LEAKAGE TESTS SHALL BE CONDUCTED ONLY FOR INSTALLED FACILITIES. ALL TESTS SHALL BE ACCEPTED BY THE COUNTY REPRESENTATIVE BEFORE ANY PAVEMENT IS PUT IN PLACE.

27. ALL PIPING SHALL BE CLEAN AND FREE OF ALL DIRT, DEBRIS, AND BIOLOGY BEFORE PRESSURE TESTING AND SHALL BE INCIDENTAL TO PIPE INSTALLATION COST.

28. PRESSURE TESTING REQUIREMENTS AND SUBMITTALS ARE LISTED IN SECTION 01 45 17.

29. MINIMUM REINFORCEMENT STEEL AND CONCRETE COVER SHALL BE IN ACCORDANCE WITH ACI-318

30. A COMPLETE SET OF AS-BUILT DRAWINGS (34" X 22" HARD COPY & AutoCAD FILE), AND ALL INSPECTION AND TEST RECORDS MUST BE SUBMITTED TO PINELLAS COUNTY AND APPROVED BEFORE THE NEW SYSTEM IS ALLOWED TO BE PUT INTO SERVICE. THE DRAWINGS MUST INCLUDE ACCURATE LAYOUT, SIZING, AND STATE PLANE COORDINATES FOR ALL VALVES, PIPING BENDS, BRANCHES, ENDS, OUTLETS, CONNECTION POINTS, METER BOXES AND LOCATOR BALLS, OR ANY ITEM LISTED ABOVE. AS-BUILTS SHALL BE SIGNED AND SEALED BY FLORIDA LICENSED SURVEYOR. ADDITIONAL REQUIREMENTS AND SUBMITTALS ARE LISTED IN SECTION 01 78 39, PROJECT RECORD DOCUMENTS.

31. ALL WATER, SEWER, AND RECLAIMED WATER PIPE, PIPE FITTINGS AND APPURTENANCES INSTALLED UNDER THIS PROJECT WILL BE COLOR CODED OR MARKED IN ACCORDANCE WITH SUBPARAGRAPH 62-555.320 (21) (b) 3, FAC, USING BLUE AS A PREDOMINANT COLOR FOR WATER; GREEN FOR WASTEWATER; PANTONE PURPLE 522C FOR RECLAIMED WATER.

32. TRENCHES LOCATED UNDER PAVEMENT OR INSIDE THE TWO FEET HORIZONTAL TO ONE FOOT VERTICAL SLOPE, DOWNWARD FROM ROADWAY SHOULDER OR THE BACK OF CURB AND FROM SPRING LINE TO BOTTOM OF SUB-GRADE OR THE FINISHED SURFACE OF THE EMBANKMENT, AS APPROPRIATE, SHALL BE COMPACTED TO A DENSITY OF ONE HUNDRED (100) PERCENT AS DETERMINED BY AASHTO T-99 METHOD C.

33. TRENCHES LOCATED OUTSIDE OF THE TWO FEET HORIZONTAL TO ONE FOOT VERTICAL SLOPE DOWNWARD FROM ROADWAY SHOULDER OR THE BACK OF CURB AND WHERE NO VEHICULAR TRAFFIC WILL PASS OVER THE TRENCHES, BACK FILL SHALL BE COMPACTED TO A DENSITY APPROXIMATELY EQUAL TO THAT SOIL ADJACENT TO THE TRENCH BUT NOT LESS THAN NINETY-FIVE (95) PERCENT OF THE MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99, METHOD-C.

34. BACKFILL TESTING SHALL BE PERFORMED IN ACCORDANCE WITH PINELLAS COUNTY MINIMUM TESTING FREQUENCY REQUIREMENTS, LATEST EDITION, UNLESS CALLED OUT DIFFERENTLY BY THE ENGINEER ON THE PLAN DOCUMENTS.

35. WHEN USING SCALED DATA CONSIDER THAT THESE PLANS MAY HAVE BEEN ALTERED IN SIZE DURING REPRODUCTION.

36. PIPE LENGTHS SHOWN ON PLANS ARE APPROXIMATE. ACTUAL LENGTHS ARE TO BE DETERMINED DURING CONSTRUCTION BY THE CONTRACTOR.

37. SUPPORT & PROTECT ALL EXISTING UTILITIES. CONTRACTOR SHALL CONTACT UTILITY OWNERS FOR LOCATION OF ALL EXISTING FACILITIES. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH UTILITY OWNERS AND BE RESPONSIBLE FOR PROVIDING TEMPORARY SUPPORT FOR UTILITY POLES AND ALL OTHER UTILITIES FACILITIES.

38. IF REQUIRED BY DEWATERING ACTIVITIES CONTRACTOR SHALL APPLY FOR AND OBTAIN A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT FROM THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP) AND COMPLY WITH ALL NPDES REQUIREMENTS DURING CONSTRUCTION OF THE PROJECT.

39. EXERCISE EXTREME CAUTION WHEN EXCAVATING NEAR WASTEWATER FORCE MAINS AND GRAVITY SEWERS. EXPOSE AND VERIFY LOCATION OF MAINS PRIOR TO EXCAVATION.

40. PROTECT EXISTING IMPROVEMENTS TO THE MAXIMUM EXTENT POSSIBLE. ALL DAMAGED SIDEWALK, ROADWAY PAVEMENT, GRASS LANDSCAPING AND OTHER IMPROVEMENTS SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER.

41. BENCHMARK LOCATIONS AND ELEVATION ARE SHOWN IN THE PLANS AS REPRESENTED BY SURVEYOR AT THE TIME OF THE SURVEY. CONTRACTOR SHALL VERIFY ITS CORRECTNESS AT THE TIME OF CONSTRUCTION AND INSTALL HIS OWN TEMPORARY BENCHMARKS. ANY DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE COUNTY FIELD REPRESENTATIVE

42. WHERE REQUIRED, AT NO ADDITIONAL COST TO THE COUNTY, THE CONTRACTOR SHALL USE TEMPORARY SHEETING OR TRENCH BOXES TO MINIMIZE THE SIZE OF EXCAVATIONS AND PROTECT EXISTING ROADWAYS, UTILITIES AND OTHER FACILITIES. CONTRACTOR TO COMPLY WITH OSHA TRENCH SAFETY REQUIREMENTS AT ALL TIMES.

43. CONTRACTOR SHALL PROVIDE ALL NECESSARY BY-PASS PIPING, PUMPING, AND ANY OTHER ITEMS NEEDED TO MAINTAIN UNINTERRUPTED SERVICE AT ALL TIMES. REFER TO SPECIFICATION SECTION 33 32 00, SUBMERSIBLE WASTEWATER PUMPING STATIONS, FOR ADDITIONAL REQUIREMENTS.

44. WHEN WORKING IN CONFINED SPACES AT THE SITE, CONTRACTOR EMPLOYEES SHALL MEET ALL OSHA CONFINED SPACE ENTRY REQUIREMENTS, INCLUDING BUT NOT LIMITED TO PERMITTING, ATMOSPHERE TESTING, CHECKLISTS, SEWER ENTRY AND RESCUE TEAMS AS REQUIRED BY OSHA 29 CFR 1910 AND PROVIDE CERTIFICATIONS TO THE COUNTY.

45. WORKING HOURS: 7AM TO 6PM, MONDAY THROUGH FRIDAY. SATURDAY WORK REQUIRES VERBAL APPROVAL AND A 24-HOUR NOTICE. SUNDAY AND HOLIDAY WORK REQUIRES WRITTEN APPROVAL. THE CONTRACTOR SHALL MAKE THE REQUEST TO WORK WEEKENDS AND/OR HOLIDAYS AT LEAST 24 HOURS IN ADVANCE. WEEKDAY (M-F) OVERTIME WORK ACCEPTABLE IF THE WORK PERFORMED DOES NOT REQUIRE IMMEDIATE INSPECTION AND THE COUNTY HAS GRANTED APPROVAL.

46. CONTRACTOR SHALL AT ALL TIMES MAINTAIN ACCESS WAYS FOR COUNTY VEHICLES AND PERSONNEL TO MAINTAIN LIFT STATION FOR MAINTENANCE/EMERGENCY SITUATIONS.

47. CONTRACTOR TO PROVIDE TEMPORARY 6-FT CHAIN LINK SECURITY FENCING TO SAFE/PROTECT THE AREA AT THE END OF THE DAY.

48. CONTRACTOR TO CONTACT THE COUNTY SURVEYOR IF SURVEY CONTROLS OR BENCHMARKS ARE TO BE DISTURBED OR THAT HAVE BEEN DAMAGED; IT IS THE RESPONSIBILITY OF THE CONTRACTOR'S SURVEYOR (A FLORIDA LICENSED SURVEYOR AND MAPPER) TO COORDINATE WITH COUNTY SURVEYOR AND ENGINEER PRIOR CONSTRUCTION OR PRIOR TO DISTURBING CONTROL DURING CONSTRUCTION. CONTRACTOR SHALL REPLACE CONTROLS WITH THE DOCUMENTATION AND DIRECTION PROVIDED BY THE COUNTY SURVEYOR.

49. CONTRACTOR SHALL HAVE FLORIDA LICENSED SURVEYOR REFERENCE ALL CONTROL POINTS TO CONSTRUCTION, INCLUDING RIGHT OF WAY, CORNERS, OR ANY CONTROL POINTS AND PROVIDE INFORMATION TO COUNTY SURVEYOR. ADDITIONAL REQUIREMENTS AND SUBMITTALS ARE LISTED IN SECTION 01 78 39, PROJECT RECORD DOCUMENTS.

EMERGENCY WASTEWATER SPILL, WATER MAIN OR ELECTRICAL BREAK PROCEDURES

1. THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHEN EXCAVATING IN PROXIMITY OF WATER, WASTEWATER FORCE MAINS AND GRAVITY SEWERS. LOCATIONS SHOWN ON PLANS ARE NOT EXACT OR GUARANTEED. CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING EXISTING UTILITY LOCATIONS WHETHER SHOWN ON THE PLANS OR NOT.

2. THE PINELLAS COUNTY EMERGENCY CONTACT SHALL BE NOTIFIED IMMEDIATELY IN THE EVENT OF A FORCE MAIN, RECLAIMED WATER MAIN, OR GRAVITY SEWER BREAK OR DAMAGE.

3. PCU EMERGENCY CONTACT SHALL BE NOTIFIED IMMEDIATELY IN THE EVENT OF A WATER OR ELECTRICAL BREAK OR DAMAGE.

4. ALL DAMAGE TO MAINS SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE. IF THE REPAIR IS NOT MADE IN A TIMELY MANNER, AS DETERMINED BY THE COUNTY INSPECTOR, THE COUNTY MAY PERFORM REPAIRS AND THE CONTRACTOR WILL BE CHARGED FOR REPAIRS.

SEQUENCE OF CONSTRUCTION

1. CONTRACTOR SHALL SUBMIT SEQUENCE OF CONSTRUCTION PLAN FOR APPROVAL TO COUNTY 14-DAYS PRIOR TO ONSITE CONSTRUCTION. LIFT STATIONS OR BYPASS PUMPS SHALL REMAIN IN OPERATION 24-HOURS 7-DAYS PER WEEK.

BYPASS PUMPING CAPACITY REQUIREMENTS

LS NO.	FIRM CAPACITY (GPM)	TDH
079-REDINGTON SHORES	1100	14
079-NORTH REDINGTON BEACH	600	14

MOT NOTES

1. MAINTENANCE OF TRAFFIC SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (LATEST EDITION AND REVISIONS) AND THE FLORIDA DEPARTMENT OF TRANSPORTATION ROADWAY DESIGN STANDARDS (LATEST EDITION AND REVISIONS)

2. CONTRACTOR SHALL PAY FOR AND SUBMIT (INCLUDING REQUIRED REVISIONS) TO THE ENGINEER A MAINTENANCE OF TRAFFIC PLAN THAT IS DESIGNED, SIGNED AND SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF FLORIDA, FOR REVIEW AND APPROVAL PRIOR TO START OF WORK.

3. ANY CHANGES MADE TO THE TRAFFIC CONTROL PLAN BY THE CONTRACTOR, SHALL BE SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER AND APPROVED BY THE ENGINEER PRIOR TO IMPLEMENTATION.

4. PINELLAS COUNTY RESERVES THE RIGHT TO REQUIRE ADDITIONAL DEVICES AND/OR CHANGES TO THE TRAFFIC CONTROL PLAN BASED UPON CHANGING TRAFFIC CONDITIONS.

5. LOCAL RESIDENTIAL ACCESS SHALL BE MAINTAINED AT ALL TIMES. CONTRACTOR SHALL PROVIDE WRITTEN NOTIFICATION TO THE RESIDENTS/BUSINESSES AFFECTED BY CONSTRUCTION ACTIVITIES, ONE (1) WEEK IN ADVANCE OF THE START OF ANY PHASE OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE COPIES OF THE NOTIFICATION TO THE TRAFFIC CONTROL MANAGER PRIOR TO DISTRIBUTION.

7. THE CONTRACTOR SHALL NOTIFY THE PINELLAS COUNTY SCHOOL BOARD, SAFETY MANAGER, ONE (1) WEEK IN ADVANCE OF THE START OF ANY PHASE OF CONSTRUCTION TO COORDINATE SCHOOL BUS RE-ROUTING.

8. THE NUMBER OF DEVICES SHOWN ON THESE PLANS IS FOR ILLUSTRATION PURPOSES. ADDITIONAL DEVICES MAY BE REQUIRED TO PROPERLY PROTECT THE WORKERS AND WORK ZONE FROM VEHICULAR TRAFFIC

9. TEMPORARY MARKINGS REQUIRED ON FINAL SURFACES OR SURFACES NOT BEING REPAVED SHALL BE INSTALLED USING 3M BRAND STAMARK REMOVABLE TAPE, SERIES 780, WET REFLECTIVE TEMPORARY TAPE OR APPROVED EQUAL. THE USE OF "FOIL BACK" TYPES OF TEMPORARY TAPE IS NOT PERMITTED.

10. 3M BRAND REMOVABLE BLACK MASK TAPE, SERIES 145, IS THE ONLY APPROVED MATERIAL FOR "BLACKING OUT" OF EXISTING PAVEMENT MARKINGS ON FINAL ROADWAY SURFACES OR SURFACES NOT BEING REPAVED. UNDER NO CIRCUMSTANCES WILL BLACK PAINT OR GRINDING BE PERMITTED.

11. PAINT PRODUCTS AND RETRO-REFLECTIVE PAVEMENT MARKERS WILL BE CONSIDERED TEMPORARY PAVEMENT MARKING MATERIALS ON SURFACES THAT ARE TO BE MILLED AND RESURFACED.

12. EXISTING PAVEMENT MARKINGS, WHICH ARE TO BE OBLITERATED, SHALL BE RESTORED TO ORIGINAL CONDITION UPON COMPLETION OF CONSTRUCTION AND PRIOR TO REINSTATING VEHICULAR TRAFFIC.

13. ALL SIGNS AND TRAFFIC CONTROL DEVICES SHALL BE NEW OR LIKE NEW CONDITION. ALL SIGNS SHALL BE POST MOUNTED UNLESS OTHERWISE INDICATED.

14. CHANNELIZING DRUMS SHALL BE USED ON NEWLY PAVED ROADWAYS.

15. DURING NON-WORKING HOURS, NO EQUIPMENT, VEHICLES OR MATERIAL SHALL BE PARKED OR STORED WITHIN THE CLEAR ZONE OF A ROADWAY OPEN TO VEHICULAR TRAFFIC.

16. EXISTING REGULATORY AND WARNING SIGNS ARE TO BE MAINTAINED AT ALL TIMES UNLESS OTHERWISE NOTED.

17. DELIVERY TRUCKS SHALL NOT BLOCK TRAFFIC.

18. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSURING EACH EMPLOYEE SUPERVISING THE SELECTION AND PLACEMENT OF MAINTENANCE OF TRAFFIC (MOT) CONTROL DEVICES SHALL BE PROPERLY TRAINED BY ATTENDING AND SUCCESSFULLY COMPLETING A FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT) APPROVED MOT COURSE. THE TRAINING SHALL BE AT A LEVEL APPLICABLE TO THE EMPLOYEE'S LEVEL OF INVOLVEMENT. COPIES OF CERTIFICATIONS SHALL BE PROVIDED TO THE COUNTY TRANSPORTATION ENGINEERING DIVISION PRIOR TO IMPLEMENTING ANY PHASE OF MOT.

48 HOURS BEFORE DIGGING
CALL
TOLL FREE
1-800-432-4770
SUNSHINE STATE ONE CALL CENTER

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED PMW
DRAWN HCR
CHECKED TBC

Pinellas County

PROJECT: PUMP STATION 079 REPLACEMENT

DESCRIPTION: GENERAL NOTES

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

APPROVED BY:

Thomas Brady Cross, P.E.
FLA. LIC. NO. 59868

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: G-001

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LIST OF STANDARD ABBREVIATIONS

A			
AAP	ALARM ANNUNCIATOR PANEL		
AARV	AUTOMATIC AIR RELEASE VALVE		
AAV	AUTOMATIC AIR VENT		
AB	ANCHOR BOLT		
ABAN	ABANDON(ED)		
ABV	ABOVE		
AC	ALTERNATING CURRENT		
ACCMP	ASPHALT-COATED CORRUGATED METAL PIPE		
ACP	ASBESTOS CEMENT PIPE		
ADDM	ADDENDUM		
ADH	ADHESIVE		
AFF	ABOVE FINISHED FLOOR		
AFG	ABOVE FINISHED GRADE		
AFS	ABOVE FINISHED SLAB		
AHD	AHEAD		
AL	ALUMINUM		
ALT	ALTERNATE		
AMP	AMPERE		
AMT	AMOUNT		
ANT	ANTENNA		
APRX	APPROXIMATE(LY)		
ARCH	ARCHITECT(URAL)		
AS	ALUM SOLUTION		
ASPH	ASPHALT		
ASSY	ASSEMBLY		
AVE	AVENUE		
A/C	AIR CONDITIONING		
A/VV	AIR/VACUUM AIR VALVE		
B			
BAF	BAFFLE		
BCV	BALL CHECK VALVE		
BF	BLIND FLANGE		
BFV	BUTTERFLY VALVE		
BHP	BRAKE HORSEPOWER		
BI	BLACK IRON		
B/L	BASELINE		
BLDG	BUILDING		
BLK	BLOCK		
BM	BENCH MARK		
BOC	BACK OF CURB		
BOT	BOTTOM		
BP	BASE PLATE		
BRG	BEARING		
BSP	BLACK STEEL PIPE		
BV	BALL VALVE		
BW	BOTH WAYS		
BWW	BACKWASH WATER		
C			
CAP	CAPACITY		
CA	COMPRESSED AIR		
CAV	COMBINATION AIR VALVE		
CB	CATCH BASIN		
CCC	CHLORINE CONTACT CHAMBER		
CE	CHLORINATED EFFLUENT		
CFM	CUBIC FEET PER MINUTE		
CFS	CUBIC FEET PER SECOND		
CV	CHECK VALVE		
CI	CAST IRON		
CIP	CAST IRON PIPE		
CISP	CAST IRON SOIL PIPE		
CJ	CONSTRUCTION JOINT		
CKT	CIRCUIT		
C/L	CENTER LINE		
CLF	CHAIN LINK FENCE		
CLR	CLEAR OR CLEARANCE		
CLVT	CULVERT		
CM	CONCRETE MONUMENT		
CMP	CORRUGATED METAL PIPE		
CMPA	CORRUGATED METAL PIPE ARCH		
CMU	CONCRETE MASONRY UNIT		
CND	CONDUIT		
CNR	CORNER		
CO	CLEAN OUT		
COAG	COAGULANT		
COL	COLUMN		
COM	COMMON		
CONC	CONCRETE		
CONN	CONNECTION		
CONSTR	CONSTRUCT(ION)		
CONT	CONTINUOUS		
CONTR	CONTRACT(OR)		
COORD	COORDINATE		
CO	COMPANY		
CP	CONCRETE PIPE		
CPP	CORRUGATED PLASTIC PIPE		
CPA	CONCRETE PIPE ARCH		
CPLG	COUPLING		
CR	CONCENTRIC REDUCER		
CSG	CASING		
CTV	CABLE TELEVISION		
CY	CUBIC YARD		
CYL	CYLINDER		
C&G	CURB AND GUTTER		
C/C	CENTER TO CENTER		
D			
DAT	DATUM		
DBL	DOUBLE		
DC	DIRECT CURRENT		
DEMO	DEMOLITION		
DEPT	DEPARTMENT		
DESC	DESCRIPTION		
DET	DETAIL		
DF	DIESEL FUEL		
DH	DRILL HOLE		
DI	DUCTILE IRON		
DIA	DIAMETER		
DIFF	DIFFUSER		
DIM	DIMENSION		
DIP	DUCTILE IRON PIPE		
DISCH	DISCHARGE		
DIR	DIRECTION		
DMH	DROP MANHOLE		
DN	DOWN		
DR	DRAIN		
DV	DIAPHRAGM VALVE		
DW	DRIVEWAY	DWG	DRAWING
DWV	DRAIN, WASTE, AND VENT		
E			
E	EAST		
EA	EACH		
EB	ELECTRIC RISER		
ECC	ECCENTRIC		
EF	EACH FACE		
EFF	EFFLUENT		
E/L	EASEMENT LINE		
EL	ELEVATION		
ELEC	ELECTRICAL		
EM	ELECTRIC METER		
EMER	EMERGENCY		
EMC	ENCASE(MENT)		
ENGR	ENGINEER		
EP	EDGE OF PAVEMENT		
EPRF	EXPLOSION PROOF		
EQUIP	EQUIPMENT		
ER	ECCENTRIC REDUCER		
ESTM	EASEMENT		
EST	ESTIMATE(D)		
ET	ELECTRIC TRANSFORMER		
EW	EACH WAY		
EXC	EXCAVATE		
EXP	EXPANSION		
EXST	EXISTING		
EXST GR	EXISTING GRADE		
EXT	EXTERIOR		
EXTN	EXTENSION		
F			
F	FOUND		
FCA	FLANGED COUPLING ADAPTER		
FB	FLAT BAR		
FCV	FLOW-CONTROL VALVE		
FD	FLOOR DRAIN		
FDN	FOUNDATION		
FDC	FIRE DEPT CONNECTION		
FE	FILTER(ED) EFFLUENT		
FF	FINISH FLOOR		
FH	FIRE HYDRANT		
FIG	FIGURE		
FIN	FINISH(ED)		
FIN GR	FINISH GRADE		
FL	FLUORIDE		
FLG	FLANGE(D)		
FLL	FLOW LINE		
FLTR	FILTER		
FM	FORCE MAIN		
FO	FIBER OPTIC		
FPM	FEET PER MINUTE		
FPS	FEET PER SECOND		
FRP	FIBERGLASS REINFORCED PLASTIC		
FT	FOOT OR FEET		
FUT	FUTURE		
FV	FOOT VALVE		
FW	FINISHED WATER		
FWP	FACTORY WIRED PANEL		
F/F	FACE TO FACE		
G			
G	GAS		
GA	GAUGE		
GAL	GALLON(S)		
GALV	GALVANIZED		
GIP	GALVANIZED IRON PIPE		
GJ	GROOVE JOINT		
GM	GAS METER		
GND	GROUND		
GPD	GALLONS PER DAY		
GPH	GALLONS PER HOUR		
GPM	GALLONS PER MINUTE		
GPS	GALLONS PER SECOND		
GR	GRADE		
GRTG	GRATING		
GS	GALVANIZED STEEL		
GSP	GALVANIZED STEEL PIPE		
GSR	GROUND STORAGE RESERVOIR		
GST	GROUND STORAGE TANK		
GT	GROUT		
GV	GAS VALVE		
H			
HB	HOSE BIBB		
HD	HEAVY-DUTY		
HDD	HORIZONATL DIRECTIONAL DRILL		
HDPE	HIGH-DENSITY POLYETHYLENE		
HDR	HYDRAULIC		
HFA	HYDROFLUOSILICIC ACID		
HGR	HANGER		
HGT	HEIGHT		
HNDRL	HAND RAIL		
HOA	HAND-OFF-AUTO		
HORIZ	HORIZONTAL		
HP	HORSEPOWER		
HPA	HIGH PRESSURE AIR		
HR	HOUR		
HVAC	HEATING, VENTILATION, AND AIR CONDITIONING		
HWL	HIGH WATER LEVEL		
HWY	HIGHWAY		
HZ	HERTZ		
I			
ID	INSIDE DIAMETER		
IN	INCH(ES)		
INF	INFLUENT		
INT	INTERSECTION		
INTR	INTERIOR		
INV	INVERT		
IP	IRON PIPE		
IPS	INTERNATIONAL PIPE STANDARD		
IR	IRON ROD		
IRRV	IRRIGATION VALVE		
IW	IRRIGATION WATER		
J			
JB	JUNCTION BOX		
JBL	JURISDICTIONAL BOUNDARY LINE		
JT	JOINT		
K			
KPL	KICK PLATE		
KV	KILOVOLT		
KVA	KILOVOLT-AMPERE		
KW	KILOWATT		
KWH	KILOWATT-HOUR		
L			
L	LEFT		
LAB	LABORATORY		
LATL	LATERAL		
LAV	LAVATORY		
LEN	LENGTH		
LB	POUND(S)		
LF	LINEAR FEET		
LP	LIGHT POLE		
LS	LIME SLURRY		
LSS	LIME STABILIZED SLUDGE		
LVR	LOUVER		
LWL	LOW WATER LEVEL		
M			
M	METER		
MAINT	MAINTAIN OR MAINTENANCE		
MAN	MANUAL(LY)		
MAS	MASONRY		
MATL	MATERIAL		
MAX	MAXIMUM		
MB	MAILBOX		
MCC	MOTOR CONTROL CENTER		
ME	MITERED END		
MECH	MECHANICAL		
MEG	MATCH EXISTING GRADE		
MFR	MANUFACTURER(R)		
MG	MILLION GALLONS		
MGD	MILLION GALLONS PER DAY		
MH	MANHOLE		
MI	MILE(S)		
MIN	MINIMUM, MINUTE(S)		
MISC	MISCELLANEOUS		
MJ	MECHANICAL JOINT		
ML	MIXED LIQUOR		
MO	MASONRY OPENING		
MON	MONUMENT		
MPH	MILES PER HOUR		
MPT	MALE PIPE THREAD		
MS	MOTOR STARTER		
MSP	MOTOR STARTER PANEL		
MTD	MOUNTED		
MV	MOTORIZED VALVE		
MW	MONITORING WELL		
MWL	MEAN WATER LEVEL		
MWP	MAXIMUM WORKING PRESSURE		
N			
N	NORTH		
ND	NAIL & DISK		
NE	NORTHEAST		
NIC	NOT IN CONTRACT		
NL	NAIL		
NO	NUMBER		
NOM	NOMINAL		
NPF	NATIONAL PIPE THREAD		
NPT	NATIONAL PIPE TAPER (THREAD)		
NPW	NON-POTABLE WATER		
NRS	NON-RISING SYSTEM		
NTS	NOT TO SCALE		
NW	NORTHWEST		
N/A	NOT APPLICABLE		
O			
OC	ON CENTER		
OD	OUTSIDE DIAMETER		
ODP	OPEN DRIP PROOF		
OE	OVERHEAD UTILITY LINES		
OF	OUTSIDE FACE		
OH	OVER HEAD		
OHW	OVER HEAD WIRE		
OPP	OPPOSITE		
OPT	OPTIONAL		
OR	OFFICIAL RECORDS		
OSY	OUTSIDE SCREW AND YOKE		
O&M	OPERATION AND MAINTENANCE		
P			
P	POST		
PA	PROCESS AIR		
PB	PLAT BOOK		
PC	POINT OF CURVE		
PCM	PERMANENT CONTROL MONUMENT		
PE	PLAIN END		
PG	PAGE		
PI	POINT OF INTERSECTION		
PK	PK NAIL		
PL	PLATE		
P/L	PROPERTY LINE		
PNV	PINCH VALVE		
POB	POINT OF BEGINNING		
POJ	PUSH-ON JOINT		
POL	POLYMER		
PP	POWER POLE		
PPD	POUNDS PER DAY		
PPM	PARTS PER MILLION		
PREFAB	PREFABRICATED		
PRESS	PRESSURE		
PRV	PRESSURE REDUCING VALVE		
PRW	PROCESS WATER		
PSF	POUNDS PER SQUARE FOOT		
PSI	POUNDS PER SQUARE INCH		
PSIA	POUNDS PER SQUARE INCH ABSOLUTE		
PSIG	POUNDS PER SQUARE INCH GAGE		
PT	POINT OF TANGENCY		
PV	PLUG VALVE		
PVC	POLYVINYL CHLORIDE		
PVMT	PAVEMENT		
PW	POTABLE WATER		
PWR	POWER		
Q			
Q	FLOW		
QTY	QUANTITY		
R			
RAD	RADIUS		
RAS	RETURN ACTIVATED SLUDGE		
RC	REINFORCED CONCRETE		
RCB	REINFORCED CONCRETE BOX		
RCP	REINFORCED CONCRETE PIPE		
RCPA	REINFORCED CONCRETE PIPE ARCH		
RD	ROAD		
RDCR	REDUCER		
REBAR	REINFORCING STEEL		
REF	REFERENCE		
REINF	REINFORCE(D)(ING)(MENT)		
REM	REMOVE(ABLE)		
REQ'D	REQUIRED		
RF	RAISED FACE		
RJ	RESTRAINED JOINT		
RM	ROOM		
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER		
RPM	REVOLUTIONS PER MINUTE		
RR	RAILROAD		
RT	RIGHT		
RVT	RIVETED		
RW	RAW WATER		
RWM	RECLAIMED WATER MAIN		
RWW	RAW WASTEWATER		
R/W	RIGHT-OF-WAY		
S			
S	SOUTH		
SA	SAMPLE LINE		
SAN	SANITARY		
SEC	SECTION CORNER		
SCHED	SCHEDULE		
SD	STORM DRAIN		
SE	SOUTHEAST		
SECT	SECTION		
SEFF	SECONDARY EFFLUENT		
SF	SQUARE FOOT OR FEET		
SH	SPRINKLER HEAD		
SHT	SHEET(ED)(ING)		
SIG	SIGNAL		
SIM	SIMILAR		
SL	SLUDGE		
SLV	SLEEVE		
SM	SHEET METAL		
SOLN	SOLUTION		
SP	SOIL PIPE, SPACE(ING)		
SPEC	SPECIFICATION		
SPIG	WATER SPIGOT		
SPRT	SUPPORT		
SQ	SQUARE		
SS	SANITARY SEWER		
SSE	SUBSTANDARD EFFLUENT		
SST	STAINLESS STEEL		
ST	STREET		
STA	STATION		
STD	STANDARD		
STK	STAKE		
STL	STEEL		
STR	STRAIGHT		
STRUCT	STRUCTURAL		
SURF	SURFACE		
SV	SEWER VALVE		
SVCE	SERVICE		
SVW	SERVICE WATER		
SW	SOUTHWEST		
SWD	SIDEWATER DEPTH		
SWSH	SURFACE WASH		
SYM	SYMBOL		
SYMM	SYMMETRICAL		
S/W	SIDEWALK		
T			
TAN	TANGENT		
TB	TELEPHONE RISER		
TBM	TEMPORARY BENCH MARK		
TB-xx	TEST BORING-xx (e.g. TB-1)		
TD	TRENCH DRAIN		
TDH	TOTAL DYNAMIC HEAD		
TE	TOTALLY ENCLOSED		
TEFC	TOTALLY ENCLOSED FAN COOLED		
TEL	TELEPHONE		
TENV	TOTALLY ENCLOSED NON-VENTILATED		
THD	THREAD(ED)		
THK	THICK(NESS)		
TLM	TELEMETRY		
TOB	TOP OF BANK		
TOC	TOP OF CURB		
TOS	TOE OF SLOPE		
TOT	TOTAL		
TP	TRAVERSE POINT		
TSC	TRAFFIC SIGNAL CONTROL		
TSP	TRAFFIC SIGNAL POST		
TV	CABLE TELEVISION		
TYP	TYPICAL		
T&B	TOP AND BOTTOM		
U			
UD	UNDERDRAIN		
UE	UNDERGROUND ELECTRIC		
UG	UNDERGROUND		
ULT	ULTIMATE		
UN	UNION		
UON	UNLESS OTHERWISE NOTED		
UTIL	UTILITY		
UTV	UNDERGROUND TELEPHONE CABLE		
V			
V	VOLT(S)		
VAC	VACUUM		
VAR	VARIES		
VC	VERTICAL CURVE		
VCP	VITRIFIED CLAY PIPE		
VEL	VELOCITY		
VERT	VERTICAL		
VFD	VARIABLE FREQUENCY DRIVE		
VOL	VOLUME		
W			
W	WATER MAIN		
WAS	WASTE ACTIVATED SLUDGE		
WCO	WALL CLEAN OUT		
WF	WIDE FLANGE		
WH	WALL HYDRANT		
WL	WATER LINE		
WM	WATER METER		
WP	WATER PROOF(ING), WORKING POINT		
WPR	WORKING PRESSURE		
WS	WATER SURFACE		
WSP	WELDED STEEL PIPE		
WT	WEIGHT		
WTP	WATER TREATMENT PLANT		
WV	WATER VALVE		
WW	WASTEWATER		
WWF	WELDED WIRE FABRIC		
WWM	WELDED WIRE MESH		
WWTP	WASTEWATER TREATMENT PLANT		
W/	WITH		
W/O	WITHOUT		
X			
XC	X CUT		
XFER	TRANSFER		
Y			
YD	YARD(S)		
YH	YARD HYDRANT		
YR	YEAR(S) YR		

PIPING LEGEND

FITTING/ APPURTENANCE	FLANGED				MECHANICAL JOINT				GROOVE JOINT				SOLVENT WELD			
	SINGLE-LINE		DOUBLE-LINE		SINGLE-LINE		DOUBLE-LINE		SINGLE-LINE		DOUBLE-LINE		SINGLE-LINE		DOUBLE-LINE	
	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED
BEND																
TEE																
WYE																
REDUCER																
CAP/ BLIND FLANGE					N/A	N/A	N/A	N/A								
PLUG	N/A	N/A	N/A	N/A					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
BUTTERFLY VALVE																
BALL VALVE					N/A	N/A	N/A	N/A								
CHECK VALVE					N/A	N/A	N/A	N/A								
GATE VALVE																
PLUG VALVE																
AUTOMATIC CONTROL VALVE					N/A	N/A	N/A	N/A								
PINCH VALVE					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				

CIVIL LEGEND

- PROPERTY LINE
- RIGHT OF WAY LINE (R-O-W)
- EASEMENT
- 130 — PROPOSED CONTOUR MAJOR
- 129 — PROPOSED CONTOUR MINOR (LABEL OPTIONAL)
- WATER (HDD)
- W — WATER (OPEN CUT)
- STORM WATER
- SS — SANITARY SEWER
- FM — SANITARY SEWER (FORCE MAIN)
- xx xx xx xx xx — STEEL FENCE
- x x x x x x — WOOD FENCE
- VEGETATION

BM	BENCHMARK		ELECTRIC TRANSFORMER
ND	NAIL & DISK		EVERGREEN TREE
TP	TRAVERSE POINT		FIRE HYDRANT
F	FOUND IRON (TYPE)		FLAG (AS SHOWN)
S	SET IRON (TYPE)		GUY ANCHOR
F	FOUND MONUMENT (TYPE)		LIGHT POLE
S	SET MONUMENT (TYPE)	MB	MAIL BOX
SC	SECTION CORNER		PALM TREE
CO	CLEANOUT	P	POST
	DECIDUOUS TREE		SATELLITE DISH
	SPIGOT		UTILITY MANHOLE (AS SHOWN)
	SPRINKLER HEAD		UTILITY METER (AS SHOWN)
	TRAFFIC SIGN		UTILITY RISER (AS SHOWN)
	UTILITY MARKER (AS SHOWN)		UTILITY VALVE (AS SHOWN)
	WELL		UTILITY POLE (AS SHOWN)
XXX	SPOT ELEVATION		POWER POLE

REFERENCE SYMBOLS

DENOTES SECTION LETTER IDENTIFICATION
X
X-XX
DENOTES DRAWING NO WHERE SECTION IS LOCATED
SECTION REFERENCE

DENOTES DETAIL NUMBER IDENTIFICATION
X
X-XX
DENOTES DRAWING NO WHERE DETAIL IS LOCATED
DETAIL REFERENCE

DENOTES SECTION LETTER IDENTIFICATION
X
SECTION
SCALE:
DENOTES DRAWING NO WHERE SECTION IS LOCATED
SECTION TITLE

DENOTES DETAIL NUMBER IDENTIFICATION
X
DETAIL
SCALE:
DENOTES DRAWING NO WHERE DETAIL IS LOCATED
DETAIL TITLE

HATCHING LEGEND

- ASPHALT OR CONCRETE SURFACE (SIDEWALK OR ROADWAY)
- OPEN CUT EXISTING PAVEMENT
- REMOVE AND REPLACE DRIVEWAY/SIDEWALK
- SODDED OR SEEDED AND MULCHED AREA OR EXISTING WETLAND
- CAST-IN-PLACE CONCRETE
- GRAVEL
- GROUT
- STEEL
- GRATING
- EARTH

MECHANICAL/DRAFTING LEGEND

	EXISTING	PROPOSED
VISIBLE LINE		
HIDDEN LINE		
CENTER LINE		
PHANTOM LINE		
MATCHLINE		
BREAK LINE		

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED PMW
DRAWN HCR
CHECKED TBC

Pinellas County

PROJECT:
PUMP STATION 079 REPLACEMENT

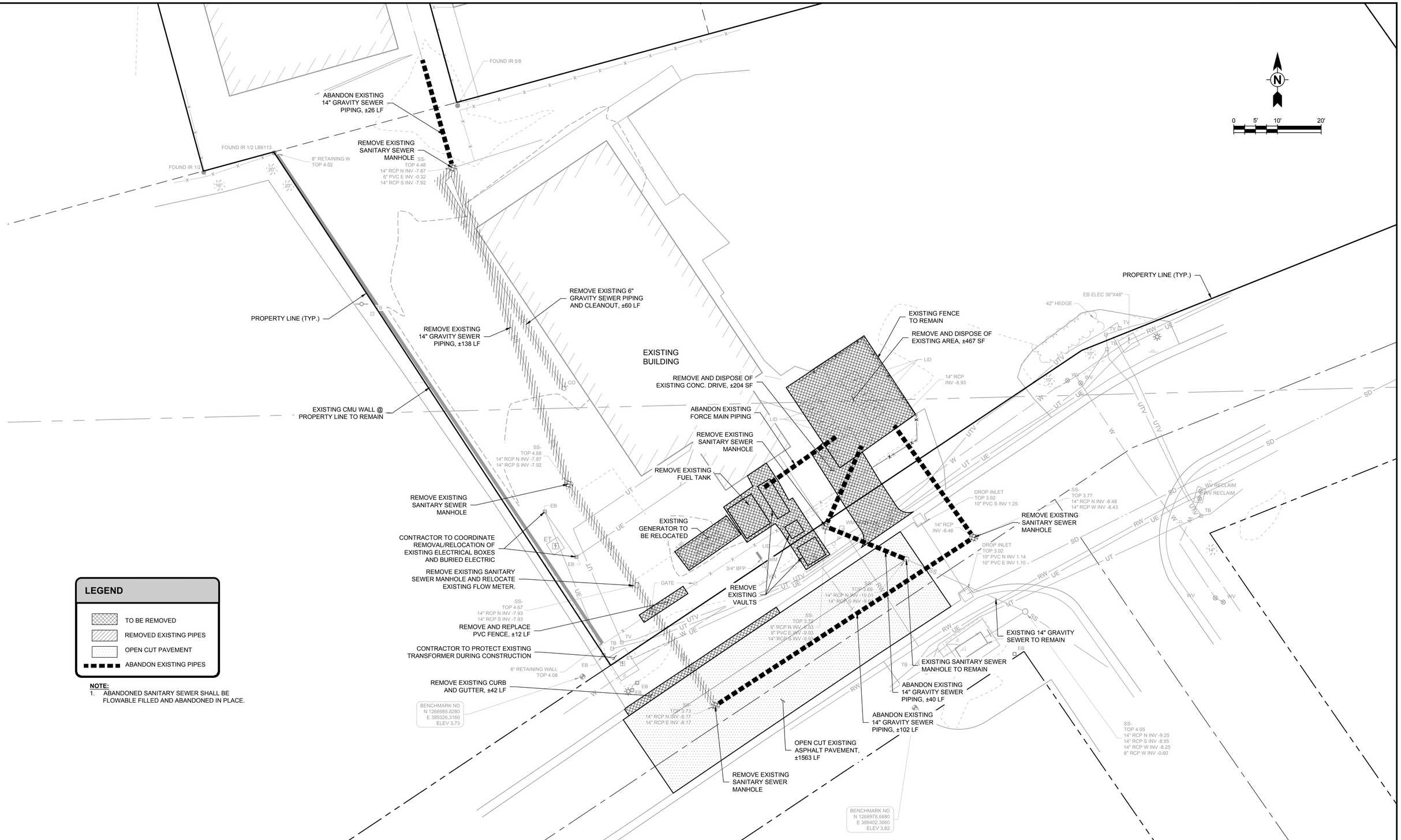
DESCRIPTION:
LEGEND AND ABBREVIATIONS

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

APPROVED BY:
Thomas Brady Cross, P.E.
FLA. LIC. NO. 59868
DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: G-002

P:\ER\144726\200-144726-17002\CAD\sheetfiles\G-002 LEGEND AND ABBREVIATIONS.dwg, Jun 09, 2018 - 4:33pm



NOTE:
1. ABANDONED SANITARY SEWER SHALL BE FLOWABLE FILLED AND ABANDONED IN PLACE.

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REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED PMW
DRAWN HCR
CHECKED TBC

Pinellas County

PROJECT:
PUMP STATION 079 REPLACEMENT

DESCRIPTION:
EXISTING CONDITIONS AND DEMOLITION PLAN

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

APPROVED BY:

Thomas Brady Cross, P.E.
FLA. LIC. NO. 59868

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: C-100

NOTES:

1. WITHIN FOUR (4) WEEKS OF THE AWARD OF THE CONTRACT, SUBMIT METHODS FOR EXCAVATION SUPPORT AND GROUNDWATER CONTROL TO THE ENGINEER FOR PRIOR APPROVAL. DOCUMENTS ARE TO BE SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF FLORIDA, AND ARE TO INCLUDE THE FOLLOWING: DESIGN CALCULATIONS AND SHOP DRAWINGS FOR INSTALLING TEMPORARY INTERLOCKED STEEL SHEET PILES TO STABILIZE EXCAVATION AND FOR DEMONSTRATING THE ADEQUACY OF THE METHODS FOR CONTROLLING THE FLOW OF GROUNDWATER INTO THE EXCAVATION. SUBMITTALS SHALL DEMONSTRATE THAT THROUGHOUT CONSTRUCTION OF THE NEW WORK, SHEET PILES TO BE INSTALLED ARE ADEQUATE TO CUT OFF THE LATERAL SEEPAGE OF GROUNDWATER, TO ENSURE THE GENERAL AND BOTTOM STABILITY OF THE EXCAVATION AND TO PRECLUDE SOIL EROSION BENEATH ANY NEW STRUCTURES TO BE INSTALLED, AND ANY EXISTING STRUCTURES TO REMAIN. DOCUMENTS ARE ALSO TO SHOW METHOD AND PROCEDURES FOR MONITORING DEWATERING, STABILITY OF THE EXCAVATION, AND ADJACENT STRUCTURES DURING THE WORK.
2. FURNISH AND INSTALL GROUNDWATER DEWATERING SYSTEM AND SETTLEMENT MONITORING PLATES AND BEGIN CONTROLLED LOWERING OF GROUNDWATER DURING DEWATERING OPERATIONS.
3. GROUNDWATER LEVEL FROM DEWATERING PROCESS TO BE LOWERED TO AT LEAST 18-INCHES BELOW BOTTOM OF EXCAVATION TO PREVENT UNSTABLE CONDITIONS.
4. SETTLEMENT MONITORING PLATES AND GROUNDWATER ELEVATIONS SHALL BE MONITORED AND RECORDED AT 4-HR INTERVALS AND REPORTED TO THE ENGINEER.
5. SUBMIT TO THE ENGINEER FOR APPROVAL: THE PROPOSED DEWATERING SYSTEM WITH THE LOCATIONS OF THE WELL POINTS TO PRECLUDE THE INFLOW OF GROUNDWATER AND POTENTIAL EROSION FROM UNDERNEATH THE WET WELL.
6. ADJUST GROUNDWATER DEWATERING SYSTEM PUMPING RATE TO A MINIMUM LEVEL REQUIRED TO CONTROL GROUNDWATER SEEPAGE TO EXECUTE THE WORK.
7. PRECAST CONCRETE MANUFACTURER TO ANALYZE AND DETAIL THE PRECAST VAULT STRUCTURES, INCLUDING BUT NOT LIMITED TO THE BASE SLAB, TOP SLAB, HATCH AND WALLS FOR HS-20 VEHICLE LOADING.

N

0 5' 10' 20'

SSMH 7
N 1269126.87
E 389289.73
RIM = 3.36'
INV IN = -7.81' (N)
INV OUT = -7.91' (S)

LIMITS OF CONSTRUCTION

50 LF ~ 14"Ø PVC PIPE @ 0.17%

LIMITS OF CONSTRUCTION

PROPOSED FUEL TANK AND CAST-IN-PLACE CONCRETE PAD - SEE DETAIL 7, SHEET S-301

N 1269076.20
E 389295.08

N 1269073.84
E 389296.96

PROPOSED GENERATOR AND CAST-IN-PLACE CONCRETE PAD - SEE DETAIL 7, SHEET S-301

N 1269061.77
E 389310.40

PROPOSED ELECTRICAL CONTROL PANEL AND CAST-IN-PLACE CONCRETE PAD - SEE DETAIL 9, SHEET S-301

SSMH 4
N 1269049.64
E 389310.97
RIM = 5.04'
INV IN = -10.58' (SW)
INV OUT = -10.68' (SE)

EXISTING BUILDING

10 LF ~ 14" Ø PVC PIPE @ 0.20%

FURNISH AND INSTALL SETTLEMENT MONITORING PLATE (TYP.) - SEE DETAIL 7, SHEET C-503

N 1269044.08
E 389317.07

N 1269047.76
E 389322.59

FURNISH AND INSTALL TEMPORARY INTERLOCKED STEEL SHEET

N 1269027.50
E 389335.47

N 1269025.03
E 389336.57

PROPOSED PRECAST CONCRETE VALVE VAULT W/ HATCH (SEE NOTE 7)

PROPOSED 8" SS FM

PRECAST CONCRETE FLOW METER VAULT (SEE NOTE 7)

12"x8" REDUCING 90° BEND MJ
N 1269021.52
E 389357.07

PROPOSED 12' DBL. SWING GATE

EXISTING 12" FM

CONNECT TO EXIST 12" FM W/ 12" 90° BEND

PROPOSED 12" SS FORCE MAIN

EXISTING PROPERTY LINE

N 1269010.05
E 389405.03

EXIST SSMH
N 1269012.64
E 389400.36
RIM = 3.69'
INV IN = -9.91' (SE)
INV OUT = -10.01' (SW)

64 LF ~ 14"Ø PVC PIPE @ 0.17%

N 1269000.42
E 389371.51

12" 90° BEND MJ
N 1268998.74
E 389372.24

FDOT VALLEY GUTTER - SEE SHEET C-502 FOR DETAILS

N 1269004.53
E 389350.62

N 1268977.59
E 389361.35

SSMH 1
N 1268977.10
E 389346.95
RIM = 3.59'
INV IN = -10.12' (NE)
INV OUT = -10.22' (NW)

29 LF ~ 14"Ø PVC PIPE @ 0.17%

N 1268967.40
E 389341.46

REPLACE ASPHALT PAVEMENT AFTER OPEN CUT

N 1268976.86
E 389336.97

FDOT TYPE "F" CURB AND GUTTER (FDOT DESIGN STANDARDS INDEX NO. 300)

EXISTING CURB AND GUTTER (TYP.)

CONTRACTOR TO PROTECT EXISTING TRANSFORMER DURING CONSTRUCTION

BY-PASS ASSEMBLY
PUMP OUT - SEE SHEET C-504

4" GV CONC. PAD - SEE DETAIL 1, SHEET C-104

SSMH 2
W/ ULTRASONIC FLOWMETER
N 1269001.41
E 389330.77
RIM = 5.00'
INV IN = -10.27' (SE)
INV OUT = -10.37' (NW)

BENCHMARK ND
N 1268985.8280
E 389326.3160
ELEV 3.73

BENCHMARK ND
N 1268978.6680
E 389402.3060
ELEV 3.82

SSMH 6
N 1269078.12
E 389279.69
RIM = 4.70'
INV IN = -7.99' (N)
INV OUT = -8.09' (SE)

12 LF ~ 14"Ø PVC PIPE @ 0.17%

SSMH 5
W/ ULTRASONIC FLOWMETER
N 1269067.73
E 389286.61
RIM = 5.14'
INV IN = -8.11' (NW)
INV OUT = -8.21' (SE)

29 LF ~ 14"Ø PVC PIPE @ 0.17%

EXISTING CMU WALL @ PROPERTY LINE

OUTSIDE DROP SSMH 3
N 1269043.95
E 389302.44
RIM = 5.39'
INV IN = -10.46' (SE)
INV IN = -8.26' (NW)
INV OUT = -10.56' (NE)

10 LF ~ 14" Ø PVC PIPE @ 0.17%

BOLLARD (TYP. OF 8)

PROPOSED CAST-IN-PLACE TRIPLEX PUMP STATION WET WELL - SEE SHEET S-101

51 LF ~ 14"Ø PVC PIPE @ 0.17%

12" GATE VALVE
12" TEE MJ
12"x8" REDUCER MJ
12"x4" REDUCER MJ
N 1269008.89
E 389338.10

BOLLARD (TYP. OF 8)

N 1269005.73
E 389329.84

PROPOSED ODOR CONTROL AND CAST-IN-PLACE CONCRETE PAD - SEE DETAIL 9, SHEET S-301

N 1269100.87
E 389265.74

EXISTING PROPERTY LINE

6" PVC ODOR CONTROL SYSTEM INLET PIPING

8" RETAINING WALL TOP 4.08

14" RCP N INV -7.92
6" PVC W INV -7.92
14" RCP S INV -7.92

SS-
TOP 4.67
14" RCP N INV -7.93
14" RCP S INV -7.93

SS-
TOP 3.77
14" RCP N INV -8.48
14" RCP W INV -8.43

SS-
TOP 4.05
14" RCP N INV -9.25
14" RCP S INV -8.95
14" RCP W INV -8.25
8" RCP W INV -0.60

DROP INLET
TOP 3.02
10" PVC S INV 1.25

DROP INLET
TOP 3.02
10" PVC N INV 1.14
10" PVC E INV 1.10

14" RCP INV -8.46

14" RCP INV -8.93

8" RCP INV -9.71

WM RECLAIM

WV RECLAIM

FOUND IR 5/8

FOUND IR 1/2 LB6113

FOUND IR 1/2

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED PMW
DRAWN HCR
CHECKED TBC

Pinellas County

PROJECT:
PUMP STATION 079 REPLACEMENT

DESCRIPTION:
PUMP STATION 079 SITE, GEOMETRY AND GRADING PLAN

APPROVED BY:

Thomas Brady Cross, P.E.
FLA. LIC. NO. 59868

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: C-101

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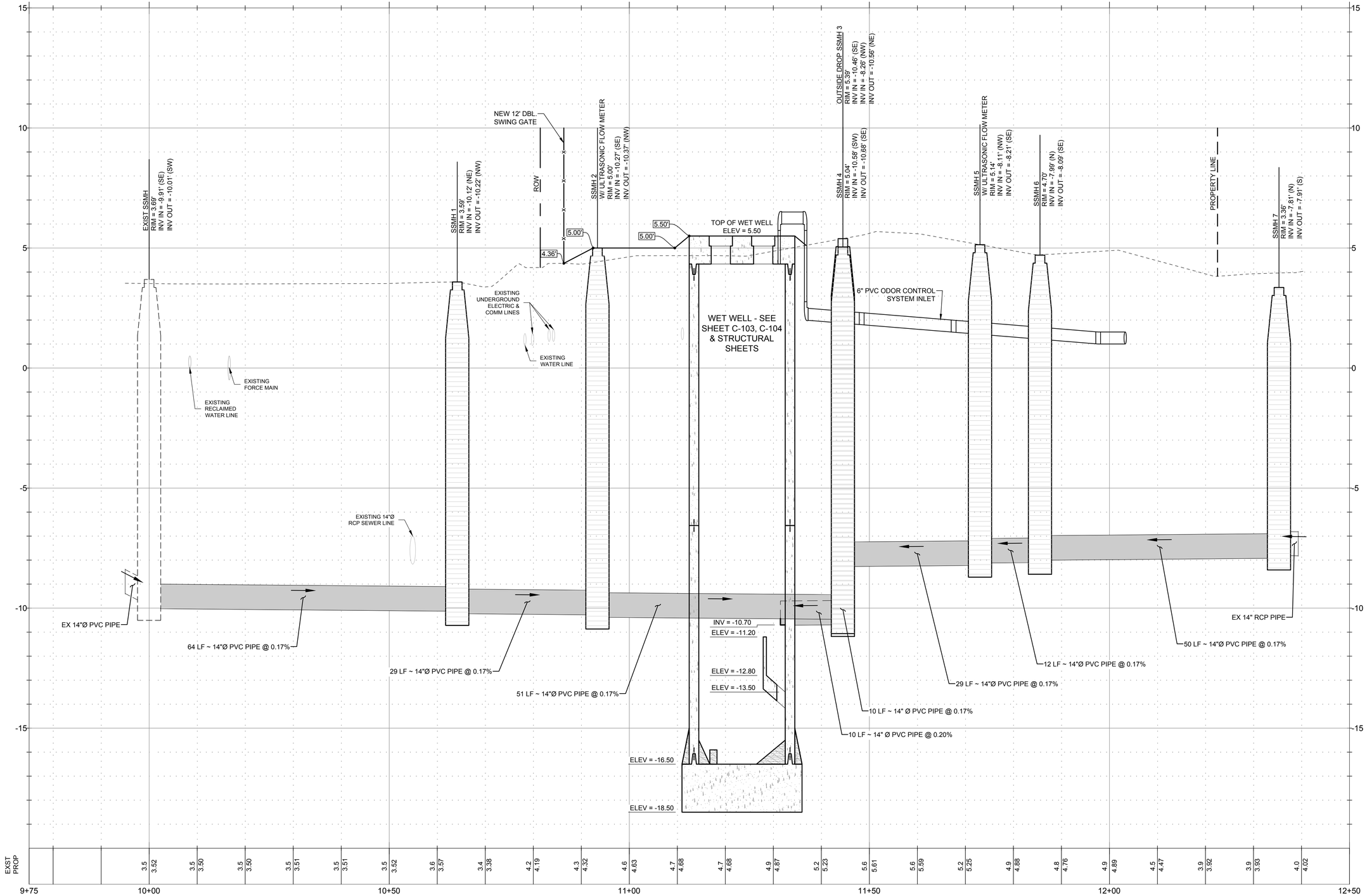

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REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED PMW
DRAWN HCR
CHECKED TBC

Pinellas County

PROJECT:
PUMP STATION 079 REPLACEMENT

DESCRIPTION:
SANITARY SEWER PROFILE

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

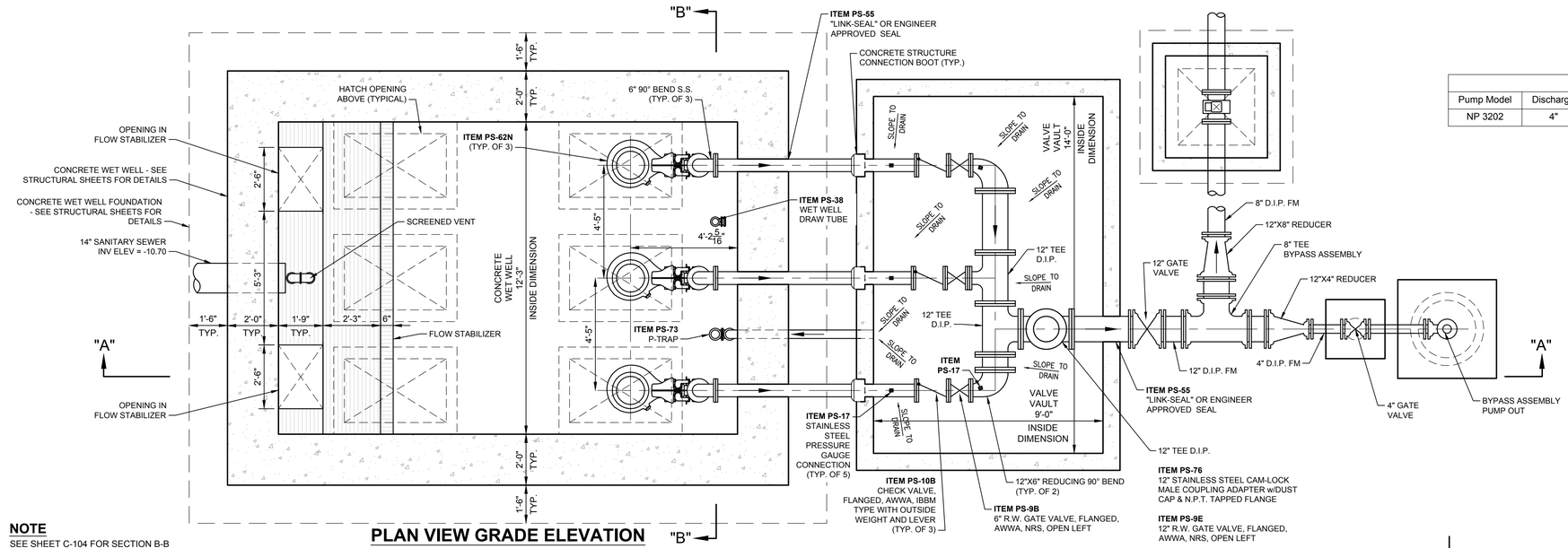
APPROVED BY:

Thomas Brady Cross, P.E.
FLA. LIC. NO. 59868

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: C-102

Item PS-62N (Typ. of 3)					
Pump Model	Discharge	Flow (gpm)	TDH	Pump HP	Volts
NP 3202	4"	850	150	60	460

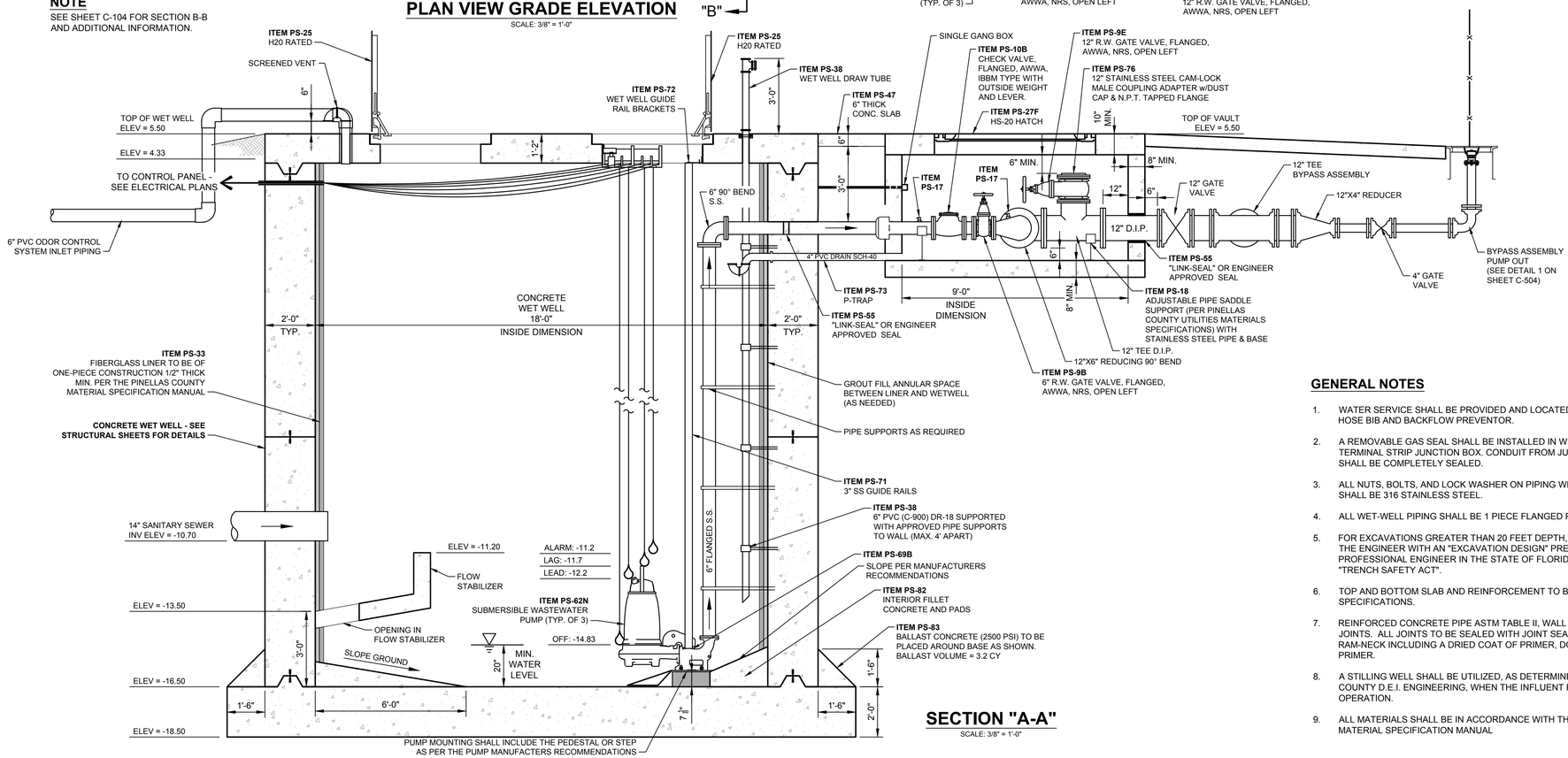


PLAN VIEW GRADE ELEVATION

SCALE: 3/8" = 1'-0"

NOTE

SEE SHEET C-104 FOR SECTION B-B AND ADDITIONAL INFORMATION.



SECTION "A-A"

SCALE: 3/8" = 1'-0"

GENERAL NOTES

1. WATER SERVICE SHALL BE PROVIDED AND LOCATED AT THE CONTROL PANEL WITH A HOSE BIB AND BACKFLOW PREVENTOR.
2. A REMOVABLE GAS SEAL SHALL BE INSTALLED IN WIRING CONDUIT AT WET-WELL AND TERMINAL STRIP JUNCTION BOX. CONDUIT FROM JUNCTION BOX TO CONTROL PANEL SHALL BE COMPLETELY SEALED.
3. ALL NUTS, BOLTS, AND LOCK WASHER ON PIPING WITHIN VALVE BOX AND WET-WELL SHALL BE 316 STAINLESS STEEL.
4. ALL WET-WELL PIPING SHALL BE 1 PIECE FLANGED PIPE OR AS SPECIFIED BY P.C.U.
5. FOR EXCAVATIONS GREATER THAN 20 FEET DEPTH, THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH AN "EXCAVATION DESIGN" PREPARED BY A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF FLORIDA IN ACCORDANCE WITH FLORIDA'S "TRENCH SAFETY ACT".
6. TOP AND BOTTOM SLAB AND REINFORCEMENT TO BE PER THE CONTRACT PLANS AND SPECIFICATIONS.
7. REINFORCED CONCRETE PIPE ASTM TABLE II, WALL B, TO HAVE TONGUE AND GROOVE JOINTS. ALL JOINTS TO BE SEALED WITH JOINT SEALING COMPOUND SUCH AS RAM-NECK INCLUDING A DRIED COAT OF PRIMER, DO NOT APPLY MORTAR RAM-NECK PRIMER.
8. A STILLING WELL SHALL BE UTILIZED, AS DETERMINED BY THE ENGINEER & PINELLAS COUNTY D.E.I. ENGINEERING, WHEN THE INFLUENT FLOW DISRUPTS PROPER PUMP OPERATION.
9. ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED PMW
DRAWN HCR
CHECKED TBC

Pinellas County

PROJECT:
PUMP STATION 079 REPLACEMENT

DESCRIPTION:
PUMP STATION PLAN AND SECTION

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

APPROVED BY:

Thomas Brady Cross, P.E.
FLA. LIC. NO. 59868

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: C-103

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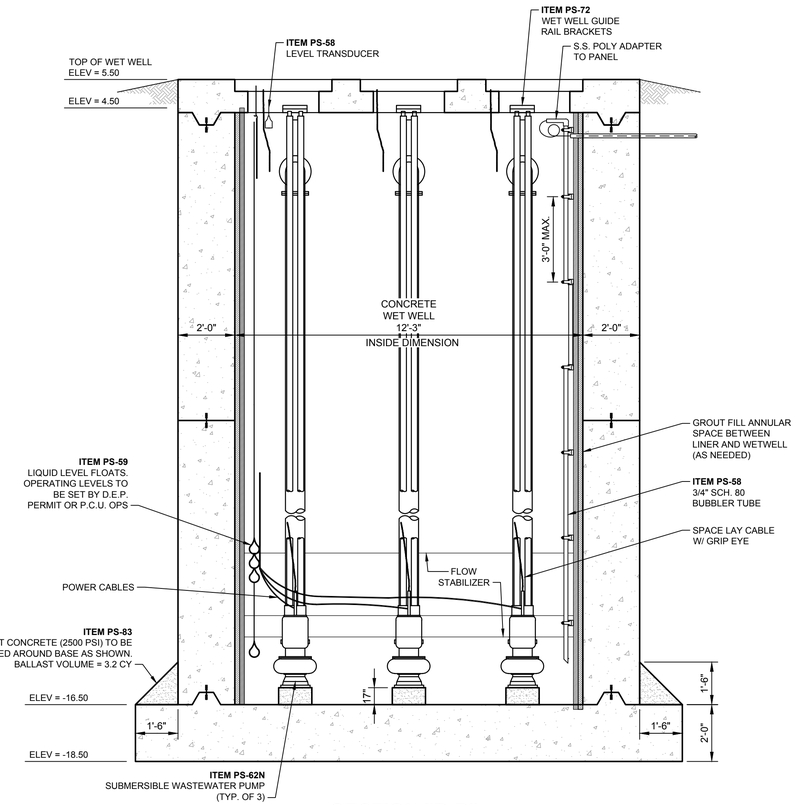
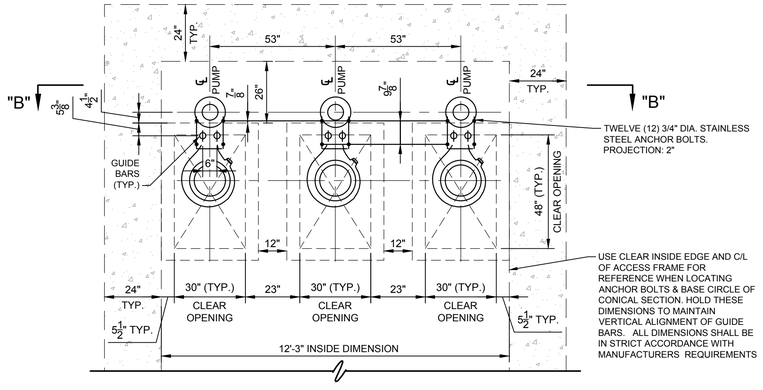


SECTION "B-B"

SCALE: 3/8" = 1'-0"

NOTE

PUMP DIMENSIONS PER MANUFACTURER'S REQUIREMENTS. SUBJECT TO APPROVAL OF SHOP DRAWINGS.



PLAN VIEW BASE ELEVATION

SCALE: 3/8" = 1'

GENERAL NOTES

1. WATER SERVICE SHALL BE PROVIDED AND LOCATED AT THE CONTROL PANEL WITH A HOSE BIB AND BACKFLOW PREVENTOR.
2. A REMOVABLE GAS SEAL SHALL BE INSTALLED IN WIRING CONDUIT AT WET-WELL AND TERMINAL STRIP JUNCTION BOX. CONDUIT FROM JUNCTION BOX TO CONTROL PANEL SHALL BE COMPLETELY SEALED.
3. ALL NUTS, BOLTS, AND LOCK WASHER ON PIPING WITHIN VALVE BOX AND WET-WELL SHALL BE 316 STAINLESS STEEL.
4. ALL WET-WELL PIPING SHALL BE 1 PIECE FLANGED PIPE OR AS SPECIFIED BY P.C.U.
5. FOR EXCAVATIONS GREATER THAN 20 FEET DEPTH, THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH AN "EXCAVATION DESIGN" PREPARED BY A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF FLORIDA IN ACCORDANCE WITH FLORIDA'S "TRENCH SAFETY ACT".
6. TOP AND BOTTOM SLAB AND REINFORCEMENT TO BE PER THE CONTRACT PLANS AND SPECIFICATIONS.
7. REINFORCED CONCRETE PIPE ASTM TABLE II, WALL B, TO HAVE TONGUE AND GROOVE JOINTS. ALL JOINTS TO BE SEALED WITH JOINT SEALING COMPOUND SUCH AS RAM-NECK INCLUDING A DRIED COAT OF PRIMER, DO NOT APPLY MORTAR RAM-NECK PRIMER.
8. A STILLING WELL SHALL BE UTILIZED, AS DETERMINED BY THE ENGINEER & PINELLAS COUNTY D.E.I. ENGINEERING, WHEN THE INFLUENT FLOW DISRUPTS PROPER PUMP OPERATION.
9. ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED PMW
DRAWN HCR
CHECKED TBC

Pinellas County

PROJECT:
PUMP STATION 079
REPLACEMENT

DESCRIPTION:
PUMP STATION
PLAN AND SECTION
(CONT'D.)

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

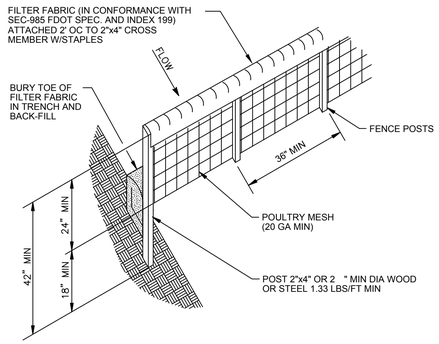
APPROVED BY:

Thomas Brady Cross, P.E.
FLA. LIC. NO. 59868

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: C-104

STACKED SILT FENCE



STAKED SILT FENCE

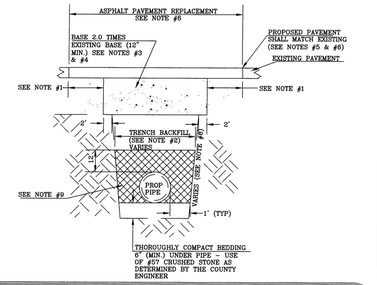
NOTE:

ALL WORK AREA AND ENTRY \EXIT PIT DIMENSIONS ARE SHOWN FOR PLANNING PURPOSES ONLY. CONTRACTOR MAY CHOOSE ALTERNATIVE WORK AREA LOCATIONS AND SIZES. THESE ALTERNATIVE WORK AREA LOCATIONS AND SIZES SHALL BE SHOWN AND EXPLAINED IN DETAIL IN THE WORK AREA PLAN TO BE SUBMITTED WITH THE PRICING BID SUBMITTAL. ALL STREETS AND SIDEWALKS MUST BE KEPT OPEN AT ALL TIMES DURING CONSTRUCTION. TEMPORARY PAVEMENT CAN BE USED TO KEEP THE STREETS AND SIDEWALKS OPEN DURING CONSTRUCTION.

1 **DETAIL**
SCALE: NTS

PINELLAS COUNTY STANDARD DETAIL

NOTES:
1. MILLING AND RESURFACING LIMITS: 3'-0" FOR RESIDENTIAL ROADWAYS; 25'-0" FOR ALL OTHER TYPES OF ROADWAYS. SHALL INCLUDE ENTIRE LANE WIDTH.
2. BACKFILL FOR TRENCH SHALL BE PLACED IN 6" COMPACTED LAYERS TO 100% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-99. (EXCAVATABLE FLOWABLE FILL OPTION IS SUBJECT TO COUNTY ENGINEER'S APPROVAL). TEST REPORTS ARE REQUIRED AND SHALL BE SUBMITTED TO PINELLAS COUNTY.
3. BASE MATERIAL SHALL BE LIME ROCK OR CRUSHED CONCRETE (MIN. LBR 100) AND SHALL BE PLACED IN 6" COMPACTED LAYERS TO 98% OF MAXIMUM DENSITY AS DETERMINED BY AASHTO T-180 (MODIFIED) (TEST REPORTS ARE REQUIRED AND SHALL BE SUBMITTED TO PINELLAS COUNTY).
4. AS AN ALTERNATIVE TO COMPACTED BASE AND IN WET AREAS, FULL-LIFT ASPHALTIC CONCRETE, FINE TRAFFIC LEVEL 'C' TYPES SP9.5 OR SP12.5 SHALL BE PLACED IN 2" COMPACTED LAYERS WITH A MINIMUM THICKNESS EQUAL TO THE EXISTING BASE (6" MIN.).
5. ASPHALTIC CONCRETE PAVEMENT JOINTS SHALL BE SAW-CUT AND ALL SURFACES TACK COATED.
6. ASPHALT SURFACE SHALL BE CONSISTENT WITH EXISTING GRADE. IN ACCORDANCE WITH PINELLAS COUNTY SPECIFICATIONS, THE PAVING ROADWAY CLASSIFICATION TYPE/THICKNESS ARE REQUIRED: ARTERIAL-3" MIN. TYPE SP-12.5 FINE TRAFFIC LEVEL 'C', COLLECTOR-2" MIN. TYPE SP-12.5 FINE TRAFFIC LEVEL 'C', RESIDENTIAL-1½" MIN. TYPE SP-9.5 TRAFFIC LEVEL 'C' (TEST REPORTS ARE REQUIRED AND SHALL BE SUBMITTED TO PINELLAS COUNTY).
7. OVERLAY OF CONSTRUCTION SCARS TO PAVEMENT AND TRENCH SHALL BE REQUIRED AS DIRECTED BY THE COUNTY ENGINEERS.
8. EXCAVATION SHALL COMPLY WITH THE TRENCH SAFETY ACT REQUIREMENTS.
9. INSTALL DRY COMPACTABLE MATERIAL AROUND THE PIPE.
10. ALL MATERIAL, WORK AND TESTING SHALL MEET PINELLAS COUNTY STANDARD SPECIFICATIONS.
11. CONTRACTOR SHALL RESTORE PAVEMENT TO MATCH THE GRADES THAT EXISTED PRIOR TO CONSTRUCTION. ANY ADDITIONAL SURVEY NECESSARY TO ENSURE THAT THIS REQUIREMENT IS MET SHALL BE PERFORMED AT THE CONTRACTOR'S EXPENSE.

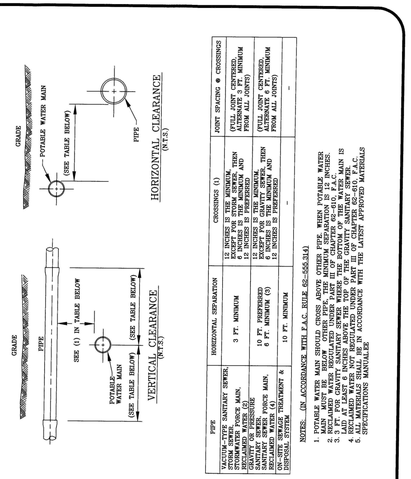


PINELLAS COUNTY

PAVEMENT CUTS, EXCAVATION AND RESTORATION

DETAIL INDEX I.D.: 1291
DATE: FEB/2016
IVER D. FERNANDEZ, P.E.
REVISION:

PINELLAS COUNTY STANDARD DETAIL



PIPE	HORIZONTAL SEPARATION	CROSSINGS (1)	JOINT SPACING @ CROSSINGS
VACUUM-TYPE SANITARY SEWER, FORCE MAIN, STORMWATER FORCE MAIN, IRRIGATION FORCE MAIN, GRAVITY OR PRESSURE SANITARY SEWER FORCE MAIN, RECLAIMED WATER MAIN, ON-SITE SEWAGE TREATMENT & DISPOSAL SYSTEM	3 FT. MINIMUM	12 INCHES IS THE MINIMUM, EITHER ABOVE OR BELOW STORM SEWER, WITH 6 INCH PVC PIPE IS PREFERRED.	6 FEET MAXIMUM (ALTERNATE 3 OPTIONS) 1. RESTRAINED JOINTS FROM ALL JOINTS)
	10 FT. PREFERRED 6 FT. MINIMUM (3)	12 INCHES IS THE MINIMUM, EITHER ABOVE OR BELOW STORM SEWER, WITH 6 INCH PVC PIPE IS PREFERRED.	6 FEET MAXIMUM (ALTERNATE 3 OPTIONS) 1. RESTRAINED JOINTS FROM ALL JOINTS)
POTABLE WATER MAIN	10 FT. MINIMUM	12 INCHES IS PREFERRED	-

NOTES: (IN ACCORDANCE WITH F.A.C. RULE 62-555.314)
1. MAIN, WATER SHOULD CROSS ABOVE OTHER PIPES, WHEN POTABLE WATER MAIN IS BELOW OTHER PIPES, THE POTABLE WATER MAIN SHALL BE SLEEVED.
2. S.F.P. FOR GRAVITY SANITARY SEWER IS 100 FEET, FOR FORCE MAIN IS 200 FEET.
3. S.F.P. FOR GRAVITY SANITARY SEWER PART II OF CHAPTER 62-610, F.A.C.
4. RECLAIMED WATER MAIN SHALL BE SEPARATED FROM POTABLE WATER MAIN AS REQUIRED ABOVE FOR THE TOP OF THE GRAVITY SANITARY SEWER.
5. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST APPROVED SPECIFICATIONS MANUALS.

PINELLAS COUNTY

MAIN CLEARANCES DETAIL

DETAIL INDEX I.D.: PCU GD 2
DATE: FEB/2016
KEVIN BECOTTE, P.E.
REVISION:

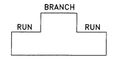
3 **DETAIL**
SCALE: NTS

PINELLAS COUNTY STANDARD DETAIL

NOTES:
1. ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL.
2. MANUAL. THIS TABLE SHALL BE UTILIZED FOR ALL PRESSURE MAIN INSTALLATIONS. ALL FITTINGS SHALL BE RESTRAINED TO THE LENGTHS INDICATED, AT A MINIMUM.
3. THIS TABLE WAS DEVELOPED USING THE FOLLOWING ASSUMPTIONS:
   - D.I. PIPE WITH POLY WRAP
   - SAFETY FACTOR OF 1.5 TO 1
   - TEST PRESSURE OF 150 P.S.I.
   - SOIL TYPE = S.M.
   - TYPE 3 TRENCH
   - DEPTH OF COVER = 2.5' UP TO 18" AND 3' FOR 20" AND ABOVE.
4. WHEN A TEE HAS A VALVE ON THE RUN, THE BRANCH AND THE RUNS SHALL BE RESTRAINED AS A 90° BEND FOR THE SIZE OF THE PIPE.
5. ALL BENDS, TEES, AND VALVES SHALL BE RESTRAINED ON EACH SIDE OF THE FITTING.
6. ALL RESTRAINED PIPE LENGTHS ARE IN FEET.
7. "F" REPRESENTS THE RESTRAINED JOINTS AT THE FITTINGS.
8. HDPE TRANSITION VALVE IS FOR STRAIGHT TIE-INS, IF A BEND IS USED, THE VALVE FOR THE BEND MUST BE ADDED.
9. LINE VALVES SHALL BE RESTRAINED UPSTREAM AND DOWNSTREAM AS A DEAD END.

PIPE SIZE	FITTINGS					
	TEE BRANCH ONLY	90°	45°	22½°	11¼°	DEAD END
2"	F	40	17	F	F	40
4"	19	49	20	10	5	49
6"	33	69	28	14	7	69
8"	58	88	37	18	9	88
10"	76	107	44	21	11	107
12"	93	125	52	25	12	125
14"	110	142	59	28	14	142
16"	127	159	66	32	16	159
18"	143	175	73	35	17	175
20"	132	164	68	33	16	164
24"	159	192	79	38	19	192
30"	195	229	95	46	23	229
36"	230	264	109	53	26	264

PRESSURE MAIN RESTRAINED JOINT



FITTINGS			
REDUCERS			LARGER PIPE
LG. SIZE	SM. SIZE	LENGTH	
4"	2"	17'	24
6"	4"	50'	35
8"	4"	91'	64
	6"	53'	37
10"	4"	123'	87
	6"	93'	66
	8"	51'	36
12"	4"	154'	108
	6"	129'	91
	8"	94'	66
	10"	52'	37
14"	6"	160'	113
	8"	131'	92
	10"	95'	67
	12"	52'	36
16"	6"	190'	134
	8"	165'	116
	10"	134'	94
	12"	96'	67
	14"	52'	36
18"	8"	196'	137
	10"	169'	118
	12"	135'	95
	14"	96'	67
	16"	51'	36
20"	10"	172'	121
	12"	147'	103
	14"	117'	82
	16"	82'	58
	18"	44'	30
24"	12"	201'	141
	14"	177'	124
	16"	149'	104
	18"	117'	82
	20"	82'	57
30"	18"	206'	144
	20"	178'	125
	24"	115'	80
36"	20"	258'	180
	24"	207'	144
	30"	114'	80

PINELLAS COUNTY

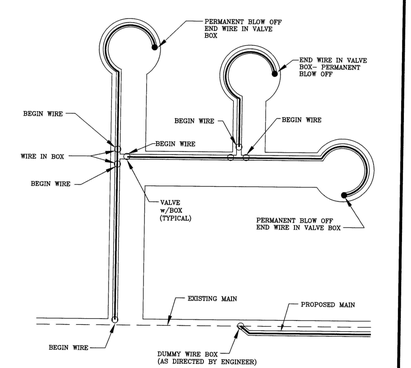
PRESSURE MAIN RESTRAINED JOINT DETAIL

DETAIL INDEX I.D.: PCU GD 11
DATE: FEB/2016
KEVIN BECOTTE, P.E.
REVISION:

4 **DETAIL**
SCALE: NTS

PINELLAS COUNTY STANDARD DETAIL

NOTES:
1. ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL.
2. IF STREET IS A SHORT CUL-DE-SAC, LOCATOR WIRE IS TO RUN FROM MAIN VALVE TO BLOW-OFF VALVE BOX.



PINELLAS COUNTY

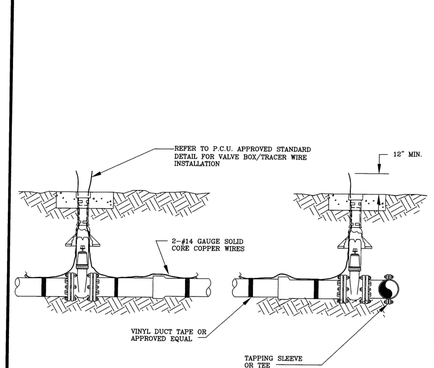
TRACER WIRE LAYOUT DETAIL

DETAIL INDEX I.D.: PCU GD 3
DATE: FEB/2016
KEVIN BECOTTE, P.E.
REVISION:

5 **DETAIL**
SCALE: NTS

PINELLAS COUNTY STANDARD DETAIL

NOTES:
1. ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL AND TECHNICAL SPECIFICATIONS.
2. ALL WIRE SHALL BE #12 AWG SOLID CORE COPPER WIRE WITH COLOR CODED INSULATION PER SERVICE.
3. THERE SHALL BE SUFFICIENT SLACK IN TRACER WIRE TO EXTEND A MIN. OF 12" ABOVE VALVE BOX.
4. WIRE IS TO CONTINUE THROUGH TEES ON MAIN LINE WHERE NO VALVES EXIST.
5. ATTACH WIRE TO TOP CENTER LINE OF MAIN USING DUCT TAPE OR APPROVED EQUAL @ 5'- 0" INTERVALS.
6. DUMMY BOXES ARE TO CONSIST OF A TOP SECTION OF A VALVE BOX ASSEMBLY ENCASED IN A CONCRETE VALVE BOX COLLAR PER P.C.U. APPROVED STANDARD DETAIL.



PINELLAS COUNTY

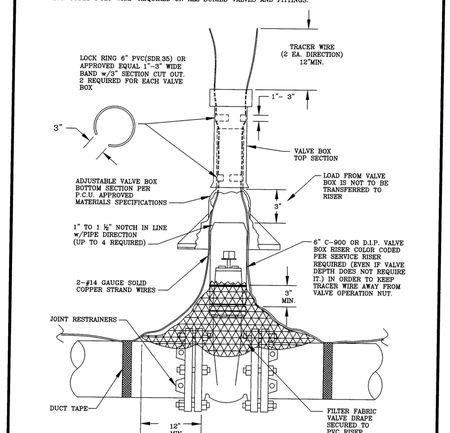
TRACER WIRE INSTALLATION DETAIL

DETAIL INDEX I.D.: PCU GD 3a
DATE: FEB/2016
KEVIN BECOTTE, P.E.
REVISION:

6 **DETAIL**
SCALE: NTS

PINELLAS COUNTY STANDARD DETAIL

NOTES:
1. ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL.
2. FILTER FABRIC REQUIRED ON VALVES WHEN PIPE LINE HAS 5' OR MORE OF COVER
   VALVE KEY EXTENSION REQUIRED ON VALVES WITH OPERATOR NUT OVER 3' DEEP.
   COLOR CODED POLY WRAP REQUIRED ON ALL BURIED VALVES AND FITTINGS.



PINELLAS COUNTY

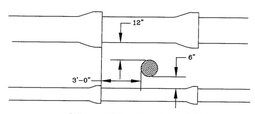
VALVE BOX/TRACER WIRE INSTALLION DETAIL

DETAIL INDEX I.D.: PCU GD 4
DATE: FEB/2016
KEVIN BECOTTE, P.E.
REVISION:

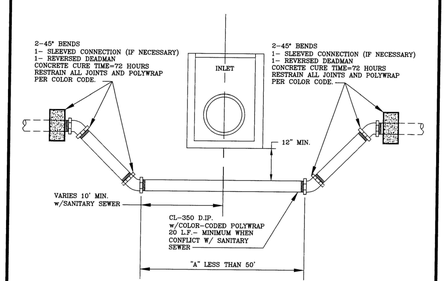
7 **DETAIL**
SCALE: NTS

PINELLAS COUNTY STANDARD DETAIL

NOTES:
1. ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL AND TECHNICAL SPECIFICATIONS.
2. ALL WORK SHOWN ON THIS DRAWING SHALL BE PAID FOR UNDER THE OFFSET PAY-ITEM FOR THE APPLICABLE SIZE OF THE EXISTING PIPE TO BE RELOCATED DUE TO CONFLICT. NO SEPARATE PAYMENT SHALL BE MADE UNDER INDIVIDUAL PAY-ITEMS UNLESS "A" IS GREATER THAN 50'.



PIPE SEPERATION-MINIMUM



PROFILE VIEW

PINELLAS COUNTY

TYPICAL PRESSURE LINE OFFSET RELOCATION DETAIL

DETAIL INDEX I.D.: PCU GD 13
DATE: FEB/2016
KEVIN BECOTTE, P.E.
REVISION:

8 **DETAIL**
SCALE: NTS

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED PMW
DRAWN HCR
CHECKED TBC

Pinellas County

PROJECT: PUMP STATION 079 REPLACEMENT

DESCRIPTION: DETAILS

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

APPROVED BY:

Thomas Brady Cross, P.E.
FLA. LIC. NO. 59868

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: C-501

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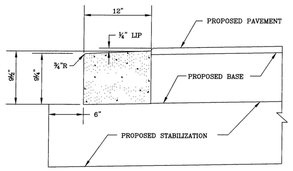
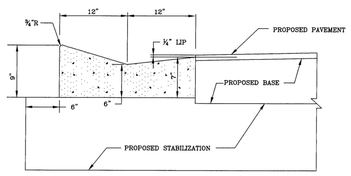
PINELLAS COUNTY STANDARD DETAIL

NOTE:
1. ¾" EXPANSION JOINT EVERY 500', BETWEEN CURB SECTIONS, AT RADII, END OF POUR AND STRUCTURES. (FALSE JOINTS EVERY 10', LONGITUDINALLY. SEE SECTION 520 OF THE F.D.O.T. STANDARD SPECIFICATIONS.)



PROFILE VIEW OF HEADER CURB



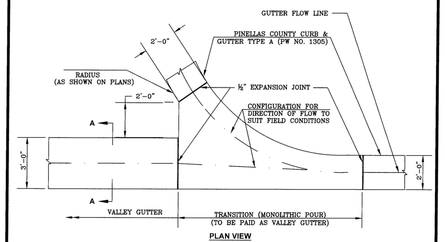
PROFILE VIEW OF CURB & GUTTER

PINELLAS COUNTY	DETAIL INDEX I.D.: 1305
CURB AND GUTTER TYPE A AND HEADER CURB	DATE: FEB/2016
	IVAN J. FERNANDEZ, P.E.
	REVISION:

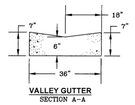
1 **DETAIL** SCALE: NTS

PINELLAS COUNTY STANDARD DETAIL

NOTES:
1. SURFACE OF PAVEMENT SHALL BE ¼" ABOVE LIP OF GUTTER.
2. ½" EXPANSION JOINT (AS SHOWN) AND CENTERLINE OF SIDE STREET, WITH (SAWCUT) FALSE JOINTS EVERY 10', LONGITUDINALLY. (SEE SECTION 520 OF THE F.D.O.T. STANDARD SPECIFICATIONS).



PLAN VIEW



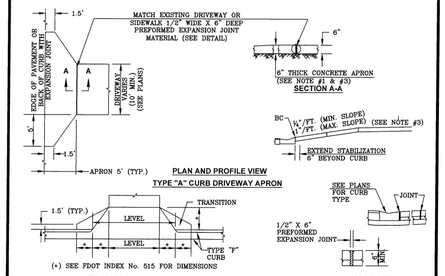
VALLEY GUTTER
SECTION A-A

PINELLAS COUNTY	DETAIL INDEX I.D.: 1315
VALLEY GUTTER AND TRANSITION	DATE: FEB/2016
	IVAN J. FERNANDEZ, P.E.
	REVISION:

2 **DETAIL** SCALE: NTS

PINELLAS COUNTY STANDARD DETAIL

NOTES:
1. CONCRETE DRIVEWAY APRONS AND SIDEWALK CROSSINGS SHALL BE CONSTRUCTED OF CONCRETE PAVEMENT (3000 PSI), 6" THICK REINFORCED WITH 6" X 6" #10/#10 WELDED WIRE FABRIC, (2" MINIMUM COVER FROM THE BOTTOM.)
2. FIBER REINFORCED CONCRETE 3000 PSI (MIN.) MAY BE USED IN PLACE OF THE REQUIREMENTS OF NO. 1 ABOVE.
3. CONSTRUCTION OF APRON/DRIVEWAY CROSS SLOPES AND SIDEWALK CROSS SLOPE THROUGH THE DRIVEWAY SHALL COMPLY WITH F.D.O.T. INDEX NO. 515 FOR ADA REQUIREMENTS.
4. REMOVE TREE ROOTS WITHIN 10' OF PROPOSED GRADE.
5. WHEN THERE IS EXISTING SIDEWALK CROSSING THE PROPOSED DRIVEWAY, IT MUST BE REMOVED TO THE NEAREST JOINT BEYOND THE DRIVEWAY.
6. SIDEWALKS ADJACENT TO LOT PROPERTY LINES SHALL NOT HAVE A CROSS SLOPE GREATER THAN 2% PER F.D.O.T. INDEX 310.
7. CORNER LOTS INVOLVING HANDICAP RAMPS SHALL BE IN ACCORDANCE WITH F.D.O.T. INDEX 304 FOR SIDEWALK AND RAMP CONSTRUCTION.



PLAN AND PROFILE VIEW
TYPE "A" CURB DRIVEWAY APRON

(*) SEE FDOT INDEX No. 515 FOR DIMENSIONS

TYPE "F" CURB DRIVEWAY APRON

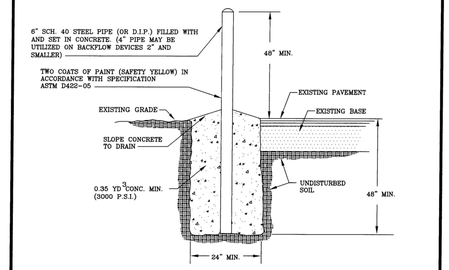
JOINT DETAIL

PINELLAS COUNTY	DETAIL INDEX I.D.: 1340
CONCRETE DRIVEWAY APRON	DATE: FEB/2016
	IVAN J. FERNANDEZ, P.E.
	REVISION:

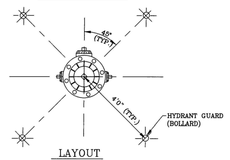
3 **DETAIL** SCALE: NTS

PINELLAS COUNTY STANDARD DETAIL

NOTE:
1. ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST APPROVED MATERIAL SPECIFICATION MANUAL



INSTALLATION



LAYOUT

PINELLAS COUNTY	DETAIL INDEX I.D.: PCU GD 7
BOLLARD DETAIL	DATE: FEB/2016
	KEVIN BECOTTE, P.E.
	REVISION:

4 **DETAIL** SCALE: NTS

PINELLAS COUNTY STANDARD DETAIL

SANITARY SEWER MANHOLE CONSTRUCTION NOTES

ALL MANHOLES
1. ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL.
2. PRECAST MANHOLE SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH THE LATEST EDITIONS OF ASTM C-478 WITH 4000 P.S.I., TYPE II PORTLAND CEMENT.
3. ALL RISER UNITS SHALL HAVE A MINIMUM HEIGHT OF 12" WITH THE CONCENTRIC CONE SET BETWEEN 2⅝" AND 14⅝" BELOW THE BOTTOM OF MANHOLE COVER FRAME.
4. ALL KEYED JOINTS SHALL BE SEALED WITH TWO CONTINUOUS RINGS OF FLEXIBLE JOINT SEALANT, OR APPROVED EQUAL.
5. ALL INTERIOR AND EXTERIOR MANHOLE SURFACES SHALL BE PREPARED FOR COATING AND COATED IN ACCORDANCE WITH F.C.U. STANDARD SPECIFICATIONS AND APPROVED MATERIAL SPECIFICATIONS. INSIDE COATING OF MANHOLE MAY BE ELIMINATED IF USING P.C.U. APPROVED LINING SYSTEM.
6. MANHOLE BASE AND BOTTOM SECTION SHALL BE MONOLITHICALLY CAST.
7. ALL PIPE PENETRATIONS IN MANHOLE SHALL BE PRECAST OR CORE DRILLED.
8. MANHOLE COVER SHALL BE EQUIPPED WITH AN INFLOW PROTECTOR.
9. A DROP CONNECTION IS REQUIRED WHERE THE PIPE INVERT IS GREATER THAN 2' ABOVE THE MANHOLE INVERT. FOR DROPS 2' OR LESS A FLUME SHALL BE CONSTRUCTED.
10. ALL MANHOLES 5' IN DIAMETER OR GREATER SHALL REQUIRE THE USE OF A DOUBLE RING AND COVER.
11. ALL MANHOLES WITH A DEPTH OF 14' OR GREATER SHALL BE DESIGNED FOR ANTI-FLOATATION AND SHALL REQUIRE SUBMITTAL OF CALCULATIONS.

INSIDE DROP MANHOLES
12. THERE SHALL BE NO MORE THAN 2 INSIDE DROPS PER MANHOLE.
13. WHEN USING A 90° BEND ON RISER, IT SHALL BE ROTATED BETWEEN 2⅝" AND 45° IN THE DIRECTION OF FLOW AND GROUTED INTO BENCH.
14. ALL FORCE MAIN CONNECTIONS REQUIRE THE USE OF A FORCE MAIN HOOD WITH INSIDE DROP BOWL.
15. ALL INSIDE DROPS SHALL BE CONSTRUCTED USING P.V.C. SDR-35 PIPE.

OUTSIDE DROP MANHOLES
16. OUTSIDE DROP PIPING SHALL BE CONSTRUCTED USING THE SAME MATERIAL AS THE MAIN LINE.

TABLE

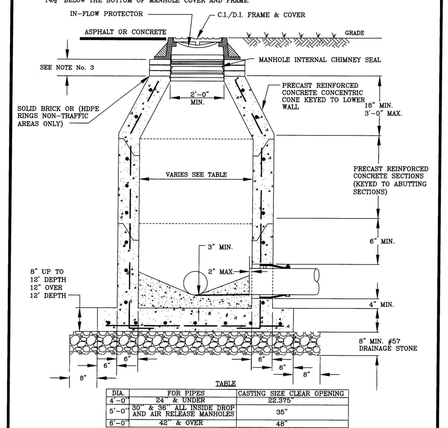
DIA	FOR PIPES	CASTING SIZE CLEAR OPENING
4'-0"	24" & UNDER	22.375"
5'-0"	30" & 36" ALL INSIDE DROP AND AIR RELEASE MANHOLES	35"
6'-0"	42" & OVER	48"

PINELLAS COUNTY	DETAIL INDEX I.D.: PCU SD 1
MANHOLE CONSTRUCTION NOTES	DATE: FEB/2016
	KEVIN BECOTTE, P.E.
	REVISION:

5 **DETAIL** SCALE: NTS

PINELLAS COUNTY STANDARD DETAIL

NOTES:
1. ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIALS SPECIFICATION MANUAL.
2. REFER TO P.C.U. STANDARD DETAIL ON MANHOLE CONSTRUCTION NOTES.
3. ALL RISER UNITS SHALL HAVE A MINIMUM HEIGHT OF 12" WITH THE CONCENTRIC CONE SET BETWEEN 2⅝" AND 14⅝" BELOW THE BOTTOM OF MANHOLE COVER AND FRAME.



TABLE

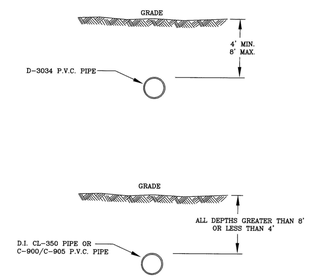
DIA	FOR PIPES	CASTING SIZE CLEAR OPENING
4'-0"	24" & UNDER	22.375"
5'-0"	30" & 36" ALL INSIDE DROP AND AIR RELEASE MANHOLES	35"
6'-0"	42" & OVER	48"

PINELLAS COUNTY	DETAIL INDEX I.D.: PCU SD 1a
STANDARD MANHOLE (PRE-CAST) DETAIL	DATE: FEB/2016
	KEVIN BECOTTE, P.E.
	REVISION:

6 **DETAIL** SCALE: NTS

PINELLAS COUNTY STANDARD DETAIL

NOTE:
1. ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL.

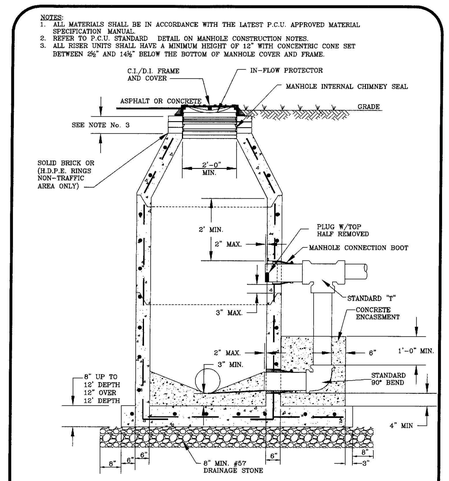


PINELLAS COUNTY	DETAIL INDEX I.D.: PCU SD 5
DEPTH LIMITATIONS OF SANITARY SEWER PIPE DETAIL	DATE: FEB/2016
	KEVIN BECOTTE, P.E.
	REVISION:

7 **DETAIL** SCALE: NTS

PINELLAS COUNTY STANDARD DETAIL

NOTES:
1. ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL.
2. REFER TO P.C.U. STANDARD DETAIL ON MANHOLE CONSTRUCTION NOTES.
3. ALL RISER UNITS SHALL HAVE A MINIMUM HEIGHT OF 12" WITH CONCENTRIC CONE SET BETWEEN 2⅝" AND 14⅝" BELOW THE BOTTOM OF MANHOLE COVER AND FRAME.



PINELLAS COUNTY	DETAIL INDEX I.D.: PCU SD 1c
OUTSIDE DROP MANHOLE CONNECTION DETAIL	DATE: FEB/2016
	KEVIN BECOTTE, P.E.
	REVISION:

8 **DETAIL** SCALE: NTS

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED PMW
DRAWN HCR
CHECKED TBC

Pinellas County

PROJECT: PUMP STATION 079 REPLACEMENT

DESCRIPTION: DETAILS

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

APPROVED BY:

Thomas Brady Cross, P.E.
FLA. LIC. NO. 59868

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: C-502

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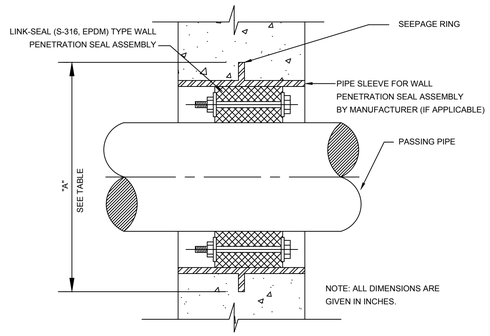
PENETRATION SEAL - LINK SEAL

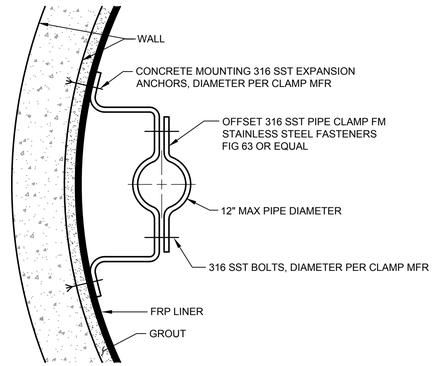


PIPE SIZE	NOMINAL SLEEVE DIA	"A"	PIPE SIZE	NOMINAL SLEEVE DIA	"A"
2	4	6	12	16	19
2-1/2	4	7	14	18	21
3	5	7-1/2	16	20	23-1/2
4	6	9	18	24	25
6	10	13	20	24	27-1/2
8	12	15	24	30	32
10	14	17			

ALL METALS SHALL BE STAINLESS STEEL

1 **DETAIL**
SCALE: NTS

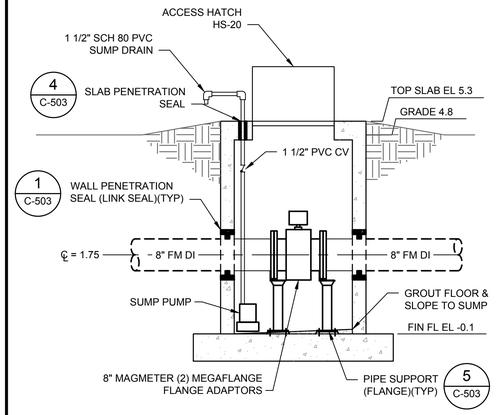
PIPE SUPPORT - OFFSET WETWELL



NOTE:
ALL MATERIALS OF CONSTRUCTION SHALL BE 316 STAINLESS STEEL. ALL MOUNTING HARDWARE SHALL BE 316 STAINLESS STEEL.

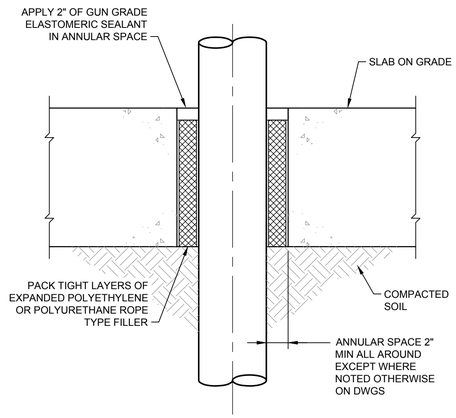
2 **DETAIL**
SCALE: NTS

MAGMETER FLANGE ADAPTORS



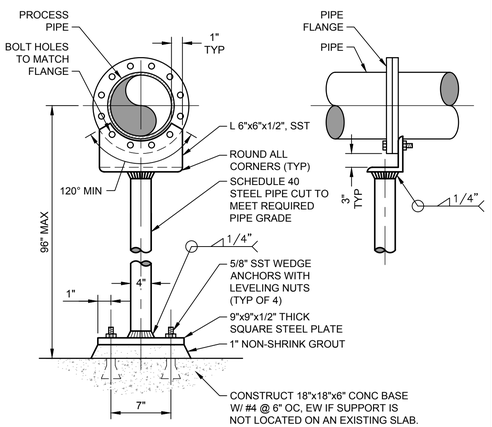
3 **DETAIL**
SCALE: NTS

PIPE PENETRATION - SLAB-ON-GRADE



4 **DETAIL**
SCALE: NTS

PIPE SUPPORT - FLANGE

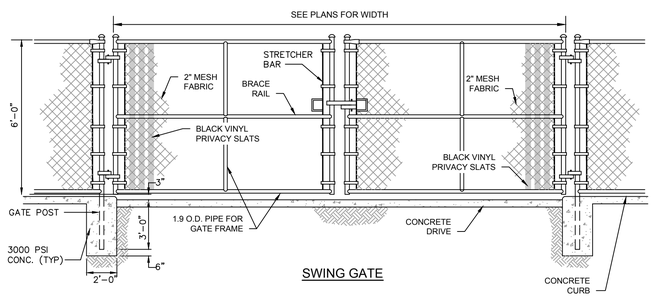


NOTES:

1. HOT-DIP GALVANIZE ENTIRE PIPE SUPPORT AFTER FABRICATION (EXCEPT FOR STAINLESS STEEL FASTENING HARDWARE).
2. SEE PLANS AND SECTIONS FOR PIPE GRADE REQUIREMENT.
3. PIPE SUPPORT SUITABLE FOR PIPE SIZES 3" THROUGH 24" DIA.

5 **DETAIL**
SCALE: NTS

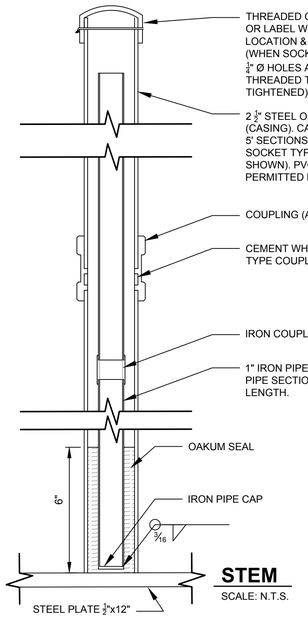
DOUBLE SWING GATE



SWING GATE

6 **DETAIL**
SCALE: NTS

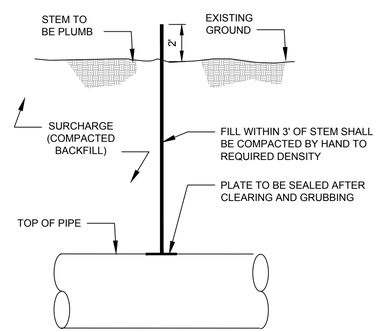
SETTLEMENT MONITORING PLATE



STEM
SCALE: N.T.S.

NOTES:

1. ELEVATION ON THE TOP OF EACH LENGTH OF MARKER PIPE SHALL BE DETERMINED AS SOON AS IT IS INSTALLED AND ALSO IMMEDIATELY BEFORE THE NEXT LENGTH OF MARKER PIPE.
2. SETTLEMENT PLATE LOCATIONS SHALL BE FLAGGED & PROTECTED FROM CONSTRUCTION VEHICLES & EQUIPMENT. IF SETTLEMENT PLATES ARE DISTURBED, THEY SHALL BE REPLACED IN KIND.
3. OAKUM USED TO CONSTRUCT SEAL SHALL HAVE A MESH COVERING (PLASTIC OR OTHER SYNTHETIC MATERIAL).



7 **DETAIL**
SCALE: NTS

INSTALLATION
SCALE: NTS

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED PMW
DRAWN HCR
CHECKED TBC

Pinellas County

PROJECT:
PUMP STATION 079 REPLACEMENT

DESCRIPTION:
DETAILS

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

APPROVED BY:

Thomas Brady Cross, P.E.
FLA. LIC. NO. 59868

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: C-503

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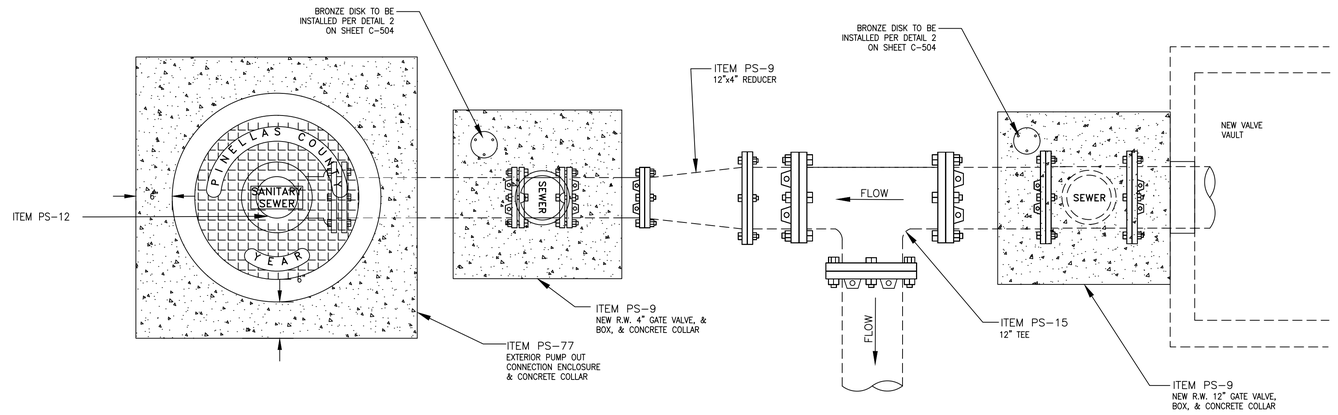
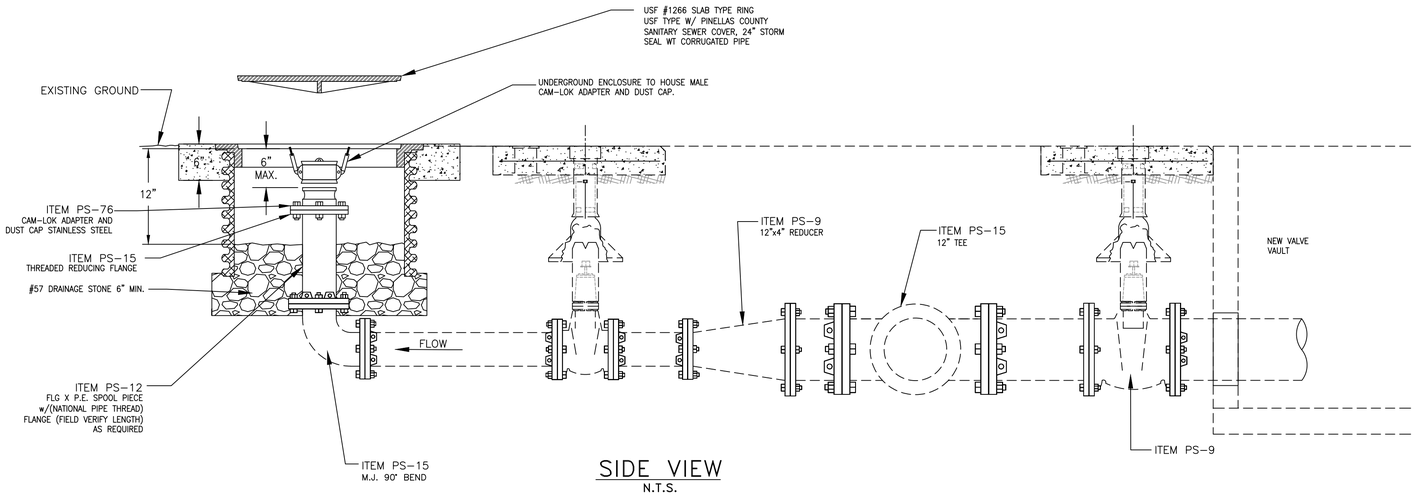
BY-PASS ASSEMBLY



TOP VIEW
N.T.S.

NOTES:
1. ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL.(SEE P.C.U. WEBSITE)
2. ALL BURIED JOINTS SHALL BE RESTRAINED MECHANICAL JOINTS (M.J.).
3. CONTRACTOR SHALL PROVIDE SLEEVES TO MAKE CONNECTION.

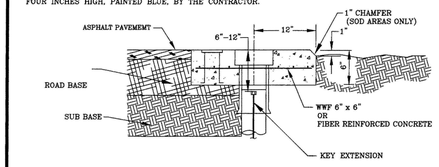


SIDE VIEW
N.T.S.

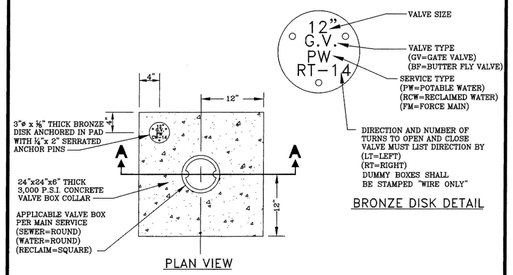
1 **DETAIL**
SCALE: NTS

PINELLAS COUNTY STANDARD DETAIL

NOTES
1. ALL MATERIALS SHALL BE IN ACCORDANCE WITH THE LATEST P.C.U. APPROVED MATERIAL SPECIFICATION MANUAL.
2. IF VALVE IS LOCATED WITHIN A SIDEWALK CONCRETE COLLAR MAY BE ELIMINATED AND DISK SET FLUSH DIRECTLY IN SIDEWALK.
3. BRONZE DISK REQUIRED: FOR ALL VALVES, AND DUMMY BOXES.
4. THE 24"x24"X6" THICK CONCRETE VALVE BOX COLLAR CAN BE INSTALLED BELOW THE FRICTION COURSE AND THE BRONZE DISK ANCHORED IN A NEAR-BY CURB OR SIDEWALK.
5. ALL VALVES/BOXES SHALL BE LOCATED BY MEANS OF A PERPENDICULAR 6"x2' BLUE STRIPE ACROSS THE CURB. THE DISTANCE FROM THE BACK OF THE CURB TO THE VALVE SHALL BE STENCILED ON THE CURB WITH NUMBERS FOUR INCHES HIGH, PAINTED BLUE, BY THE CONTRACTOR.



SECTION A-A



BRONZE DISK DETAIL

PLAN VIEW

PINELLAS COUNTY
CONCRETE VALVE BOX AND COLLAR DETAIL

DETAIL INDEX I.D.: PCU GD 5
DATE: FEB/2016
KEVIN BECOTTE, P.E.,
REVISION:

2 **DETAIL**
SCALE: NTS

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED PMW
DRAWN HCR
CHECKED TBC

Pinellas County

PROJECT: PUMP STATION 079 REPLACEMENT

DESCRIPTION: DETAILS

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

APPROVED BY:

Thomas Brady Cross, P.E.
FLA. LIC. NO. 59868

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: C-504

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STRUCTURAL GENERAL NOTES

A. THESE GENERAL NOTES PRESENT AND/OR SUMMARIZE KEY PROJECT INFORMATION FOR THE DRAWING READER'S CONVENIENCE. SEE ALSO INDIVIDUAL DRAWING NOTES AND PROJECT SPECIFICATIONS FOR FURTHER DETAILS AND REQUIREMENTS.

B. ALL REFERENCES TO REFERENCE STANDARDS HEREIN ARE TO MOST RECENT ISSUE IN EFFECT AS OF THE DATE OF THESE DOCUMENTS, UNLESS NOTED OTHERWISE IN PROJECT SPECIFICATIONS OR ON THE DRAWING

C. ALL ELEVATIONS SHOWN ON DRAWINGS ARE SITE ELEVATIONS. SEE CIVIL DRAWINGS .

D. ALL EXISTING DIMENSIONS SHOWN WITH THE ± SYMBOL ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR BEFORE FABRICATION AND CONSTRUCTION.

E. DIMENSIONS MARKED WITH A "X" SHALL BE DETERMINED BY EQUIPMENT MANUFACTURER AND COORDINATED BY CONTRACTOR

F. SUBMIT SHOP DRAWINGS, PROJECT DATA AND SAMPLES AS SPECIFIED IN PROJECT SPECIFICATIONS.

G. ABBREVIATIONS

A.B.	ANCHOR BOLT	EW	EACH WAY	PL	PLATE
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION	EXIST	EXISTING	PLF	POUNDS PER LINEAR FOOT
		EXP	EXPANSION	PRCST	PRECAST
ALT.	ALTERNATE	EXTG	EXISTING	PREFAB	PREFABRICATED
ALUM.	ALUMINUM	FFE	FINISH FLOOR ELEVATION	PSF	POUNDS PER SQUARE FOOT
B.O.	BOTTOM OF	FLG.	FLANGE	PSI	POUNDS PER SQUARE INCH
B.O.F	BOTTOM OF FOOTING	FLR	FLOOR	PT	PRESSURE TREATED
B.O.S.	BOTTOM OF STEEL	FND.	FOUNDATION	QTY	QUANTITY
BLDG.	BUILDING	FRMG	FRAMING	R	RISER
BOT.	BOTTOM	FT	FOOT	RAD.	RADIUS
BTWN	BETWEEN	FTG	FOOTING	REF	REFERENCE
C/C	CENTER TO CENTER	GA	GAGE, GAUGE	REINF.	REINFORCEMENT
CCJ	CRACK CONTROL JOINT	GALV	GALVANIZED	REV	REVISION
CJ	CONSTRUCTION JOINT	GR.	GRADE	SCHED	SCHEDULE
CL	CENTER LINE	GRTG	GRATING	SF	SQUARE FOOT
CLR	CLEAR	HORIZ	HORIZONTAL	SHT.	SHEET
CMU	CONCRETE MASONRY UNIT	HP	HIGH POINT	SIM.	SIMILAR
COL	COLUMN	HT	HEIGHT	SPEC	SPECIFICATIONS
CONC	CONCRETE	I.D.	INSIDE DIAMETER	SQ	SQUARE
CONT	CONTINUOUS	IN.	INCH	SS	STAINLESS STEEL
COORD	COORDINATE	INSUL	INSULATION	STAG.	STAGGER
CTR	CENTER	L	ANGLE	STL	STEEL
DEMO	DEMOLISH	LBS	POUNDS	STL JST	STEEL JOIST
DIA	DIAMETER	LF	LINEAR FOOT (FEET)	STRUCT	STRUCTURE(AL)
DIM	DIMENSION	LP	LOW POINT	T.O.C.	TOP OF CONCRETE
DIST	DISTANCE	MAX	MAXIMUM	T/	TOP OF
DTL.	DETAIL	MECH	MECHANICAL	TEMP	TEMPORARY
DWG(S)	DRAWING(S)	MFR	MANUFACTURER	THK	THCKNESS
DWL	DOWEL	N	NEW	TOF	TOP OF FOOTING
E	EXISTING	N.T.S.	NOT TO SCALE	TOS	TOP OF SLAB
EA	EACH	NA	NOT APPLICABLE	TRANSV.	TRANSVERE
EF	EACH FACE	NO	NUMBER	TYP	TYPICAL
EJ	EXPANSION JOINT	NOM	NOMINAL	UNO	UNLESS NOTED OTHERWISE
EL / ELEV.	ELEVATION	O.C.	ON CENTER	V.I.F.	VERIFY IN FIELD
ELEC	ELECTRIC(AL)	OPNG	OPENING	VERT	VERTICAL
ENGR	ENGINEER	OPP	OPPOSITE	W/	WITH
EQ	EQUAL	ORIG	ORIGINAL	W/O	WITHOUT
EQUIP	EQUIPMENT	PEMB	PRE-ENGINEERED METAL BUILDING	WWF	WELDED WIRE FABRIC

DESIGN CRITERIA

A. REFERENCES:

1. ICC INTERNATIONAL BUILDING CODE, 2015 EDITION
   RISK CATEGORY III IN ACCORDANCE WITH TABLE 1604.5
2. STATE BUILDING CODE: FLORIDA BUILDING CODE
3. ASCE/SEI 7-10 - MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES

B. DEAD LOADS:

WET WELL TOP SLAB LOAD	= (SELF WEIGHT)
WET WELL FLOOR DEAD LOAD	= (SELF WEIGHT)

C. LIVE LOADS (U.N.O.):

WET WELL TOP SLAB	= 125 PSF

D. WIND LOAD:

BASIC WIND SPEED, V	= 160 MPH
WIND EXPOSURE CATEGORY	= C
DIRECTIONALITY FACTOR, Kd	= 0.85
TOPOGRAPHY	= 1.0
INTERNAL PRESSURE COEFFICIENT, GCpi	= ±0.18
BUILDING ENCLOSURE CLASSIFICATION	= ENCLOSED STRUCTURE

FOR COMPONENTS & CLADDING PRESSURES, REFER TO CHART.

E. DESIGN OF WET WELL PUMP STATION DOES NOT INCLUDE FUTURE LOADING CONDITIONS ASSOCIATED WITH RAISING GRADE ELEVATIONS, INCREASING BUILDING LOADS OR INTRODUCING VEHICLE LOADS AT ADJACENT PROPERTIES. ANY FUTURE PROJECTS AT ADJACENT PROPERTIES SHALL CONSIDER THIS WET WELL PUMP STATION AND CONDUCT ANALYSIS TO ENSURE INCREASED PRESSURES ARE ADEQUATELY RESISTED WITHOUT DAMAGE OR SETTLEMENT.

FOUNDATIONS

A. SEE GEOTECHNICAL/SUBSURFACE INVESTIGATION REPORT BY MC SQUARED, INC, DATED AUGUST 11, 2017 :
IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE WHETHER OR NOT ADDITIONAL GEOTECHNICAL INFORMATION IS REQUIRED AND TO PROVIDE SUCH INFORMATION AS THE CONTRACTOR DEEMS NECESSARY.

B. ALLOWABLE BEARING PRESSURES ARE AS FOLLOWS:
WET WELL MAT SLAB = 3000 PSF (100 PCI MODULUS)
EQUIPMENT PAD = 2000 PSF

C. GEOTECHNICAL ENGINEER SHALL BE RETAINED BY OWNER TO PROVIDE OBSERVATION AND TESTING SERVICES DURING THE GRADING AND FOUNDATION PHASE OF CONSTRUCTION. INSPECTION AND TESTING REPORTS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER.

D. PRIOR TO PLACING ENGINEERED FILL, THE SITE SHALL BE STRIPPED AND PROOF ROLLED. ANY SOFT SPOTS ENCOUNTERED SHALL BE REMOVED AND REPLACED WITH ENGINEERED FILL. REFER TO EARTHWORK SPECIFICATION FOR ADDITIONAL INFORMATION.

E. THERE SHALL BE NO BACKFILLING OPERATIONS UNTIL THE CONCRETE WALLS HAVE REACHED THEIR 28 DAY DESIGN STRENGTH, UNLESS NOTED OTHERWISE OR APPROVED BY THE ENGINEER.

F. FOR STRUCTURES WITH CONCRETE TOP SLABS, THERE SHALL BE NO BACKFILLING OPERATIONS UNTIL THE TOP SLAB IS IN PLACE, HAS BEEN CURED A MINIMUM OF 7 DAYS, AND HAS REACHED 70% OF ITS 28 DAY DESIGN STRENGTH, UNLESS NOTED OTHERWISE OR APPROVED BY THE ENGINEER.

STRUCTURAL CONCRETE

A. REFERENCES:

1. ACI 318-14 BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
2. ACI 350-06 CODE REQUIREMENTS FOR ENVIRONMENTAL ENGINEERING CONCRETE STRUCTURES
3. ACI SP-66 ACI DETAILING MANUAL
4. CRSI MSP-2-01 MANUAL OF STANDARD PRACTICE
5. CRSI REINFORCING BAR DETAILING
6. CRSI PLACING REINFORCING BARS

B. MATERIALS

1. STRUCTURAL CONCRETE
   a) MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS (f'c).....4000 PSI
   b) ALL CONCRETE EXPOSED TO THE ELEMENTS SHALL BE AIR-ENTRAINED IN ACCORDANCE WITH ASTM C260. SEE SPECIFICATIONS.
   c) ALL CONCRETE IN 8" WALLS OR COLUMNS WITH TWO PLANES OF REINFORCEMENT SHALL HAVE MAXIMUM 3/4" AGGREGATE. IT IS RECOMMENDED THAT THE CONTRACTOR CONSIDER SUPER-PLASTICIZED CONCRETE PER SPECIFICATIONS.
   d) ALL CONCRETE AGGREGATE SHALL COMPLY WITH ASTM C33 (NORMAL WEIGHT).
2. REINFORCEMENT
   a) REINFORCING BARS: ASTM A615, GRADE 60
3. ACCESSORIES
   a) BAR SUPPORTS CLASS 1, MAXIMUM PROTECTION (CRSI MANUAL OF STANDARD PRACTICE) FOR ALL SLABS AND BEAMS WITH SOFFITS EXPOSED TO VIEW
4. ANCHOR RODS
   a) SHALL BE GALVANIZED, FURNISHED WITH CHAMFERED ENDS, AND SHALL MEET STRENGTH AND DUCTILITY REQUIREMENTS EQUIVALENT ASTM F1554, GR 55 WELDABLE MATERIAL.
5. MECHANICAL (TORQUE-CONTROLLED) ANCHORS
   a) APPROVED SYSTEMS INCLUDE HILTI KWIK BOLT TZ (ICC ESR 1917) OR HILTI KWIK HUS-EZ (ICC ESR 3027) OR EQUAL CONSIDERING LOAD RESISTANCE, MECHANICAL ANCHORS SHALL BE APPROVED FOR USE WITH CRACKED CONCRETE PER AC 193. CURRENT ICC-ESR SHALL BE SUBMITTED. ALL PERSONNEL INSTALLING ANCHORS SHALL BE TRAINED BY THE MANUFACTURER ON PROPER INSTALLATION TECHNIQUE. TRAINING DOCUMENTATION FROM THE MANUFACTURER SHALL BE AVAILABLE ON REQUEST
6. ADHESIVE ANCHORS
   a) APPROVED SYSTEMS INCLUDE HILTI RE 500-SD (ICC ESR 2322) OR HIT-HY 200 WITH SAFESET TECHNOLOGY (ICC ESR 3187) OR EQUAL CONSIDERING LOAD RESISTANCE, IN-SERVICE AND INSTALLATION TEMPERATURE, AVAILABILITY OR COMPREHENSIVE INSTALLATION INSTRUCTIONS, AND CREEP . ADHESIVE ANCHORS SHALL BE APPROVED FOR USE WITH CRACKED CONCRETE PER AC 308. CURRENT ICC-ESR SHALL BE SUBMITTED
   b) ALL PERSONNEL INSTALLING ANCHORS SHALL BE TRAINED BY THE MANUFACTURER ON PROPER INSTALLATION TECHNIQUE. TRAINING DOCUMENTATION FROM THE MANUFACTURER SHALL BE AVAILABLE ON REQUEST.
   c) ADHESIVE ANCHORS SHALL BE PROOF LOADED IN ACCORDANCE WITH ACI 355.4 AS REQUIRED BY SPECIAL INSPECTION.
7. GROUT: HIGH STRENGTH, NON-SHRINK STRUCTURAL GROUT. SEE SPECIFICATIONS.

C. REINFORCEMENT DETAILING

1. ALL REINFORCING STEEL DETAILS SHALL BE IN ACCORDANCE WITH THE ACI CODE REQUIREMENTS (ACI 318 OR 350 - CURRENT EDITIONS).
2. REINFORCING STEEL PLACING DRAWINGS AND BAR LISTS SHALL CONFORM TO THE ACI OR CRSI DETAILING MANUALS. ALL BAR SUPPORTS MUST BE CLEARLY DETAILED
3. CONCRETE COVER FOR REINFORCING SHALL BE INDICATED ON THE APPLICABLE REINFORCING STEEL SHOP DRAWINGS. HOWEVER, NO REINFORCING IN AREAS EXPOSED TO EARTH, WEATHER ,SEWAGE OR WATER SHALL HAVE COVER LESS THAN TWO INCHES.
4. SPECIFIED COVER FOR REINFORCING PER ACI 318 (BUILDING STRUCTURES):
   SLAB-ON-GRADE (REBAR)..... 2.0" FROM TOP OF SLAB (U.N.O.)

   SPECIFIED COVER FOR REINFORCING PER ACI 350 (WATER CONTAINMENT STRUCTURES):
   FOOTINGS (BOTTOM).....3.0"
   FOOTINGS (TOP).....2.0"
   WALLS.....2.0"
   SUSPENDED SLABS (BOTTOM).....2.0"
   SUSPENDED SLABS (TOP).....2.0"
5. REINFORCEMENT IN WALLS SHALL BE CONTINUOUS. HORIZONTAL BAR LAP SPLICES SHALL BE STAGGERED
6. PROVIDE CORNER BARS AT ALL WALL AND FOUNDATION CORNERS TO BE LAPPED WITH THE HORIZONTAL BARS. CORNER BARS ARE TO MATCH THE HORIZONTAL BARS IN SIZE, GRADE AND SPACING UNLESS OTHERWISE SHOWN.
7. HOOKS AND BENDS SHALL MEET ACI STANDARD UNLESS OTHERWISE INDICATED.
8. SPLICES: CONTINUOUS REINFORCING BARS SHALL BE FURNISHED WITH CLASS 'B' TENSION LAPS SPLICES INCLUDING CORNER BARS, UNLESS NOTED OTHERWISE.
9. MECHANICAL SPLICES SHALL NOT BE PERMITTED UNLESS SHOWN ON THE DRAWINGS OR APPROVED BY THE ENGINEER
10. REINFORCING STEEL FABRICATION AND PLACEMENT SHALL BE IN ACCORDANCE WITH CRSI MANUAL OF STANDARD PRACTICE AND CRSI PLACING REINFORCING BARS (LATEST EDITIONS).
11. REINFORCING STEEL IN FOOTINGS SHALL BE ASSEMBLED IN MAT GRILLES EQUALLY SPACED AND SECURELY WIRED TOGETHER BEFORE THE CONCRETE IS POURED.
12. WALL FOOTING DOWELS ARE TO HAVE A FULL TENSION LAP SPLICE WITH THE WALL STEEL UNLESS NOTED OTHERWISE.
13. SPREAD BARS AROUND SMALL OPENINGS AND SLEEVES IN SLABS AND WALLS WHERE POSSIBLE AND WHERE BAR SPACING WILL NOT EXCEED 1.5 TIMES THE NORMAL SPACING. DISCONTINUE BARS AT LARGE OPENINGS WHERE NECESSARY AND PROVIDE AN AREA OF REINFORCEMENT EQUAL TO THE INTERRUPTED REINFORCEMENT DISTRIBUTING ONE-HALF OF THIS REINFORCEMENT EACH SIDE OF THE OPENING (TENSION LAP SPLICED). HOLES LARGER THAN 12 INCHES IN ANY DIRECTION SHALL HAVE (2) #6 X 4'-0" DIAGONAL BARS IN BOTH FACES AT EACH CORNER
14. ALL REINFORCING SHALL BE HELD SECURELY IN POSITION WITH STANDARD ACCESSORIES IN CONCRETE
15. NO REINFORCING STEEL SHALL BE FIELD BENT WITHOUT THE APPROVAL OF THE STRUCTURAL ENGINEER. FIELD BENDING OF PLAIN REINFORCEMENT, IF PERMITTED, SHALL BE PERFORMED USING AN APPROVED AND APPROPRIATE SIZED PORTABLE HYDRAULIC DEVICE THAT MAKES ACI STANDARD RADIUS BENDS. NO OTHER FIELD BENDING METHOD SHALL BE PERMITTED.
16. WELDING, INCLUDING TACK WELDING, FOR REINFORCING STEEL IS PROHIBITED. WELDING OF REINFORCING STEEL AND HIGH STRENGTH BOLTS, IE. A36, F1554, WILL BE PERMITTED ONLY BY WRITTEN APPROVAL OF THE ENGINEER.
17. ALL OPENINGS THROUGH WALLS, SLABS OR OTHER STRUCTURAL ELEMENTS NOT DETAILED ON THE STRUCTURAL DRAWINGS MUST BE LOCATED BY THE CONTRACTOR AND SHOWN ON THE APPLICABLE REINFORCING STEEL SHOP DRAWINGS. THE FINAL LOCATION OF ALL OPENINGS MUST BE REVIEWED BY THE ENGINEER BEFORE THE CONCRETE IS POURED.
18. MODIFICATION AND REPAIR TO EXISTING CONCRETE: (A) SEE CONCRETE SPECIFICATIONS FOR COMPLETE EXPLANATION. (B) CONNECTION METHODS - METHOD A - BONDING TO SATURATED SURFACE METHOD B - BONDING BY USING BONDING AGENT METHOD C - DOWELS USING EPOXY BONDING AGENT

D. FORMWORK

1. SEE SPECIFICATIONS
2. KEYS INDICATED ARE TO BE 2x4 NOMINAL CONTINUOUS, U.N.O.
3. CAMBER: PROVIDE CAMBER TO COMPENSATE FOR DISPLACEMENT OF FORMS (SEE ALSO SPECS.) AND TO PROVIDE AS-CAST MEMBER CAMBER AS NOTED ON DRAWINGS.
4. RUSTICATION STRIPS, CHAMFERS, DRIPS, MISC. EMBEDS, ETC. SEE DRAWINGS.
5. PROVIDE 3/4" CHAMFER AT ALL EXPOSED CORNERS OF BEAMS, WALLS ETC. UNLESS OTHERWISE NOTED.
6. OPENINGS FOR MEP TRADES ARE TO BE INCLUDED IN THE BID. ALL HOLES FOR OTHER TRADES WHICH MUST BE CUT OR FORMED AND WHICH ARE NOT SHOWN ON THE STRUCTURAL DESIGN(S) DRAWINGS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER DESIGNER FOR REVIEW AND APPROVAL. ANY STRENGTHENING OR ADDITIONAL REINFORCEMENT REQUIRED SHALL BE FURNISHED BY THE CONTRACTOR WITHOUT ADDITIONAL COST TO THE OWNER.

STRUCTURAL CONCRETE (CONT)

E. CONCRETE FINISHES: SEE SPECIFICATIONS

1. FORMED SURFACES:
   a) EXPOSED TO VIEW: SMOOTH FORM FINISH
   b) COVERED OR AS NOTED ON PLANS: AS-CAST
2. FLATWORK:
   a) EXPOSED TO VIEW: SMOOTH FINISH

F. CURING AND PROTECTION: SEE SPECIFICATIONS.

G. SEE THE MECHANICAL, ELECTRICAL AND SUPPLIERS DRAWINGS AND THE SPECIFICATIONS FOR THE LOCATIONS OF SPECIAL ANCHORS, CHAMFERS, SLEEVES, PIPES, CONDUITS AND OTHER DETAILS NOT SHOWN ON THE STRUCTURAL DRAWINGS.

H. EMBEDDED PIPES OR CONDUIT. MAXIMUM DIAMETER ONE THIRD x SLAB OR WALL THICKNESS, SPACED MINIMUM OF 3 TIMES DIAMETER ON CENTER. ALL EMBEDDED PIPES OR CONDUIT SHALL BE APPROVED BY ENGINEER OF RECORD PRIOR TO INSTALLING.

J. SIZE AND LOCATION OF EQUIPMENT PADS AND ANCHOR BOLTS SHALL BE AS REQUIRED BY THE EQUIPMENT MANUFACTURER. ALL CONDUIT PLACED IN SLAB SHALL BE APPROVED BY STRUCTURAL ENGINEER OF RECORD PRIOR TO INSTALLING CONDUIT AND POURING SLAB.

K. ANY CONSTRUCTION JOINTS IN STRUCTURES WHERE WATERSTOPS ARE USED SHALL BE PROTECTED BY WATERSTOP UNLESS OTHERWISE NOTED. CONTRACTOR SHALL SUBMIT A CONSTRUCTION JOINT LAYOUT PLAN FOR APPROVAL BY THE ENGINEER OF RECORD PRIOR TO CONSTRUCTION.

L. CONTRACTOR SHALL DESIGN, FURNISH, INSTALL, TEST, OPERATE, MONITOR, AND MAINTAIN A DEWATERING SYSTEM TO CONTROL HYDROSTATIC PRESSURE AND GROUND WATER ENTERING THE EXCAVATION.

M. SUBMITTALS

1. CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING THE FOLLOWING DOCUMENTS TO THE ENGINEER OF RECORD:
   a) CONCRETE MIX DESIGN
   b) CONCRETE REINFORCING DRAWINGS

TENSION DEVELOPMENT / LAP SPLICE SCHEDULE (UNCOATED BARS)

DEVELOPMENT / LAP SPLICE LENGTH IN CONCRETE (f'c = 4000 PSI)

BAR SIZE	DEVELOPMENT LENGTH (IN)		CLASS 'B' LAP SPLICE LENGTH (IN)		STD 90 DEG. HOOK (IN)		
	BAR TYPE 1	BAR TYPE 2	BAR TYPE 1	BAR TYPE 2	EMBED	LEG LENGTH	BEND DIA.
3	15	22	19	28	6	6	3
4	19	29	25	37	7	8	3
5	24	36	31	47	9	10	3 3/4
6	29	43	37	56	10	12	4 1/2
7	42	63	54	81	12	14	5 1/4
8	48	72	62	93	14	16	6
9	54	81	70	105	15	19	9 1/2
10	61	91	79	118	17	22	10 3/4
11	74	111	97	145	19	24	11 1/2

BAR TYPE 1 - CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED NOT LESS THAN Db, CLEAR COVER NOT LESS THAN Db, AND STIRRUPS OR TIES THROUGHOUT Ld NOT LESS THAN CODE MINIMUM

OR

CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED NOT LESS THAN 2"Db AND CLEAR COVER NOT LESS THAN Db.

BAR TYPE 2 - TOP BARS WITH MORE THAN 12" OF FRESH CONCRETE CAST BELOW **AND** OTHER CASES

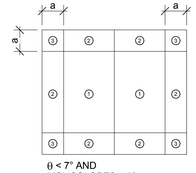
COMPONENTS & CLADDING WIND PRESSURES

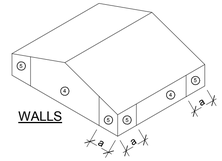
FACTORED (ULTIMATE) COMPONENTS & CLADDING WIND PRESSURES (PSF)

ROOF ZONES	ROOF EFFECTIVE TRIBUTARY AREA*		
	10 SF	50 SF	100 SF
NEGATIVE ZONE 1	-56	-53	-52
NEGATIVE ZONE 2	-94	-71	-61
NEGATIVE ZONE 3	-141	-85	-61
POSITIVE ZONE 1	-23	20	18
OVERHANG ZONE 1 & 2	-81	-78	-76
OVERHANG ZONE 3	-133	-67	-38

WALL ZONES	WALLS EFFECTIVE TRIBUTARY AREA*		
	10 SF	50 SF	500 SF
NEGATIVE ZONE 4	-56	-51	-43
NEGATIVE ZONE 5	-69	-58	-43
POSITIVE ZONE 4 & 5	52	46	39

LOCATION OF WIND PRESSURE ZONES





NOTES:

1. EDGE DISTANCE 'a' = 3'-0"
2. * EFFECTIVE TRIBUTARY AREA: SPAN LENGTH MULTIPLIED BY AN EFFECTIVE WIDTH THAT NEED NOT BE LESS THAN 1/3 THE SPAN LENGTH
3. NEGATIVE VALUE DENOTES PRESSURE ACTING AWAY FROM THE SURFACE
4. UNFACTORED (NOMINAL) COMPONENTS AND CLADDING PRESSURES MAY BE OBTAINED BY MULTIPLYING THE VALUES IN THE TABLE BY 0.60

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED SPS
DRAWN SPS
CHECKED ATC

Pinellas County

PROJECT: PUMP STATION 079 REPLACEMENT

DESCRIPTION: STRUCTURAL GENERAL NOTES

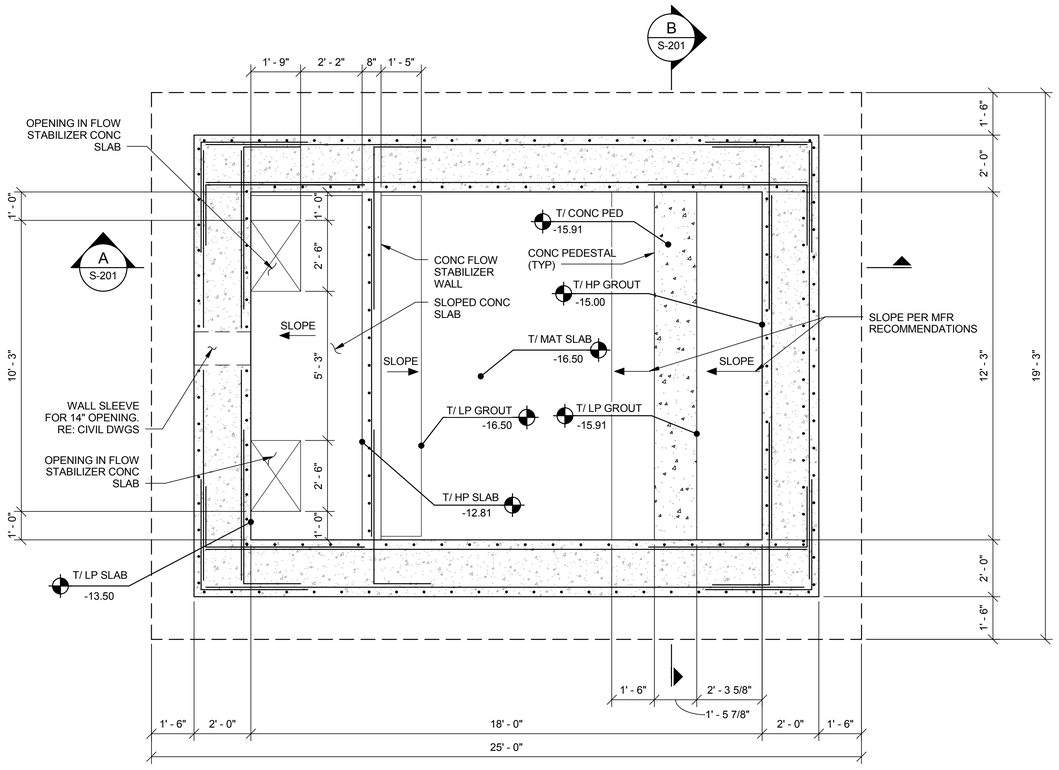
TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

APPROVED BY:

Andrew Coats, P.E.
FLA. LIC. NO. 73359

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: S-001

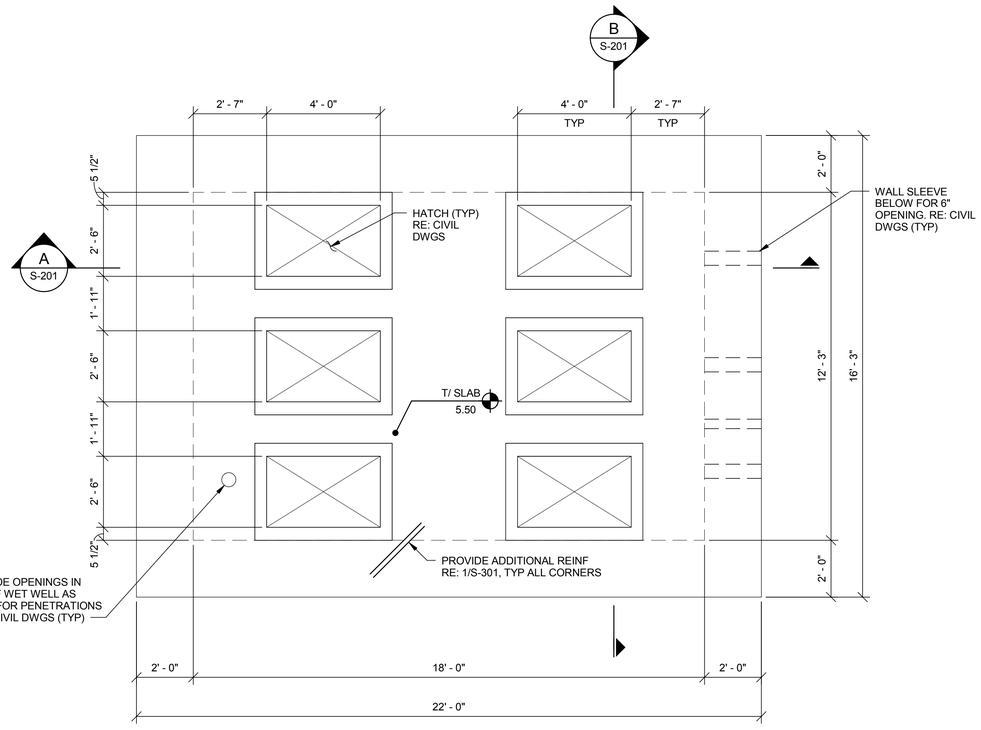


A S-101 WET WELL FOUNDATION PLAN

SCALE: 3/8" = 1'-0"

NOTES:

1. REFER TO S-001 FOR STRUCTURAL GENERAL NOTES.
2. COORDINATE ALL OPENINGS THROUGH CONCRETE WITH PROCESS DRAWINGS.
3. SEE DRAWING S-301 FOR TYP DETAILS NOT CALLED OUT ON PLAN.

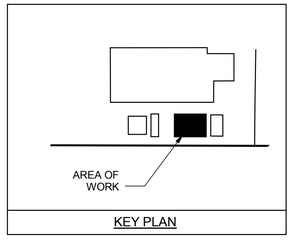


B S-101 WET WELL TOP SLAB PLAN

SCALE: 3/8" = 1'-0"

NOTES:

1. REFER TO S-001 FOR STRUCTURAL GENERAL NOTES.
2. COORDINATE ALL OPENINGS THROUGH CONCRETE WITH PROCESS DRAWINGS.
3. SEE DRAWING S-301 FOR TYP DETAILS NOT CALLED OUT ON PLAN.
4. SEE CIVIL DWGS FOR BOLLARD LOCATIONS AND DETAILS.



KEY PLAN

0 1'-4" 2'-8" 5'-4"

SCALE: 3/8" = 1'-0"

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED SPS
DRAWN SPS
CHECKED ATC

Pinellas County

PROJECT:
PUMP STATION 079 REPLACEMENT

DESCRIPTION:
STRUCTURAL FOUNDATION PLAN

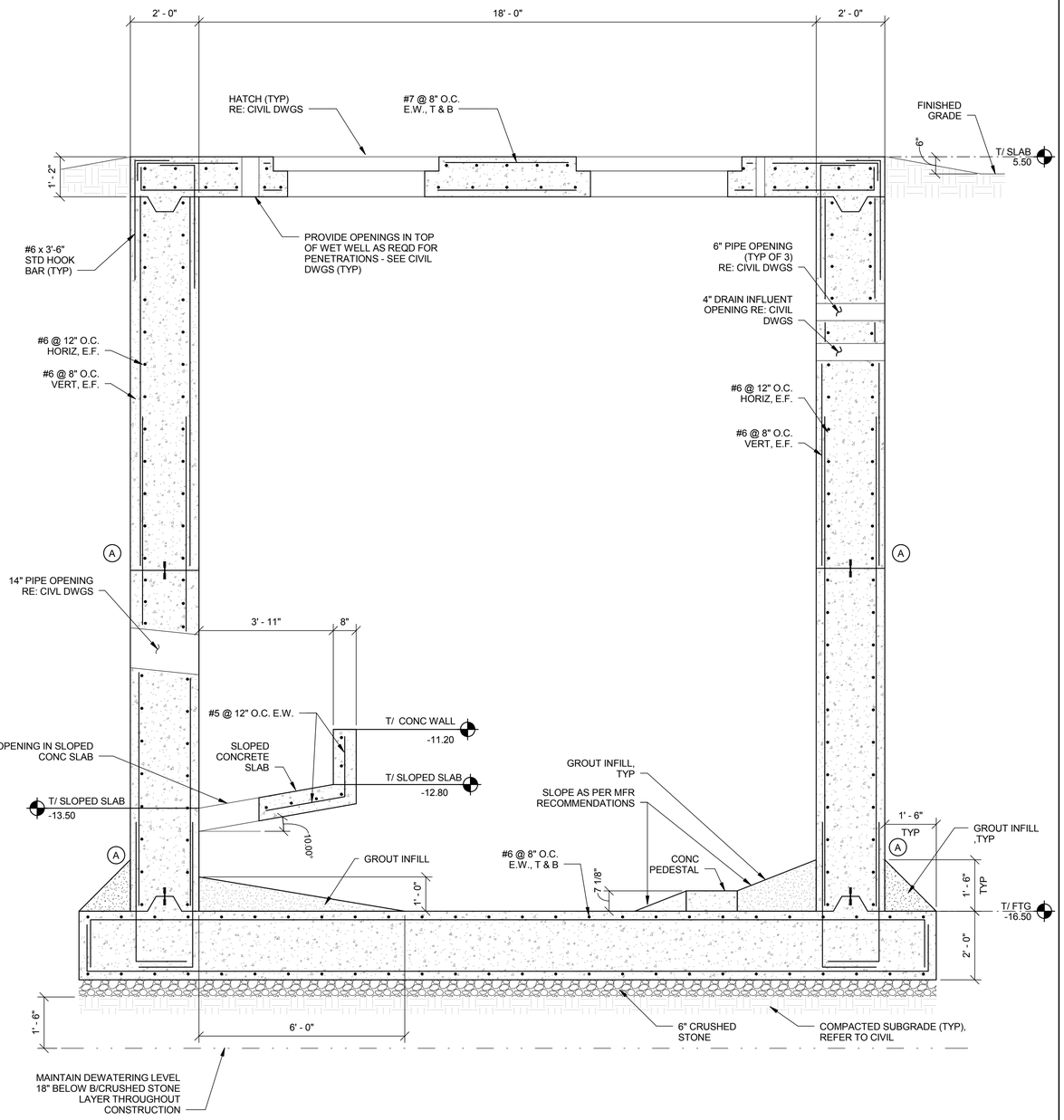
TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

APPROVED BY:

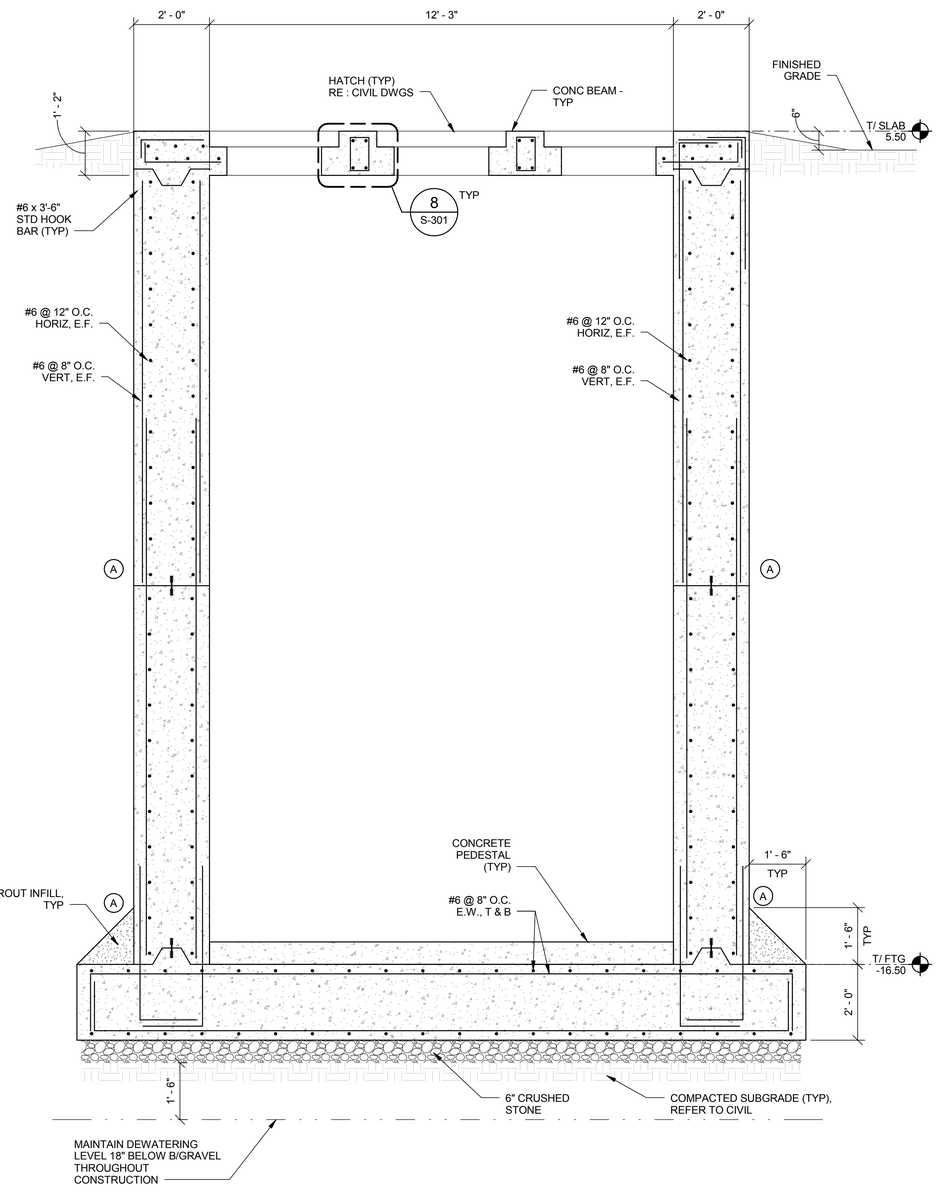
Andrew Coats, P.E.
FLA. LIC. NO. 73359

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: S-101



A SECTION
S-201 SCALE: 1/2" = 1'-0"



B SECTION
S-201 SCALE: 1/2" = 1'-0"

0 1' 2' 4'
SCALE: 1/2" = 1'-0"

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED SPS
DRAWN SPS
CHECKED ATC

Pinellas County

PROJECT:
PUMP STATION 079
REPLACEMENT

DESCRIPTION:
STRUCTURAL FOUNDATION
SECTIONS

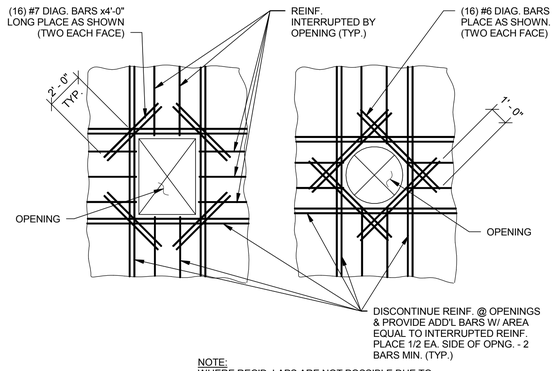
TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

APPROVED BY:

Andrew Coats, P.E.
FLA. LIC. NO. 73359

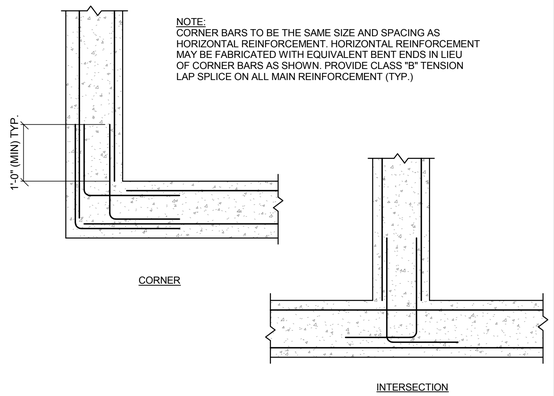
DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: S-201



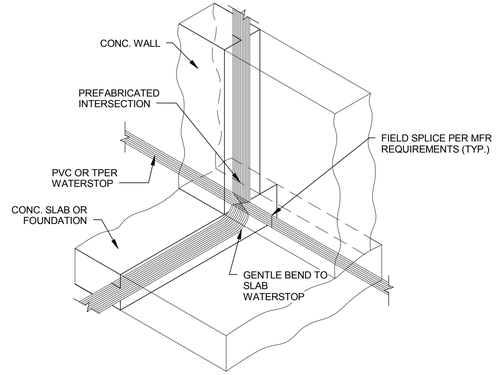
NOTE:
WHERE REQ'D. LAPS ARE NOT POSSIBLE DUE TO PRESENCE OF ADJACENT HOLES OR CORNERS, PROVIDE STANDARD END HOOK

1 S-301 **REINF. STEEL @ OPENING**
SCALE: 1/4" = 1'-0"



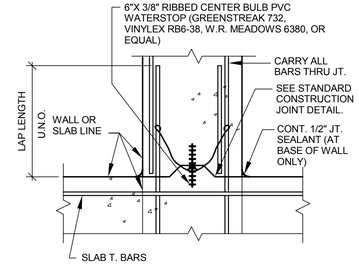
NOTE:
CORNER BARS TO BE THE SAME SIZE AND SPACING AS HORIZONTAL REINFORCEMENT. HORIZONTAL REINFORCEMENT MAY BE FABRICATED WITH EQUIVALENT BENT ENDS IN LIEU OF CORNER BARS AS SHOWN. PROVIDE CLASS "B" TENSION LAP SPLICE ON ALL MAIN REINFORCEMENT (TYP.)

2 S-301 **WALL CORNERS**
SCALE: 3/4" = 1'-0"



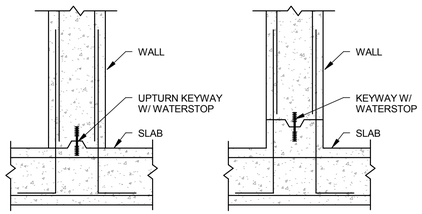
TYP. WATERSTOP AT SLAB AND WALL

3 S-301 **WATERSTOP AT SLAB & WALL**
SCALE: 3/4" = 1'-0"



NOTE:
FOR ADDITIONAL CONSTRUCTION JOINT DETAILS, REFER TO "PVC OR TPER WATERTIGHT CONSTRUCTION JOINTS" DETAIL INDICATED BY SYMBOL (A)

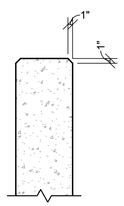
4 S-301 **TYPE "A" WATERTIGHT CONSTRUCTION JOINT**
SCALE: 1" = 1'-0"



ALTERNATE 1 ALTERNATE 2

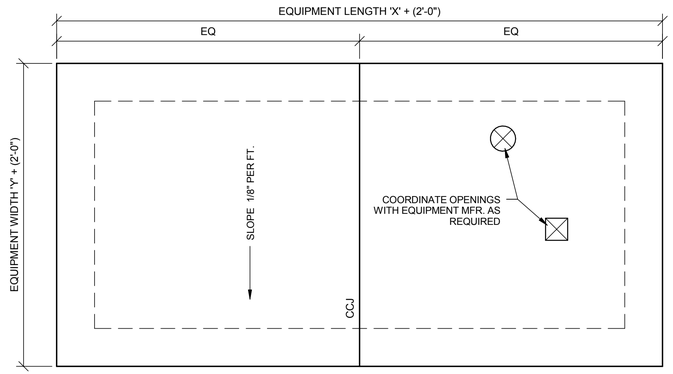
MAT SLAB TO WALL

5 S-301 **PVC WATERSTOP CONSTRUCTION JOINTS**
SCALE: 3/4" = 1'-0"

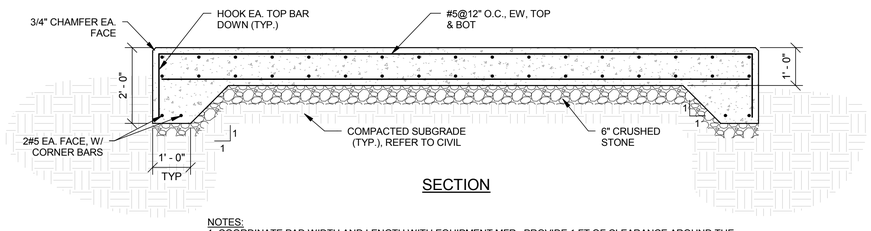


WALL

6 S-301 **CHAMFER DETAIL**
SCALE: 3/4" = 1'-0"



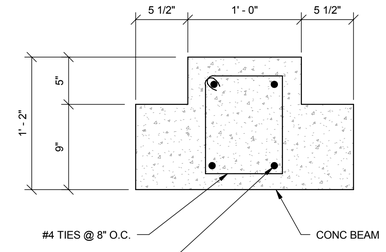
PLAN



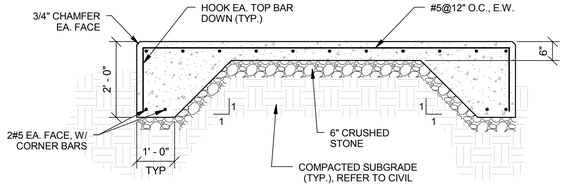
SECTION

NOTES:
1. COORDINATE PAD WIDTH AND LENGTH WITH EQUIPMENT MFR. PROVIDE 1 FT OF CLEARANCE AROUND THE PERIMETER BETWEEN THE OUTSIDE EDGE OF PAD AND OUTERMOST PORTION OF EQUIPMENT.
2. COORDINATE SIZE AND LOCATION OF REQ'D OPNG'S W/ EQUIPMENT MFR.
3. PROVIDE A BROOM FINISH TO TOP CONCRETE SURFACE.
4. PROVIDE CONTROL JOINT AT LOCATIONS WHERE PAD LENGTH AND WIDTH RATIO OS GREATER THAN 1.5:1.0.

7 S-301 **GENERATOR / FUEL TANK PAD DETAIL**
SCALE: 1/2" = 1'-0"



8 S-301 **TYP CONC BEAM**
SCALE: 1 1/2" = 1'-0"



NOTES:
1. PROVIDE A BROOM FINISH TO TOP CONCRETE SURFACE.

9 S-301 **PAD DETAIL**
SCALE: 1/2" = 1'-0"

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

0 1' 2' 4'
SCALE: 1/2" = 1'-0"

0 8" 1'-4" 2'-8"
SCALE: 3/4" = 1'-0"

0 2' 4' 8'
SCALE: 1/4" = 1'-0"

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED SPS
DRAWN SPS
CHECKED ATC

Pinellas County

PROJECT:
PUMP STATION 079 REPLACEMENT

DESCRIPTION:
STRUCTURAL TYPICAL DETAILS

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

APPROVED BY:

Andrew Coats, P.E.
FLA. LIC. NO. 73359

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: S-301

BACKGROUND PLAN AND ONE LINE SYMBOLS

SYMBOL	DESCRIPTION
	CONTROL SWITCH (SEL. OR P.B.) SEE CIRCUITS FOR SPECIFIC TYPE
F FL	SEE CIRCUITS FOR SPECIFIC TYPE FLOAT SWITCH - FLOW SWITCH
T M	TEMPERATURE - HUMIDISTAT SWITCH (SUBSCRIPT = NO. OF STAGES)
L P V	LIMIT - PRESSURE - VACUUM SWITCH
ALT	ELECTRICAL OR MECHANICAL ALTERNATOR (SEE WIRING)
OS	OVERLOAD SWITCH OR DEVICE
TB	TERMINAL BOX
	SOLENOID VALVE
PC	PHOTOCELL LINE VOLTAGE
VA	ITEM NO. INTERCOM EQUIPMENT
A MS LB	INTERCOMMUNICATION SYSTEM AMPLIFIER - WALL STATION - LINE BALANCE
DS	INTERCOMMUNICATION DESK SET
	INTERCOM. SPEAKER (SURFACE MTD.)
	INTERCOM. SPEAKER (CEILING LAY-IN)
	TELEPHONE OUTLET OR JUNCTION BOX
	WELDING RECEPTACLE - NEMA L9-50R 600V, 2P, 3W, SIMPLEX
HS	INTERCOM HANDSET - SURFACE MOUNTED WITH REMOTE SPEAKER AMPLIFIER
VC	INTERCOM VOLUME CONTROL
	INTERCOM SPEAKER - SURFACE MOUNTED
HS	INTERCOM HANDSET - FLUSH MOUNTED WITH REMOTE SPEAKER AMPLIFIER
	AS NOTED (LIGHTING PANEL, CONTROL PANEL, DISTRIBUTION PANEL ETC.) WALL MOUNTED
JB	JUNCTION BOX
	HEATER
	TRANSFORMER
	CONDUIT WITH CONDUIT SEAL FITTING
	CONDUIT EXPOSED
	CONDUIT CONCEALED
E	DIRECT BURIED CONDUIT
UG	DIRECT BURIED CABLE
OH	OVERHEAD LINE
DB	UNDERGROUND DUCT BANK
1 2 3 4 5 6	CONCRETE ENCASED DUCT BANK, WITH CABLE LOCATIONS AND SPARE DUCTS AS INDICATED ON DRAWINGS
	CABLE REEL

SYMBOL	DESCRIPTION
	LOW VOLTAGE DISCONNECT SWITCH
	LOW VOLTAGE FUSE (BELOW 600V)
1 RV 2 FVR 3 2S,2W	ALL STARTERS SHALL BE FULL VOLTAGE NON-REVERSING UNLESS OTHERWISE INDICATED (FVR) FULL VOLTAGE REVERSING (RV) REDUCED VOLTAGE (2S,2W) TWO SPEED, TWO WINDING
	600V, 3 POLE MOLDED CASE CIRCUIT BREAKER, FRAME & RATING AS SHOWN
1/2 A-3	SINGLE PHASE, FRACTIONAL HP MOTOR TO LOCATION INDICATED (SEE GEN. NOTE 4)
A 1	THREE PHASE LOAD WITH IDENTIFICATION
	HIGH VOLTAGE FUSE (ABOVE 600 V)
FT 10	TAG NO. (BALLOON) FOR DEVICE INDICATED
A-3 FT 15 MCP OR CP-1	FOR POWER (SEE GEN. NOTE 4) 3/4"C(2/C#18 SHLD.)CONDUIT AND WIRE RUN FROM DEVICE INDICATED TO LOCATION INDICATED
	CAPACITOR, 3 PHASE, SIZE AS INDICATED
F C	DISCONNECT SWITCH (F) = FUSED (C) = CIRCUIT BREAKER
	MAGNETIC STARTER (BACKGROUND DRAWINGS ONLY)
SIZE 2	COMBINATION MAGNETIC STARTER FUSED UNLESS NOTED (CIRCUIT BREAKER)
LG	COMBINATION LIGHTING CONTACTOR WITH HAND-OFF-AUTO SWITCH
R	MANUAL STARTER (R) = REVERSING
CP	CONTROL PANEL
TCP	TEMPERATURE CONTROL PANEL
1/8 UH-19	UNIT HEATER, 1/8 HORSEPOWER
BUS DUCT	600 VOLT FEEDER BUS DUCT (AMPERAGE AS INDICATED)
	LIGHTNING ARRESTOR
A-3	LOW VOLTAGE HOME RUNS 120/208 V 120/240 V (SEE GEN. NOTE 4)
NEMA 4	WATERTIGHT
NEMA 4X	WATERTIGHT AND CORROSION PROOF
NEMA 7	EXPLOSION PROOF - CLASS I, DIVISION I, GROUP D
NEMA 9	EXPLOSION PROOF - CLASS II, DIVISION 1
K	KEYLOCK
SD	SMOKE DETECTOR
E	EXIT LIGHT
	FLUORESCENT LUMINAIRE
	INCANDESCENT LUMINAIRE
	HIGH INTENSITY DISCHARGE LIGHT
EM	EMERGENCY BATTERY PACK

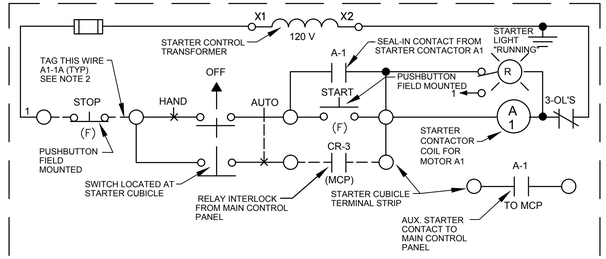
CONTROL CIRCUIT & PILOT DEVICE LEGEND

SYMBOL	DESCRIPTION
	PRESS. ACTUATED SWITCH
	FLOAT ACTUATED SWITCH
	FLOW ACTUATED SWITCH
	TEMP. ACTUATED SWITCH
	LIMIT SWITCH- NORMALLY OPEN
	LIMIT SWITCH- NORMALLY CLOSED
	LIMIT SWITCH-NORMALLY CLOSED-HELD OPEN
	LIMIT SWITCH-NORMALLY OPEN-HELD CLOSED
	LATCHING CABLE SWITCH
	TIME-DELAY FUSE
CR	CONTROL RELAY COIL
	CONTROL RELAY CONTACT-NORMALLY OPEN
	CONTROL RELAY CONTACT-NORMALLY CLOSED
CR L CR U	TWO COIL LATCHING RELAY
T	TIMING RELAY COIL
	TIMED CLOSED CONTACT ON ENERGIZATION
	TIMED OPEN CONTACT ON ENERGIZATION
	TIMED OPEN CONTACT ON DE-ENERGIZATION
	TIMED CLOSED CONTACT ON DE-ENERGIZATION
X1 X2	120 VAC TRANSFORMER

SYMBOL	DESCRIPTION
H O A	SELECTOR SWITCH OPERATOR WITH FUNCTION SHOWN
	MOMENTARY PUSHBUTTON OPERATOR-NORMALLY OPEN
	MOMENTARY PUSHBUTTON OPERATOR-NORMALLY CLOSED
	PUSHBUTTON OPERATOR WITH MUSHROOM HEAD
(F)	FIELD LOCATED STOP BUTTON
	MAINTAINED PUSH-PULL OPERATOR
	MAINTAINED STOP-START PUSHBUTTON OPERATOR
	SOLENOID OR CLUTCH
R 1	PUSH-TO-TEST INDICATING LIGHT
4	MAINTAINED STOP-MOMENTARY START PUSHBUTTON (JOG)
	ZERO SPEED OR ANTI-PLUGGING SWITCH
	LOCAL TERMINALS WITH EXTERNAL WIRING
ETI	ELAPSED TIME INDICATOR
INST. INST.	TIMING RELAY INSTANTANEOUS CONTACTS

WIRING DEVICE SCHEDULE

SYMBOL	DESCRIPTION	NEMA TYPE
	125V, 2P, SIMPLEX, CLOCK HANGER	1-15 R
	125V, 2P, SIMPLEX, 3W	5-20 R
	125V, 2P, DUPLEX, 3W	5-20 R
	125/250V, 3P, SIMPLEX, 3W, RANGE TYPE	10-50 R
S	20A, 120/277 V SWITCH	SPST
S 2P	20A, 120/277 V SWITCH	2PDT
S 3	20A, 120/277 V SWITCH	3 WAY
S 4	20A, 120/277 V SWITCH	4 WAY
S D	20A, 120/277 V DIMMER SWITCH	
	250V, 2P, SIMPLEX, 3W, 50A	6-50R
	125V, 2P, MULTI-RECEPTACLE	5-15R
	250V, 2P, SIMPLEX, 3W, 20A	6-20R
	600V, 2P, 3W, SIMPLEX WELDING	L9-50R
	208V, 3P, SIMPLEX, 4W, LOCKING	L14-20R
	277V, 2P, DUPLEX, 3W	7-15R



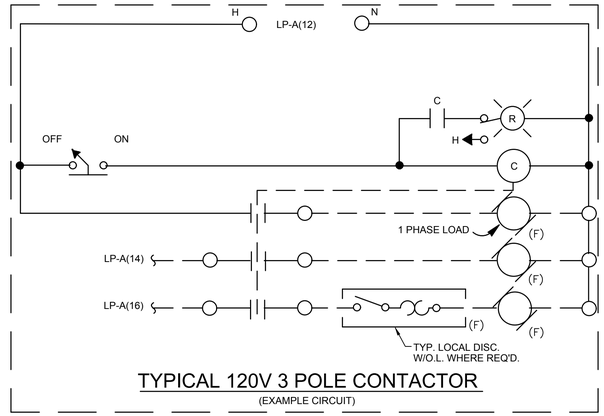
STARTER NAMEPLATE

A 1

EXAMPLE PUMP

(TAG A1)

(EXAMPLE CIRCUIT)



TYPICAL 120V 3 POLE CONTACTOR

(EXAMPLE CIRCUIT)

GENERAL NOTES:

1. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN LIGHT LINE WEIGHTS ON THE DRAWINGS ARE EXISTING ITEMS TO REMAIN. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN HEAVY LINE WEIGHTS ARE NEW THIS CONTRACT.
2. ITEMS SHOWN CROSSHATCHED ON THE DRAWINGS ARE EXISTING ITEMS TO BE REMOVED.
3. FOR ITEMS INDICATED AS "FIELD LOCATE" CHECK DRAWINGS OF OTHER TRADES (IN PARTICULAR PIPING AND STRUCTURAL) FOR INTERFERENCE AND FOR LOCATIONS OF MOUNTING FLANGES, CONNECTION POINTS, ETC.
4. INSTALL A SINGLE CONDUCTOR INSULATED (RHW, THHN, OR XHHW) COPPER GROUND WIRE IN EACH CONDUIT, SIZE AS SHOWN ON DRAWINGS OR AS A MINIMUM PER THE NATIONAL ELECTRICAL CODE. THIS GROUND WIRE SHALL BE CONNECTED AT EACH END TO THE EQUIPMENT GROUND. CONDUIT SHALL BE 3/4" MIN.
5. THE FOLLOWING COMPONENT IDENTIFICATION SHALL BE USED AS APPROPRIATE:
   (F) FIELD MOUNTED, NOT AT STARTER OR OTHER CONTROL PANELS.
   (S) STARTER PANEL MOUNTED.
   (MCP) AT MAIN CONTROL PANEL.
   (1) AT CONTROL PANEL NO. 1
   (2) AT CONTROL PANEL NO. 2
   (TCP) AT TEMPERATURE CONTROL PANEL.

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED JAS
DRAWN JAS
CHECKED DAB

Pinellas County

PROJECT:
PUMP STATION 079 REPLACEMENT

DESCRIPTION:
ELECTRICAL LEGEND

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

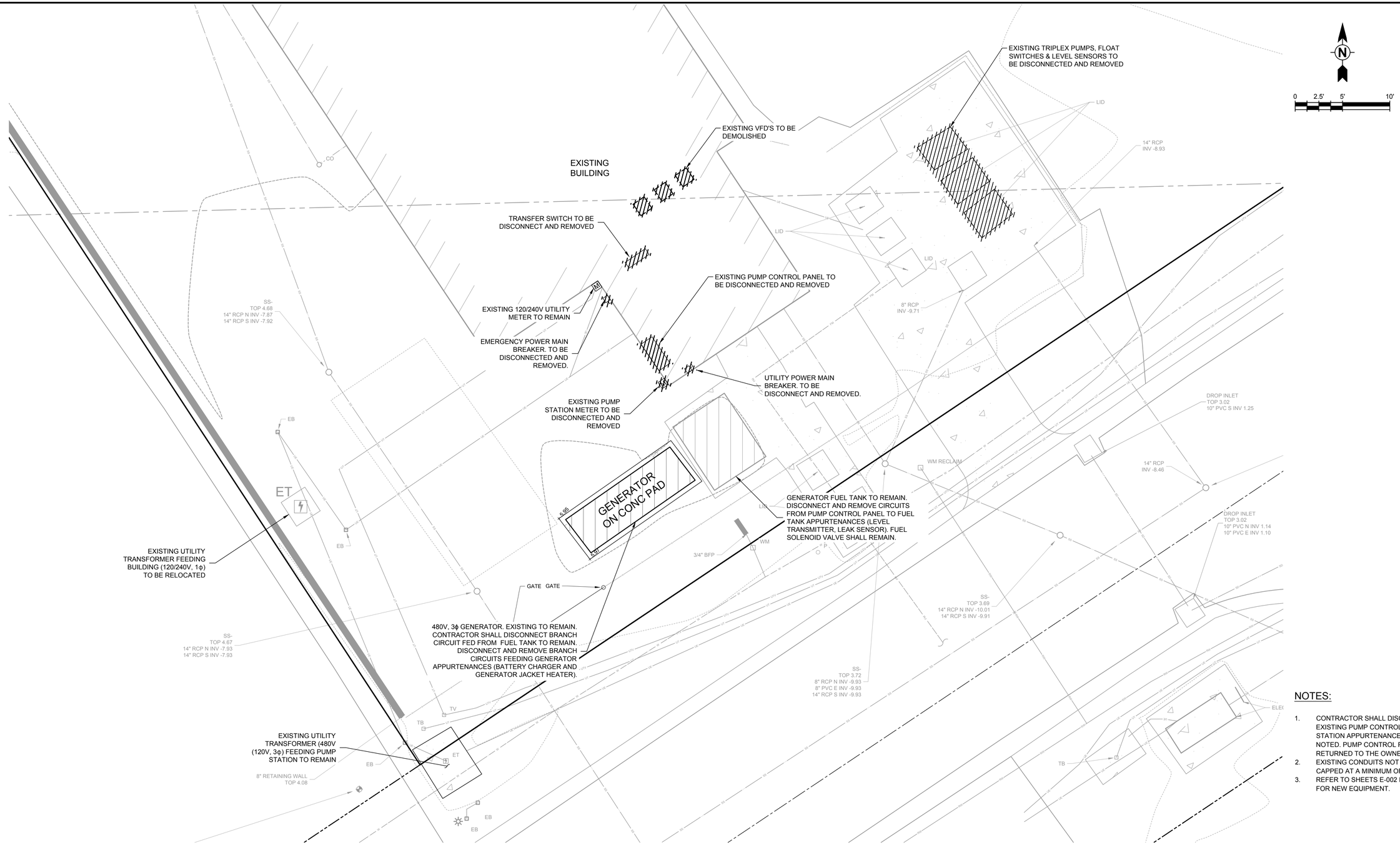
APPROVED BY:

David A. Burger, P.E.
FLA. LIC. NO. 47146

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: E-001

P:\IER\144726\200-144726-17002\CAD\sheetfiles\E-001 LEGEND AND NOTES.dwg, Jan 09, 2018 - 4:34pm



NOTES:

1. CONTRACTOR SHALL DISCONNECT AND REMOVE EXISTING PUMP CONTROL PANEL, RTU & ALL PUMP STATION APPURTENANCES UNLESS OTHERWISE NOTED. PUMP CONTROL PANEL AND RTU SHALL BE RETURNED TO THE OWNER.
2. EXISTING CONDUITS NOT REUSED SHALL BE CUT & CAPPED AT A MINIMUM OF 6" BELOW GRADE.
3. REFER TO SHEETS E-002 FOR CONDUIT SIZE & FILL FOR NEW EQUIPMENT.

DEMOLITION ELECTRICAL SITE PLAN

SCALE: 1" = 5'-0"

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED JAS
DRAWN JAS
CHECKED DAB

Pinellas County

PROJECT:
PUMP STATION 079 REPLACEMENT

DESCRIPTION:
ELECTRICAL SITE DEMOLITION PLAN

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

APPROVED BY:

David A. Burger, P.E.
FLA. LIC. NO. 47146

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: E-100

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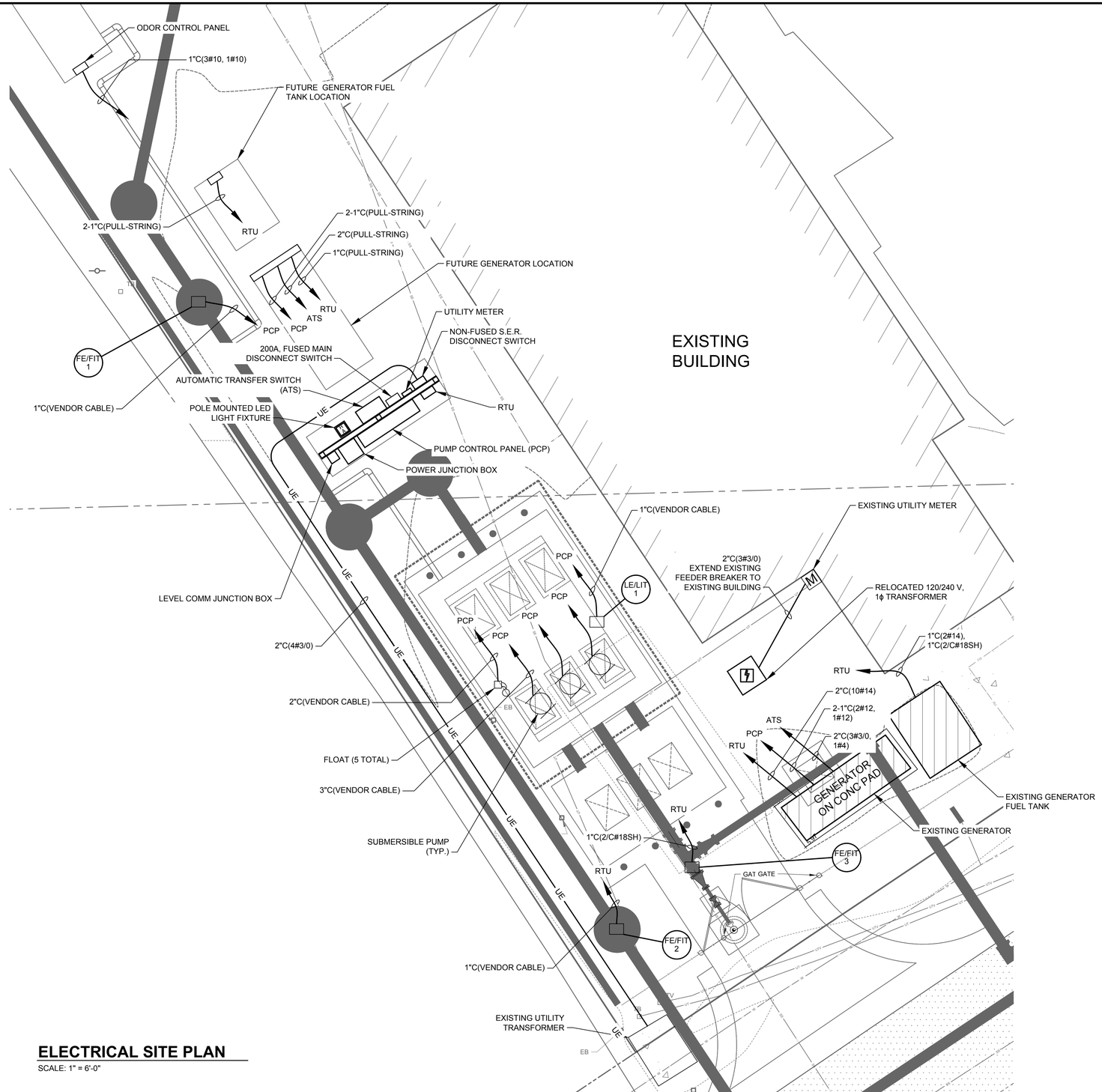

ELECTRICAL SITE PLAN

SCALE: 1" = 6'-0"

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REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED JAS
DRAWN JAS
CHECKED DAB

Pinellas County

PROJECT:
PUMP STATION 079 REPLACEMENT

DESCRIPTION:
ELECTRICAL SITE PLAN

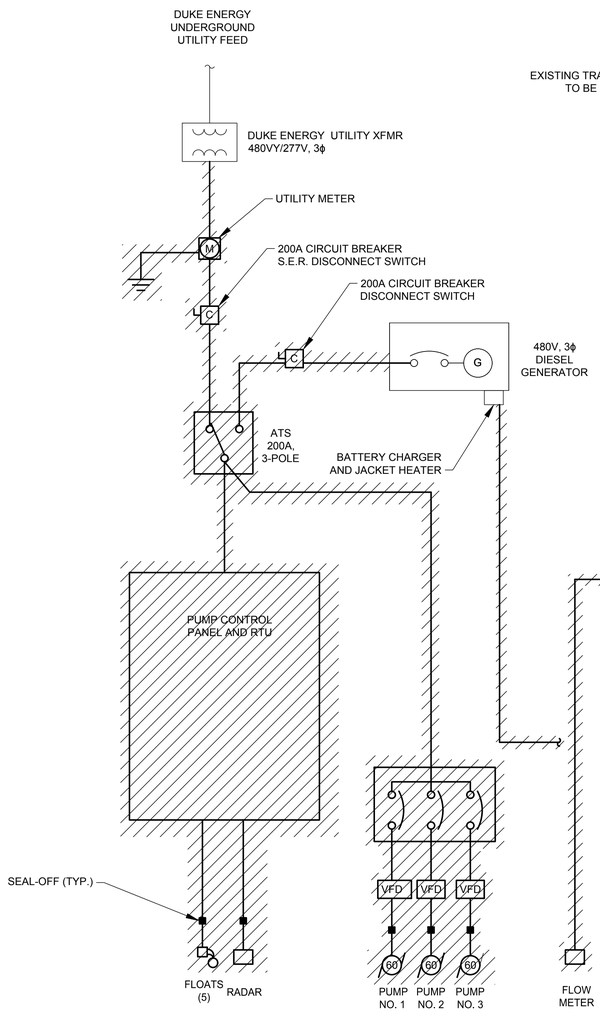
TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

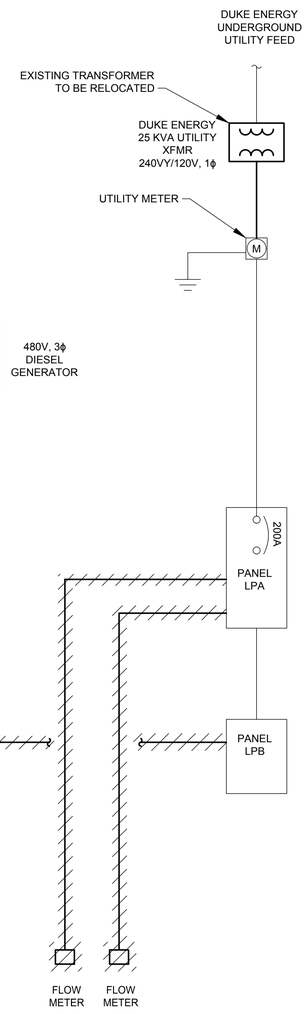
APPROVED BY:

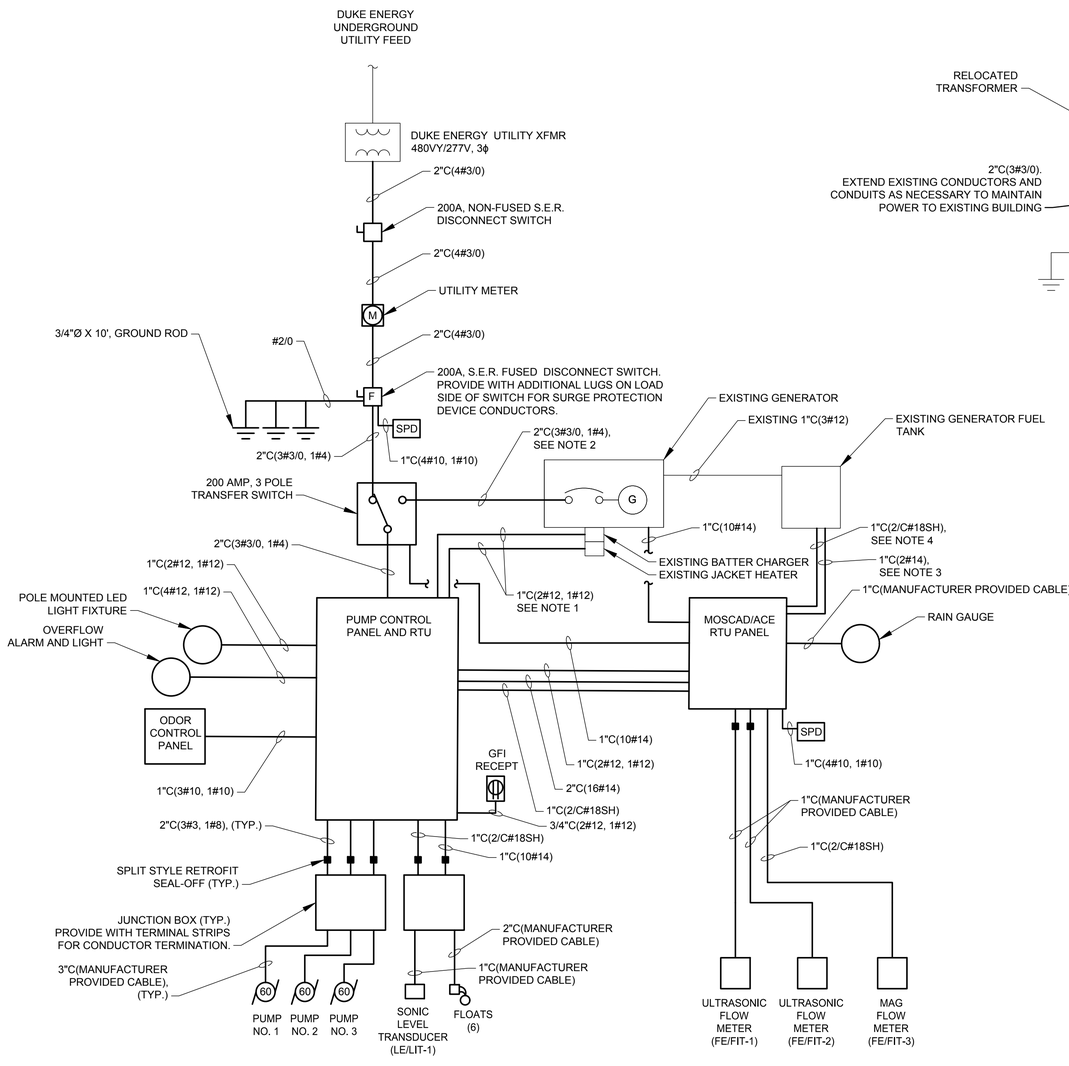
David A. Burger, P.E.
FLA. LIC. NO. 47146

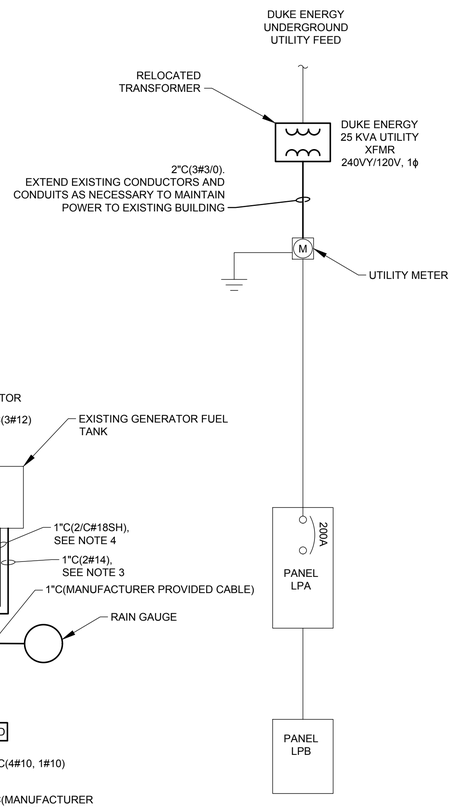
DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: E-101









DEMOLITION LEGEND

- DISCONNECT AND REMOVE
- EXISTING TO REMAIN
- TO BE RELOCATED OR MODIFIED

INSTALLATION LEGEND

- EXISTING
- NEW OR MODIFIED

NOTES:

1. PROVIDE TWO SPARE 1" CONDUITS FROM PUMP CONTROL PANEL TO FUTURE GENERATOR LOCATION. CAP CONDUIT AND PROVIDE WITH NYLON PULL-STRING.
2. PROVIDE SPARE 2" CONDUIT FROM ATS TO FUTURE GENERATOR LOCATION. CAP CONDUIT AND PROVIDE WITH NYLON PULL-STRING.
3. PROVIDE SPARE 1" CONDUIT FROM RTU PANEL TO FUTURE GENERATOR FUEL TANK LOCATION. CAP CONDUIT AND PROVIDE WITH NYLON PULL-STRING.
4. PROVIDE SPARE 1" CONDUIT FROM RTU PANEL TO FUTURE GENERATOR FUEL TANK LOCATION. CAP CONDUIT AND PROVIDE WITH NYLON PULL-STRING.

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED JAS
DRAWN JAS
CHECKED DAB

Pinellas County

PROJECT:
PUMP STATION 079
REPLACEMENT

DESCRIPTION:
SINGLE LINE
DIAGRAM

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

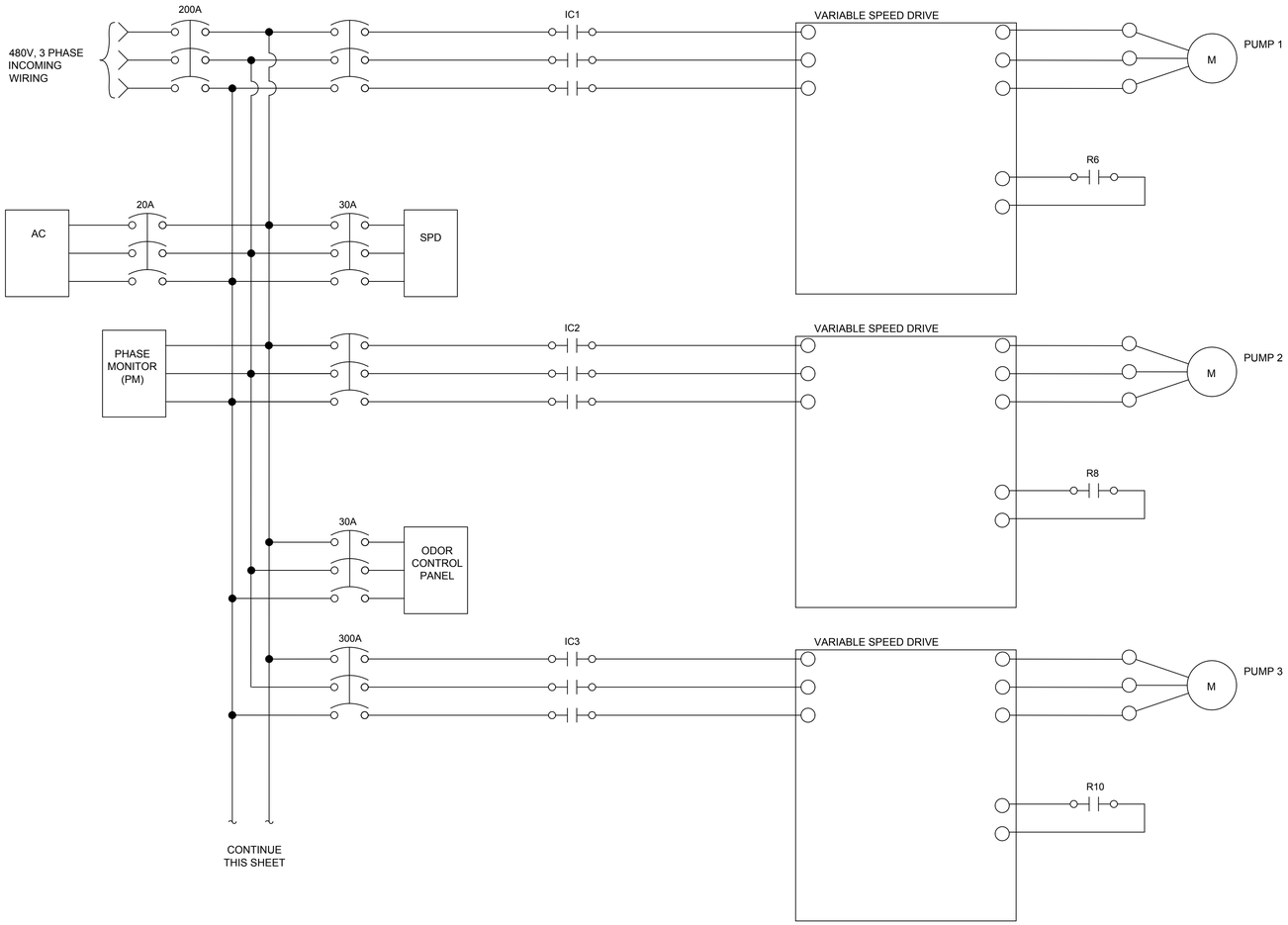
APPROVED BY:

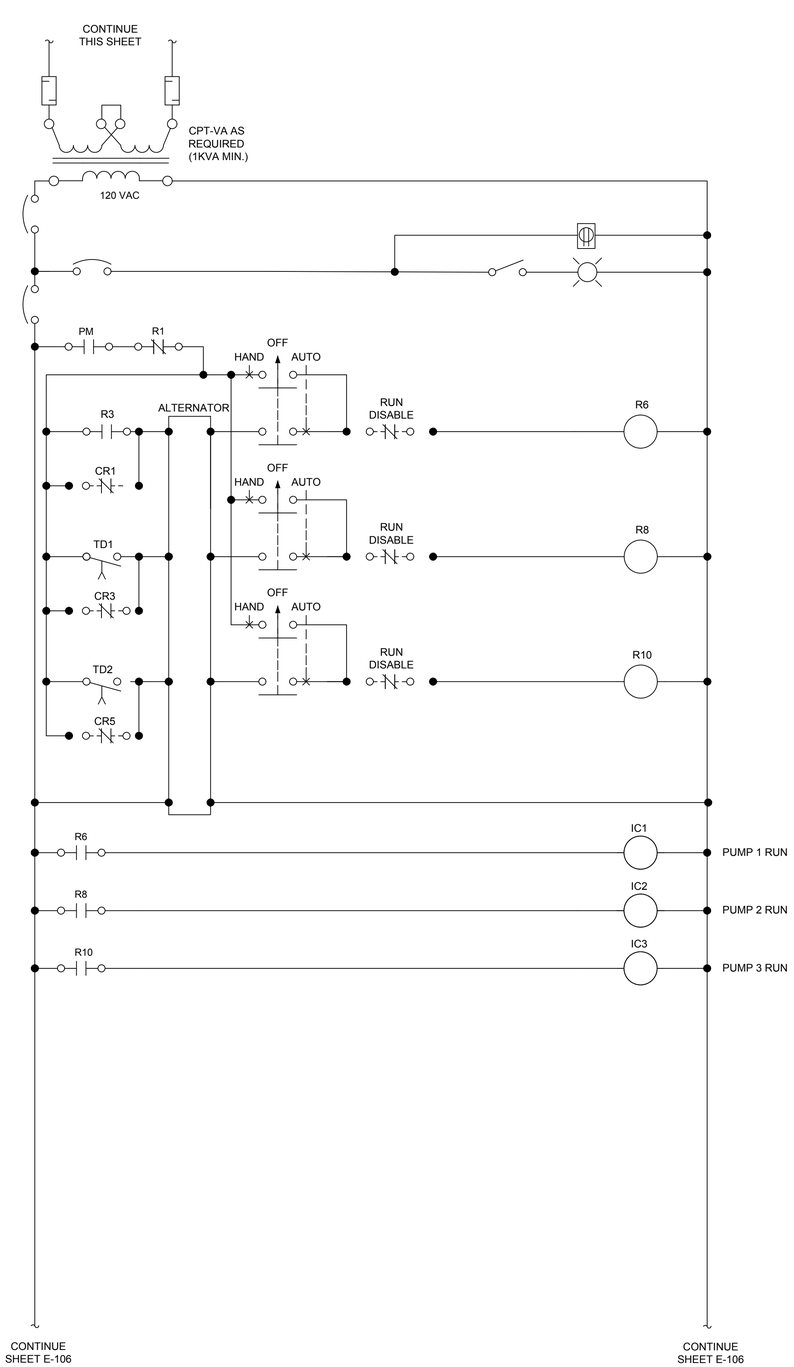
David A. Burger, P.E.
FLA. LIC. NO. 47146

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: E-201

P:\IER\144726\200-144726-17002\CAD\sheetfiles\E-201 SINGLE LINE.dwg, Jun 09, 2018 - 4:34pm





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REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED JAS
DRAWN JAS
CHECKED DAB

Pinellas County

PROJECT:
PUMP STATION 079
REPLACEMENT

DESCRIPTION:
PUMP CONTROL
PANEL WIRING
DIAGRAM

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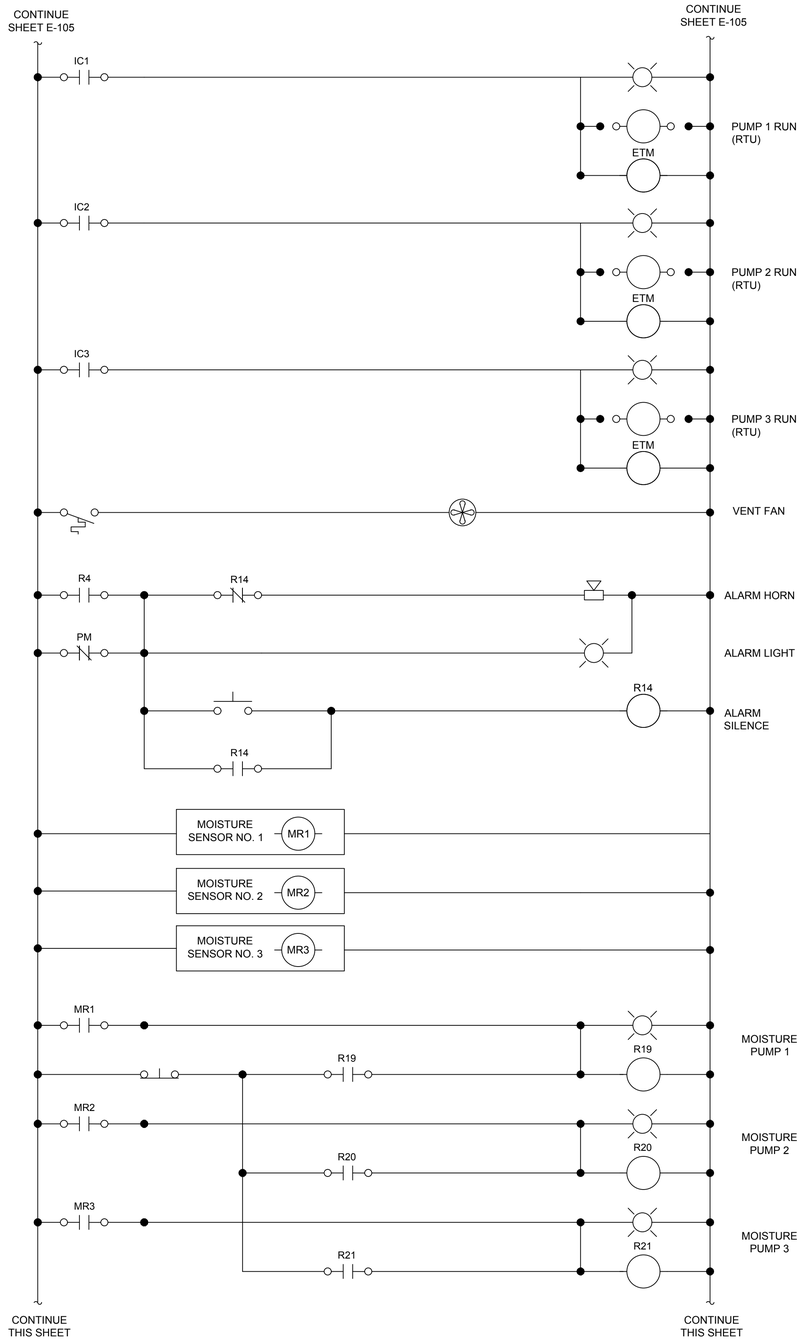
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

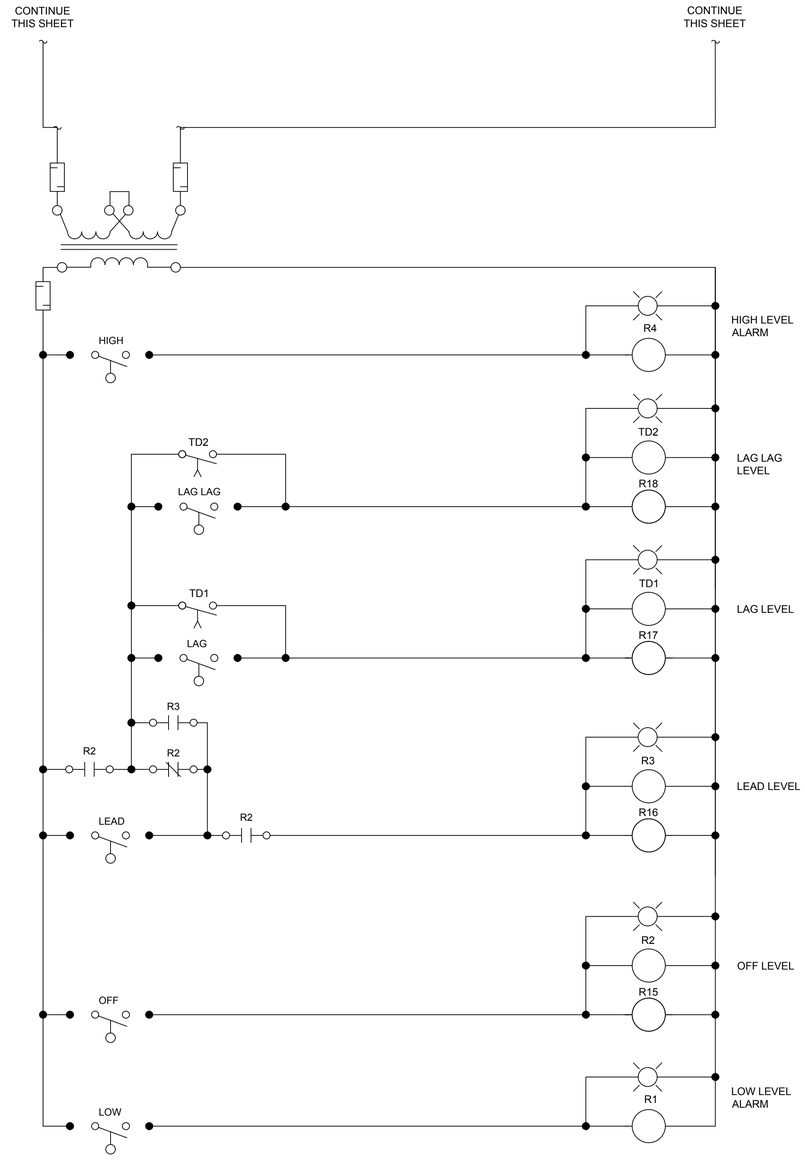
APPROVED BY:

David A. Burger, P.E.
FLA. LIC. NO. 47146

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: E-202





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REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED JAS
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CHECKED DAB

Pinellas County

PROJECT:
PUMP STATION 079 REPLACEMENT

DESCRIPTION:
PUMP CONTROL PANEL WIRING DIAGRAM

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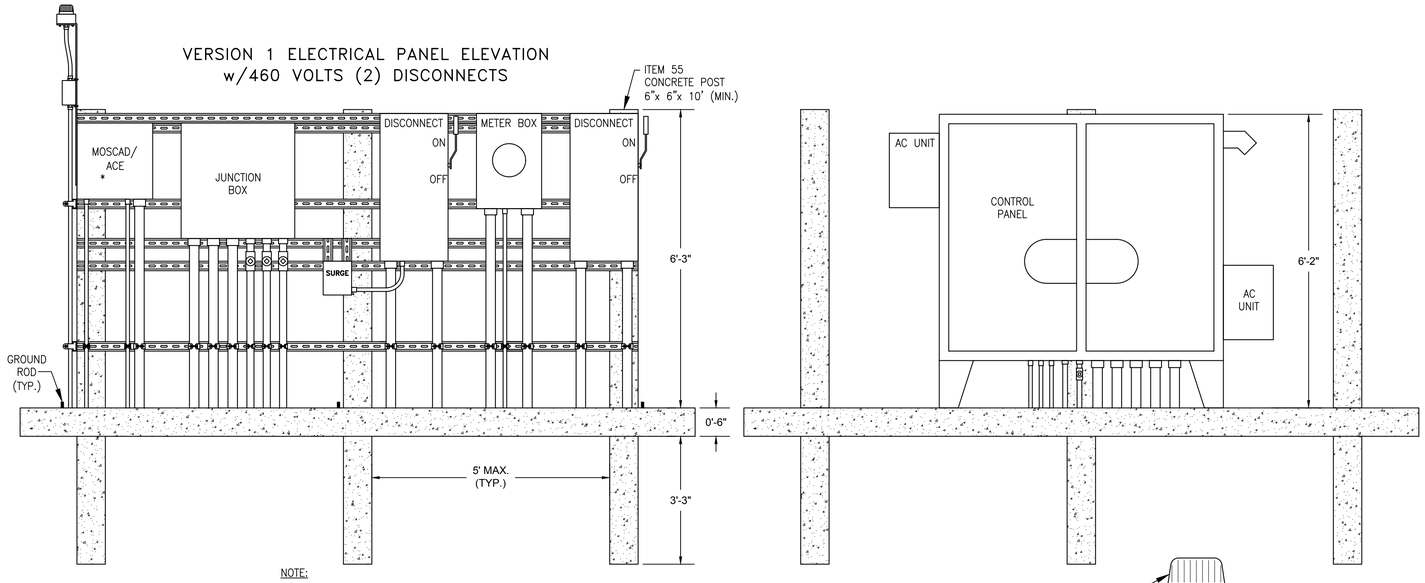
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

APPROVED BY:

David A. Burger, P.E.
FLA. LIC. NO. 47146

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: E-203

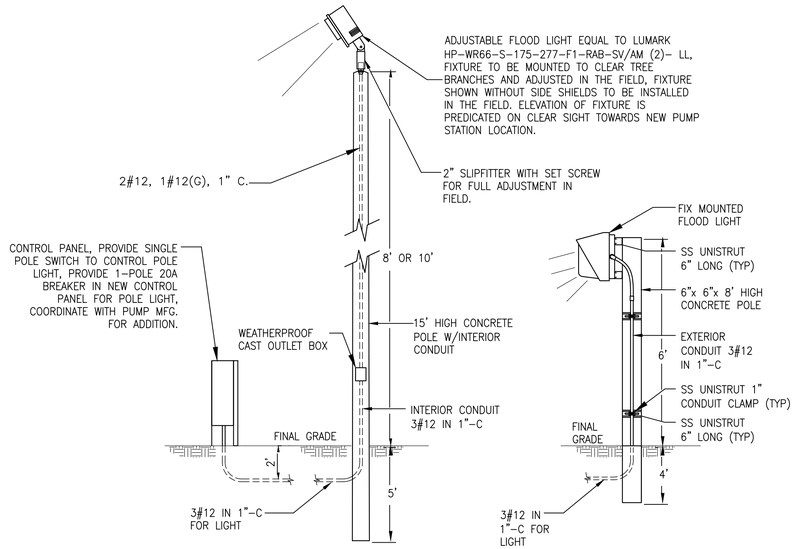


NOTE:

1. THE PANEL CONFIGURATIONS SHOWN ON THESE PLANS DO NOT INCLUDE ALL CONFIGURATIONS. PANEL CONFIGURATION SUBJECT TO SITE CONDITIONS.

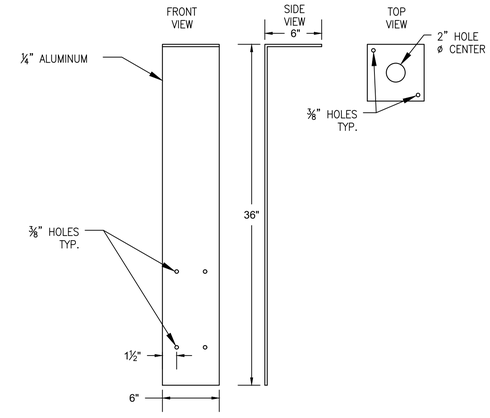
ELECTRICAL PANEL ELEVATIONS

NOT TO SCALE

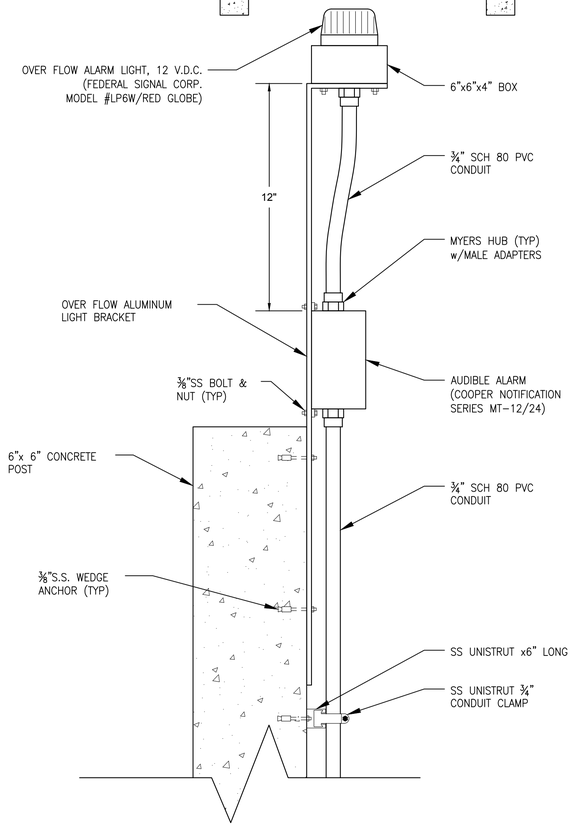


SERVICE LIGHT-DETAIL

NOT TO SCALE

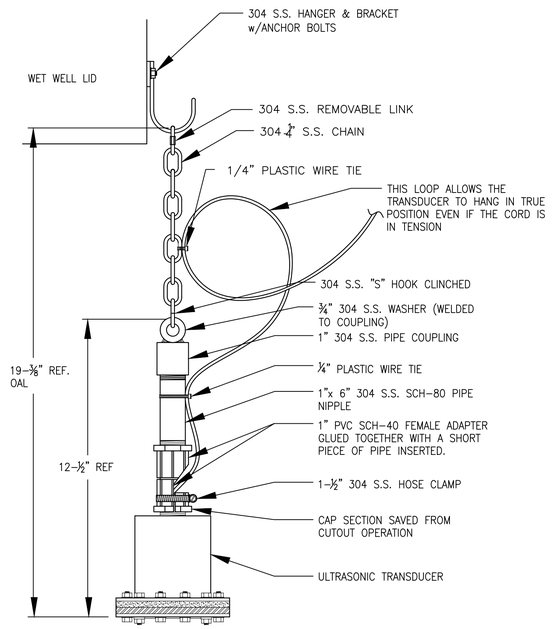


OVER FLOW ALUMINUM LIGHT BRACKET



OVER FLOW LIGHT AND ALARM DETAIL

ITEM PS-56
NOT TO SCALE



TYPICAL ULTRASONIC TRANSDUCER DETAIL
LEVEL SENSOR (GREYLINE OR HYDRO RANGER)

ITEM PS-58
NOT TO SCALE

REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED JAS
DRAWN JAS
CHECKED DAB

Pinellas County

PROJECT: PUMP STATION 079 REPLACEMENT

DESCRIPTION: ELECTRICAL DETAILS

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

APPROVED BY:

David A. Burger, P.E.
FLA. LIC. NO. 47146

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: E-501

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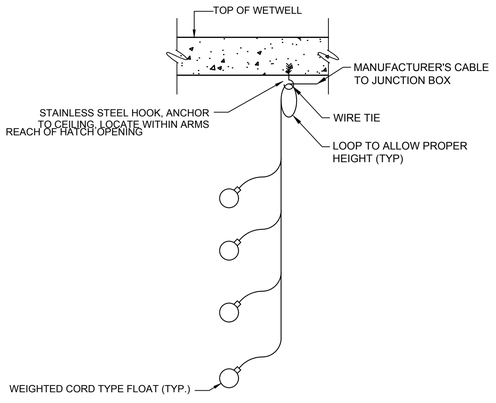

HANGING FLOAT SWITCHES DETAIL

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REV. NO.	DATE	DESCRIPTION	REV. BY

DESIGNED JAS
DRAWN JAS
CHECKED DAB

Pinellas County

PROJECT:
PUMP STATION 079
REPLACEMENT

DESCRIPTION:
ELECTRICAL
DETAILS

TETRA TECH
www.tetratech.com
5201 W KENNEDY BLVD, STE. 620
TAMPA, FLORIDA 33609
PHONE: (813) 579-5107

APPROVED BY:

David A. Burger, P.E.
FLA. LIC. NO. 47146

DATE

DATE: DECEMBER 2017
PROJECT NO. 200-144726-17002
SHEET: E-502

TECHNICAL SPECIFICATIONS

For

PUMP STATION 079 REPLACEMENT

(County PID.: 003205A)

PREPARED FOR:

PINELLAS COUNTY ENGINEERING DIVISION
14 SOUTH FORT HARRISON AVENUE
CLEARWATER, FL 33756

PREPARED BY:

TETRA TECH, INC.
5201W KENNEDY BOULEVARD, SUITE 620
TAMPA, FL 33609

100% SUBMITTAL

January 2018

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

SECTION 00 75 00

SPECIAL PROVISIONS AND SUPPLEMENTAL TECHNICAL SPECIFICATIONS

These Special Provisions provide additional information and modify the Pinellas County Standard Technical Specifications (PC-STS) for Utilities Construction. Unless noted herein, all conditions of the (STS) apply.

ARTICLE SP-1 SUMMARY OF WORK

The project consists of replacing existing triplex Pump Station (PS) 079 located southeast of the maintenance facility at 190 173rd Avenue N. North Redington Beach, FL 33708 to west of the maintenance facility.

ARTICLE SP-2 SPECIAL PROVISIONS

ARTICLE SP-3 ADDITIONAL INFORMATION AND STUDIES

ARTICLE SP-4 SUPPLEMENTAL TECHNICAL SPECIFICATIONS.

Note: The Supplemental Technical Specifications presented herein are project specific, are only related to this project and are not part of Pinellas County Standard Technical Specifications (STS). All STS will be designated as such in lower right hand corner of document by Pinellas County-STS. All Supplemental Technical Specifications will have a **(S)** designation following the section title in the Table of Contents and each specification will be designated in lower right hand corner as PCU-XXXX, where XXXX designates the specific Project Job Number.

00 75 00	Special Provisions and Supplemental Technical Specifications **(S)**
01 11 00	Summary of Project **(S)**
01 20 01	Measurement and Payment **(S)**
01 29 73	Schedule of Value **(S)**
01 30 10	Construction Shcedule **(S)**
01 33 00	Shop Drawings, Working Drawings, and Sample **(S)**
01 70 00	Contract Close Out **(S)**
01 78 36	Warranties and Bonds **(S)**
02 41 00	Demolition **(S)**

03 30 00	Cast-In-Place Concrete **(S)**
03 48 00	Precast Concrete Structures **(S)**
03 60 00	Grout **(S)**
03 80 00	Leakage Testing of Water Retaining Structures **(S)**
22 05 29	Pipe Hangers and Supports for Process Piping **(S)**
26 05 00	Common Work Results for Electrical **(S)**
26 05 19	Low-Voltage Electrical Power Conductors and Cables **(S)**
26 05 26	Grounding and Bonding for Electrical Systems **(S)**
26 05 29	Hangers and Supports for Electrical Systems **(S)**
26 05 33	Raceway and Boxes for Electrical Systems **(S)**
26 05 53	Identification for Electrical Systems **(S)**
26 28 16	Enclosed Switches and Circuit Breakers **(S)**
26 29 23	Variable-Frequency Motor Controllers **(S)**
26 32 13	Transfer Switches **(S)**
31 23 33	Excavation and Backfill for Pipes **(S)**
31 23 34	Excavation and Backfill for Structures **(S)**
32 83 00	Chain-link Fence and Gates **(S)**
33 10 00	Valves and Appurtenances **(S)**
33 53 00	Odor Control System **(S)**
40 05 00	Common Work Results for Process Integration **(S)**
40 91 23.36	Level Process Measurement Devices **(S)**
40 94 00	Digital Process Controllers **(S)**
40 95 13	Process Control Panels and Hardware **(S)**
40 97 20	Flow Process Measurement Devices **(S)**
40 91 00	Flow Measurement Devices **(S)**

ARTICLE SP-5 MODIFICATIONS TO THE STANDARD TECHNICAL SPECIFICATIONS

1. 01 57 00 Control of Work

A. Paragraph 1.13, Not Applicable

B. Part 3 – Execution, Add:

Working hours: 7am to 6pm, Monday through Friday. Saturday work requires verbal approval and a 24-hour notice. Sunday and holiday work requires written

approval. The Contractor shall make the request to work weekends and/or holidays at least 24 hours in advance. Weekday (M-F) overtime work acceptable if the work performed does not require immediate inspection and the County has granted approval

2. 01 35 00

A. Add:

1.03 L "Taking Existing Wastewater Gravity Systems Out of Service

1. Existing wastewater gravity pipelines shall be taken out of service when indicated on the Construction Drawings. When lines are taken out of service, backfill the line with flowable fill (FDOT Standard Specifications for Road and Bridge Construction Section 121) or grout if the line is not removed.

2. Existing wastewater systems to be taken out of service shall be plugged only upon approval of the Owner's representative."

TECHNICAL SPECIFICATION CHECKLIST

Project Name:	Pump Station 079 Replacement
Project Number:	003205A

The following sections of the Standard Technical Specifications will apply to this contract if marked "X" as shown below:

00 75 00		Special Provisions and Supplemental Technical Specifications
01 32 33	X	Color Audio-Video Construction Records
01 35 00	X	Special Project Procedures
01 42 01	X	Reference Standards and Definitions
01 45 17	X	Pipeline Testing Requirements
01 55 26	X	Traffic Regulation
01 57 00	X	Control of Work
01 57 13	X	Erosion and Sedimentation Control
01 58 01	X	Project Identification Signs
01 78 39	X	Project Record Documents
03 10 01		Concrete Materials
09 91 00	X	Painting and Protective Coatings
31 23 33		Excavation and Backfill for Pipes
31 23 34		Excavation and Backfill for Structures
32 12 01	X	Stabilized and Asphalt Roadway Restoration
32 13 01	X	Concrete Sidewalks, Driveways and Gutters
32 92 01	X	Seeding and Sodding
33 01 31	X	Sanitary Sewer Cured in Place Pipelining
33 01 32	X	Sanitary Sewer Cleaning and Televising
33 01 33		Manhole Rehabilitation
33 01 34		Sanitary Sewer Pipe Repairs
33 01 35		Multi-Component Stress Panel Manhole Liner System
33 01 36		Urethane/Epoxy, Polyurea Manhole Liner System
33 01 37		Polyurethane Manhole Liner System
33 01 38		Polymorphic Resin Manhole Liner System
33 01 39		Calcium Aluminate Manhole Liner System
33 01 40		CIPP Structural Lateral Connection Lining
33 05 20		Jacking and Boring
33 05 21		Horizontal Directional Drilling
33 05 22		Horizontal Directional Drilling – Subaqueous Crossings and Large Diameter Installations
33 11 01		Potable Water Main Piping and Appurtenances
33 13 01		Disinfection of Potable Water Mains
33 32 00	X	Submersible Wastewater Pumping Stations

33 33 01	X	Gravity Sewers
33 34 00	X	Sanitary Sewage Force Mains and Appurtenances
33 35 01		Reclaimed Water Main Piping and Appurtenances
33 39 00	X	Sanitary Utility Sewerage Structures
40 95 01	X	Wastewater Pump Station Scada Remote Telemetry Unit (RTU)
48 11 30		Standby Diesel Generators
13 34 19		Metal Building Systems

1 END OF SECTION

SECTION 01 11 00

SUMMARY OF PROJECT

PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. This Contract is for the Pinellas County Pump Station No. 079 as specified herein. The Work consists of furnishing all labor, equipment, and materials for the construction of the facilities consisting of, but not limited to, the following:

1. Removal and disposal of existing wet well, valve and maintenance vaults, fuel tank, gravity sewer, curbs, and manholes.

2. Abandonment of gravity sewer.

3. Relocation of generator, electrical boxes, buried electric, fencing, and flow meters.

4. Bypass pumping.

5. Installation of one (1) odor control cast-in-place concrete pad, one (1) fuel tank cast-in-place concrete pad, one (1) generator cast-in-place concrete pad, one (1) electrical control panel cast-in-place concrete pad, eight (8) sanitary sewer manholes, one (1) cast-in-place wet well, one (1) precast valve vault, one (1) precast meter vault, one (1) bypass assembly, approximately 250 LF of gravity sewer piping, approximately 130 LF of sanitary force main, one (1) odor control unit, one (1) magnetic flow meter, one (1) ultrasonic flow meter, one (1) new generator fuel tank, and all other items shown on the Drawings or specified herein.

1.02 CONTRACTOR'S USE OF PREMISES

A. The Contractor shall assume full responsibility for the protection and safekeeping of products and materials at the job site. If additional storage

or work areas are required, they shall be obtained by the Contractor at no additional cost to the Owner.

1.03 PROJECT SEQUENCE

A. The Contractor shall establish his work sequence based on the use of crews to facilitate completion of construction and testing within the specified Contract Time. The proposed project sequence, including Contractor's plans for provision of temporary facilities, shall be submitted to the Engineer prior to construction.

B. All tie-ins to existing utilities shall be coordinated with and approved by the Owner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 20 01

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.01 GENERAL INFORMATION

A. Payment will be made only for the items of work described and listed on the Bid Form. Any related work not specifically listed, but required for satisfactory completion of the work, shall be considered to be included in the scope of the appropriate listed work items unless specifically called out as a separate Pay Item. No separate payment will be made for the following items and the cost of such work shall be included in the applicable Pay Items or work:

1. Clean-up and site restoration.

2. Hydrostatic pressure or leak testing of gates or structures

3. All materials testing required to verify proper construction and installation in accordance with these specifications or standard engineering practice, including but not limited to: concrete density (density tests and cylinder breaks). All such testing shall be by an independent testing laboratory acceptable to the ENGINEER engaged by and at the expense of the CONTRACTOR.

4. Coordination of equipment requirements between individual systems and vendors, testing and placing each system in operation.

5. Submittal, record drawings, operations and maintenance manuals for each system of new equipment to adequately demonstrate proper operation and manufacturer's training of operations personnel.

6. COUNTY is to operate facility at all times. CONTRACTOR to assure construction does not impede continuous operation of the facility.

7. Traffic control and all safety precautions required to minimize impact to typical plant operations.

8. Compliance with applicable construction and operating permit conditions.

9. Obtaining any additional permits required for completion of the work not previously obtained by the COUNTY/ENGINEER, as well as any required inspections by permitting agencies and associated fees.

B. BID ITEM NO. 1 – MOBILIZATION, DEMOBILIZTION, & GENERAL CONDITIONS

1. Description: The work associated with this item consists of the preparatory work and operations in mobilization for beginning work along with the activities normally involved in the ending of the project. Mobilization activities include, but are not limited to, operations necessary for the movement of personnel, equipment, and supplies to the project site, the costs of bonds and any required insurance, permits and other pre-construction expenses necessary for the start of the work, excluding the cost of materials and labor included in other pay items. Demobilization activities include, but are not limited to, termination and removal of temporary utility services; restoration of contractor's storage and staging area; disposal of trash and rubbish and any other post construction work necessary for the proper conclusion of the work.

2. Measurement: The quantity under this item shall be measured as one (1) lump sum quantity.

3. Payment: Payment for mobilization will be made at such time when the CONTRACTOR has completed mobilization and will not exceed 75% of the lump sum bid amount for Bid Item No. 1. Payment for demobilization will be made at such time when the CONTRACTOR has completed demobilization and the work is completed in its entirety.

C. BID ITEM NO. 2 – DEMOLITION OF EXISTING STRUCTURES

1. Description: The work associated for this item includes, but is not limited to, all material, equipment, and work required to remove, abandon, and/or replace existing equipment, piping, manholes, and structures as shown on or inferred by the Contract Documents and will be made at the contract lump sum price. Contractor shall provide line item breakdown of specific work and associated costs.

2. Measurement: Measurement for this Lump Sum bid item shall be based on a percentage complete in accordance with the Contract Documents. Percent complete will be based upon progress of construction of specific items outlined in the approved Schedule of Values.

3. Payment: The quantity of work described under this description shall be paid in the units of measurement as agreed and approved in writing. The total of which shall not exceed the amount listed on the Bid Form for Work, completed and accepted.

D. BID ITEM NO. 3 – GRAVITY SEWER SYSTEM AND TEMPORARY BYPASS PUMPING

1. Description: The work associated for this item includes, but is not limited to, all material, equipment, and work required to install new gravity sewer, manholes, and put into place temporary bypass pumping as shown on or inferred by the Contract Documents and will be made at the contract lump sum price. Contractor shall provide line item breakdown of specific work and associated costs.

2. Measurement: Measurement for this Lump Sum bid item shall be based on a percentage complete in accordance with the Contract Documents. Percent complete will be based upon progress of construction of specific items outlined in the approved Schedule of Values.

3. Payment: The quantity of work described under this description shall be paid in the units of measurement as agreed and approved in writing. The total of which shall not exceed the amount listed on the Bid Form for Work in place, completed and accepted.

E. BID ITEM NO. 4 – SANITARY FORCE MAIN AND APPURTENANCES

1. Description: The work associated for this item includes, but is not limited to, all material, equipment, and work required to install new sanitary force main and appurtenances as shown on or inferred by the Contract Documents and will be made at the contract lump sum price. Contractor shall provide line item breakdown of specific work and associated costs.

2. Measurement: Measurement for this Lump Sum bid item shall be based on a percentage complete in accordance with the Contract Documents. Percent complete will be based upon progress of construction of specific items outlined in the approved Schedule of Values.

3. Payment: The quantity of work described under this description shall be paid in the units of measurement as agreed and approved in writing. The total of which shall not exceed the amount listed on the Bid Form for Work in place, completed and accepted.

F. BID ITEM NO. 5 – PRECAST VALVE AND METER VAULT

1. Description: The work associated for this item includes, but is not limited to, all material, equipment, and work required to install new precast valve and meter vault, top slabs, and hatches as shown on or inferred by the Contract Documents and will be made at the contract lump sum price. Contractor shall provide line item breakdown of specific work and associated costs. The piping and appurtenances contained within the precast valve vault and meter vault shall be included in Bid Item No.4. Installation of the magnetic flow meter shall be included in Bid Item No. 5.

2. Measurement: Measurement for this Lump Sum bid item shall be based on a percentage complete in accordance with the Contract Documents. Percent complete will be based upon progress of construction of specific items outlined in the approved Schedule of Values.

3. Payment: The quantity of work described under this description shall be paid in the units of measurement as agreed and approved in writing. The total of which shall not exceed the amount listed on the Bid Form for Work in place, completed and accepted.

G. BID ITEM NO. 6 – CONCRETE WET WELL

1. Description: The work associated for this item includes, but is not limited to, all material, equipment, and work required to install new cast-in-place wet well, top slabs, hatches, liner, penetrations, sheeting, and excavation as shown on or inferred by the Contract Documents and will be made at the contract lump sum price. Contractor shall provide line item breakdown of specific work and associated costs.

2. Measurement: Measurement for this Lump Sum bid item shall be based on a percentage complete in accordance with the Contract Documents. Percent complete will be based upon progress of construction of specific items outlined in the approved Schedule of Values.

3. Payment: The quantity of work described under this description shall be paid in the units of measurement as agreed and approved in writing. The total of which shall not exceed the amount listed on the Bid Form for Work in place, completed and accepted.

H. BID ITEM NO. 7 – SUBMERSIBLE PUMPS AND PUMP STATION EQUIPMENT

1. Description: The work associated for this item includes, but is not limited to, all material, equipment, and work required to install new submersible wastewater pumps and pump station equipment as shown on or inferred by the Contract Documents and will be made at the contract lump sum price. Contractor shall provide line item breakdown of specific work and associated costs. Pump station equipment includes, but is not limited to, the pump discharge connection, draw tube, level floats, bubbler, flush valve, guide rails and appurtenances, vents, and flow stabilizer. All piping and appurtenances receiving flow after contact with the pump is considered sanitary force main and should be included in Bid Item No. 4.

2. Measurement: Measurement for this Lump Sum bid item shall be based on a percentage complete in accordance with the Contract Documents. Percent complete will be based upon progress of construction of specific items outlined in the approved Schedule of Values.

3. Payment: The quantity of work described under this description shall be paid in the units of measurement as agreed and approved in writing. The total of which shall not exceed the amount listed on the Bid Form for Work in place, completed and accepted.

I. BID ITEM NO. 8 – ODOR CONTROL SYSTEM

1. Description: The work associated for this item includes, but is not limited to, all material, equipment, and work required to install a new odor control system, piping, appurtenances, and testing as shown on or inferred by the Contract Documents and will be made at the contract lump sum price. Contractor shall provide line item breakdown of specific work and associated costs. The cast-in-place concrete pad for the odor control system shall be included in Bid Item No. 9.

2. Measurement: Measurement for this Lump Sum bid item shall be based on a percentage complete in accordance with the Contract Documents. Percent complete will be based upon progress of construction of specific items outlined in the approved Schedule of Values.

3. Payment: The quantity of work described under this description shall be paid in the units of measurement as agreed and approved in writing. The total of which shall not exceed the amount listed on the Bid Form for Work in place, completed and accepted.

J. BID ITEM NO. 9 – Concrete and Concrete Pads

1. Description: The work associated for this item includes, but is not limited to, all material, equipment, and work required to install cast-in-place concrete pads, driveways, curbs and gutters, and any concrete not required for the wet well (Bid Item No. 6) or precast meter vault (Bid Item No. 5) as shown on or inferred by the Contract Documents and will be made at the contract lump sum price. Contractor shall provide line item breakdown of specific work and associated costs.

2. Measurement: Measurement for this Lump Sum bid item shall be based on a percentage complete in accordance with the Contract Documents. Percent complete will be based upon progress of construction of specific items outlined in the approved Schedule of Values.

3. Payment: The quantity of work described under this description shall be paid in the units of measurement as agreed and approved in writing. The total of which shall not exceed the amount listed on the Bid Form for Work in place, completed and accepted.

K. BID ITEM NO. 10 – PAINTING & COATING

4. Description: The work associated for this item includes, but is not limited to, all material, equipment, and work required to paint and coat structures and equipment as shown on or inferred by the Contract Documents and will be made at the contract lump sum price. Contractor shall provide line item breakdown of specific work and associated costs.

5. Measurement: Measurement for this Lump Sum bid item shall be based on a percentage complete in accordance with the Contract Documents. Percent complete will be based upon progress of construction of specific items outlined in the approved Schedule of Values.

6. Payment: The quantity of work described under this description shall be paid in the units of measurement as agreed and approved in writing. The total of which shall not exceed the amount listed on the Bid Form for Work in place, completed and accepted.

L. BID ITEM NO. 11 – ELECTRICAL

1. Description: The work associated for this item includes, but is not limited to, all material, equipment, and work required to furnish and install electrical items as shown on or inferred by the Contract Documents and will be made at the contract lump sum price. Contractor shall provide line item breakdown of specific work and associated costs.

2. Measurement: Measurement for this Lump Sum bid item shall be based on a percentage complete in accordance with the Contract Documents. Percent complete will be based upon progress of construction of specific items outlined in the approved Schedule of Values.

3. Payment: The quantity of work described under this description shall be paid in the units of measurement as agreed and approved in writing. The total of which shall not exceed the amount listed on the Bid Form for Work in place, completed and accepted.

M. BID ITEM NO. 12 – INSTRUMENTATION

1. Description: The work associated for this item includes, but is not limited to, all material, equipment, and work required to furnish and install instrumentation items as shown on or inferred by the Contract Documents and will be made at the contract lump sum price. Contractor shall provide line item breakdown of specific work and associated costs.

2. Measurement: Measurement for this Lump Sum bid item shall be based on a percentage complete in accordance with the Contract Documents. Percent complete will be based upon progress of construction of specific items outlined in the approved Schedule of Values..

3. Payment: The quantity of work described under this description shall be paid in the units of measurement as agreed and approved in writing. The total of which shall not exceed the amount listed on the Bid Form for Work in place, completed and accepted.

N. BID ITEM NO. 13 – OWNER'S CONTINGENCY

1. Description: The Owner's Contingency shall be an allowance for miscellaneous work associated with the work in this contract and shall apply only to additional items over and above those included in the Contract Documents. This Owner's Contingency will not be used for costs associated with work that is included in the documents or required to meet the intent of the Contract Documents.

2. Measurement: The maximum quantity under this item shall be measured as ten-percent (10%) of Bid Items No. 1 thru Bid Items No. 12. For Lump Sum and Unit Price items, the lump sum price will be determined by negotiation, requiring written approval by the City's representatives. Unit price items will be measured by measurement (e.g., vertical feet) or per each.

3. Payment: Payment for work not accounted for in the project costs by the Contractor but required according to the Contract Documents or Intent of the design will not be considered for payment. Payment will be paid based on Owner approved change order or written authorization. Any unused amounts of the Owners Contingency will be retained by the Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 29 73

SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Submit to the Engineer a Schedule of Values allocated to the various portions of the Work as described in the bid form, at the Pre-Construction Conference.

2. Upon request of the Engineer support the values with data which will substantiate their correctness. The data shall include, but not be limited to quantity of materials, all sub-elements of the activity, and their units of measure.

3. The Schedule of Values shall establish the actual value for each activity of the Work to be completed taken from the Critical Path Method (CPM) Construction Schedule, and shall be used as the basis for the Contractor's Applications for Payment.

1.02 FORM AND CONTENT OF SCHEDULE OF VALUES

A. Type schedule on 8-1/2 inch x 11 inch white paper. Contractor's standard forms and computer printouts may be considered for approval by the Engineer upon Contractor's request. Identify schedule with:

1. Title of project and location.

2. Owner and purchase order number.

3. Engineer and project number.

4. Name and address of Contractor.

5. Contract designation.

6. 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 item prices for progress payments during construction.

C. Identify each line item with the number and the title of the respective section of the Specifications.

D. For each major item of the Work, list sub-values of major products or operations under the major item.

E. For the various portions of the Work:

1. The amount for each item shall reflect a total installed cost including 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. Payment for materials shall be limited to the invoiced amount only.

b. The total installed value.

F. Round off figures to nearest dollar amount.

G. The sum of the costs of all items listed in the schedule shall equal the total Contract Price.

H. For each item which has an installed value of more than $15,000, provide a breakdown of costs to list major products or operations under each item.

1.03 SUBSCHEDULE OF UNIT MATERIAL VALUES

A. Submit a separate schedule of unit prices for materials to be stored on site and for those materials incorporated into the Work for which progress payments will be requested.

B. 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 paid invoices for component material shall be included with the payment request in which the material first appears.

C. Only materials unique to the project may be billed when stored on site. Materials of standard use such as conduit, wire, small-diameter pipe, steel, etc., shall not be accepted for payment.

D. The installed unit value multiplied by the quantity listed shall equal the cost of that item in the Schedule of Values.

1.04 REVIEW AND RESUBMITTAL

A. After review by Engineer, revise and resubmit Schedule of Values and Schedule of Unit Material Values as required.

B. Resubmit revised schedules in same manner.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 30 10

CONSTRUCTION SCHEDULE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Promptly after award of the Contract, prepare and submit to the Engineer estimated construction progress schedules demonstrating complete fulfillment of all Contract requirements utilizing a Critical Path Method (hereinafter referred to as CPM) in planning, coordinating, and performing the Work under this Contract (including all activities of subcontractors, equipment vendors, and suppliers). The principles and definition of CPM terms used herein shall be as set forth in the Associated General Contractors of America (AGC) publication, The Use of CPM in Construction, A Manual for General Contractors and the Construction Industry, Copyright 1976, but the provisions of this Specification shall govern the planning, coordinating, and performance of the Work.

2. Submit revised progress schedules on a monthly basis. No partial payments shall be approved until there is an updated construction progress schedule on hand.

B. Related Requirements Described Elsewhere:

1. Summary of Project: Section 01 11 00.

2. Shop Drawings, Working Drawings, & Samples: Section 01 33 00.

1.02 QUALIFICATIONS

A. A statement of computerized CPM capability shall be submitted and shall verify that either Contractor's organization has in-house capability to use the CPM technique or that Contractor will employ a CPM consultant who is so qualified.

1.03 FORM OF SCHEDULES

A. Prepare schedules in the form of a horizontal bar chart.

1. Provide a separate horizontal bar for each trade or operation within each structure or item.

2. Horizontal time scale:

   a. Show starting and completion dates for each activity in terms of the number of days after Notice to Proceed. All completion dates shown shall be within the period specified for contract completion.

   b. Identify the first work day of each month.

3. Scale and Spacing: Sufficient to allow space for notations and future revisions.

4. Maximum Sheet Size: 24 inches by 36 inches.

B. Format of Listings: The chronological order of the start of each item of work for each structure.

C. Identification of Listings: By major specification section numbers as applicable and by structure.

D. Construction Progress Schedules shall be computer generated using software equal to Primavera Project Planner for Windows by Primavera Systems, Inc., Bala Cynwyd, P.A., Microsoft Project, or approved equal.

1.04 CONTENT OF SCHEDULES

A. Construction Progress Schedule:

1. Show the complete sequence of construction by activity and by structure.

2. Show the dates for the beginning and completion of each major element of construction in no more than a two (2) week increment scale.

3. Show projected percentage of completion for each item, as of the first day of each month.

4. Show projected dollar cash flow requirements for each month of construction and for each activity as indicated by the approved Schedule of Values.

B. Submittals for construction progress schedules shall be in accordance with Section 01 33 00: Shop Drawings, Work Drawings, and Samples. Indicate on the schedule the following:

1. The dates for Contractor's submittals.

2. The dates submittals will be required for Owner-furnished products, if applicable.

3. The dates approved submittals will be required from the Engineer.

C. A typewritten list of all long lead items (equipment, materials, etc.).

D. Failure to include any element of work required for the performance of this Contract shall not excuse the Contractor from completing all work required within any applicable completion date.

E. Scheduling Constraints: The work within Owner's property must be completed within the maximum number of days start to finish, as indicated in the Contract. Additionally, work must proceed on a continuous basis, without stoppages, except for nights and weekends. There shall be no lapses between phases of construction.

1.05 PROGRESS REVISIONS

A. Indicate progress of each activity to date of submission.

B. Show changes occurring since previous submission of schedule:

1. Major changes in scope.

2. Activities modified since previous submission.

3. Revised projections of progress and completion.

4. Other identifiable changes.

C. Provide a narrative report as needed to define:

1. Problem areas, anticipated delays, and the impact on the schedule.

2. Corrective action recommended, and its effect.

3. The effect of changes on schedules of other prime contractors.

D. If the Work falls behind the critical path schedule by two (2) weeks or more, the Contractor shall prepare a recovery schedule.

1.06 SUBMISSIONS

A. Submittal Requirements.

1. Logic network and/or time-phased bar chart, computer generated.

2. Narrative description of the logic and reasoning of the schedule.

B. Time of Submittals: Within ten (10) working days after Notice to Proceed, Contractor shall submit a network diagram describing the activities to be accomplished in the project and their dependency relationships, (predecessor/successor) as well as a tabulated schedule as herein defined. The total length of time indicated on the initial CPM schedule shall equal the exact number of days as defined in the Contract. The schedule produced and submitted shall also indicate calendar dates, including project starting and completion dates, based on the Contract Commencement and completion dates indicated in the Notice to Proceed. The Engineer will complete the review of the complete schedule within fifteen (15) working days after receipt. During the review process, the Engineer may meet with a representative of Contractor to review the proposed plan and schedule to discuss any clarifications that may be necessary.

C. Within ten (10) working days after the conclusion of the Engineer's review period, Contractor shall revise the network diagram as required and resubmit the network diagram and a tabulated schedule produced therefrom. The revised network diagram and tabulated schedule shall be reviewed and accepted or rejected by the Engineer within fifteen (15) working days after receipt. The network diagram and tabulated schedule, when accepted by the Engineer, shall constitute the project work schedule unless a revised schedule is required due to substantial changes in the Work, a change in Contract Time or a recovery schedule is required and requested.

D. Acceptance. The finalized schedule will be acceptable to the Engineer when, in the opinion of the Engineer, it demonstrates an orderly progression of the Work to completion in accordance with the Contract Documents. Such acceptance will neither impose on the Engineer responsibility for the progress or scheduling of the Work nor relieve Contractor from full responsibility therefore. The finalized schedule of shop drawing submittals will be acceptable to the Engineer when, in the

opinion of the Engineer, it demonstrates a workable arrangement for processing the submittals in accordance with the requirements. The finalized Schedule of Values (lump sum price breakdown), as applicable, will be acceptable to the Engineer as to form and content when, in the opinion of the Engineer, it demonstrates a substantial basis for equitably distributing the Contract Price. When the network diagram and tabulated schedule have been accepted, the Contractor shall submit to the Engineer six (6) copies of the time-scaled network diagram, six (6) copies of a computerized tabulated schedule in which the activities have been sequenced by numbers, six (6) copies of a computerized tabulated schedule in which the activities have been sequenced by early starting date, and six (6) copies of a computerized, tabulated schedule in which activities have been sequenced by total float, and six (6) copies sorted by predecessor/successor.

E. Revised Work Schedules. Contractor, if requested by the Engineer, shall provide a revised work schedule if, at any time, the Engineer considers the completion date to be in jeopardy because of "activities behind schedule." The revised work schedule shall include a new diagram and tabulated schedule conforming to the requirements of Paragraph 1.09 herein, designed to show how Contractor intends to accomplish the Work to meet the completion date. The form and method employed by Contractor shall be the same as for the original work schedule. No payment will be made if activities fall more than two (2) weeks behind schedule and a revised work schedule is not furnished.

F. Schedule Revisions. The Engineer may require Contractor to modify any portions of the work schedule that become infeasible because of "activities behind schedule" or for any other valid reason. An activity that cannot be completed by its original latest completion date shall be deemed to be behind schedule. No change may be made to the sequence, duration, or relationships of any activity without approval of the Engineer.

1.07 DISTRIBUTION

A. Distribute copies of the reviewed schedules to:

1. Engineer.

2. Jobsite file.

3. Subcontractors.

4. Other concerned parties.

5. Owner (two copies).

B. Instruct recipients to report promptly to the Contractor, in writing, any problems anticipated by the projections shown in the schedules.

1.08 CHANGE ORDERS

A. Upon approval of a change order, the approved changes shall be reflected in the next scheduled revision or update submittal of the construction progress schedule by the Contractor.

1.09 CPM STANDARDS

A. CPM, as required by this Section, shall be interpreted to be generally as outlined in the Associated General Contractor's (AGC) publication, The Use of CPM in Construction, A Manual for General Contractors and the Construction Industry, Copyright 1976.

B. Work schedules shall include a graphic network and computerized, tabulated schedules as described below. To be acceptable the schedule must demonstrate the following:

1. A logical succession of work from start to finish.

2. Definition of each activity. Activities shall be identified by major specification section numbers, as applicable, and by major structure.

3. A logical flow of work crews/equipment (crews are to be defined by manpower category and man-hours; equipment by type and hours).

4. Show all work activities and interfaces including submittals as well as major material and equipment deliveries.

C. Networks.

1. The CPM network, or diagram, shall be in the form of a time-scaled diagram of the customary activity-on-type and may be divided into a number of separate pages with suitable notation relating the interface points among the pages. Notation on each activity line shall include a brief work description and a duration, as described in Paragraph 1.09, D. herein.

2. All construction activities and procurement shall be indicted in a time-scaled format, and a calendar shall be shown on all sheets along the entire sheet length. Each activity arrow shall be plotted so the beginning and completion dates of said activity can be determined graphically by comparison with the calendar scale. All activities shall be shown using the symbols that clearly distinguish between critical path activities, non-critical path activities, and float for each non-critical activity. All non-critical path activities shall show estimated performances time and float time in scaled form.

D. The duration indicated for each activity shall be in calendar days and shall represent the single best time considering the scope of the work and resources planned for the activity including time for inclement weather. Except for certain non-labor activities, such as curing concrete or delivering materials, activity durations shall not exceed fourteen (14) days nor be less than one (1) day unless otherwise accepted by the Engineer.

E. Tabulated Schedules. The initial schedule shall include the following minimum data for each activity.

1. Activity Beginning and Ending Numbers (i-j numbers) (single activity numbers may be used).

2. Duration.

3. Activity Description.

4. Early Start Date (Calendar Dated).

5. Late Start Date (Calendar Dated).

6. Early Finish Date (Calendar Dated).

7. Late Finish Date (Calendar Dated).

8. Identified Critical Path.

9. Total Float (Note: No activity may show more than 20 days float).

10. Cost of Activity.

11. Equipment Hours, by type; Man-Power Hours, by crew or trade.

F. Project Information. Each tabulation shall be prefaced with the following summary data.

1. Project Name.

2. Contractor.

3. Type of Tabulation (Initial or Updated).

4. Project Duration.

5. Project Scheduled Completion Date.

6. Effective or Starting Date of the Schedule.

7. New Project Completion Date and Project Status (if an updated or revised schedule).

8. Actual Start Date and Actual Finish Date (for all updated schedules.)

1.10 SCHEDULE MONITORING

A. At not less than monthly intervals or when specifically requested by Engineer, Contractor shall submit to the Engineer a computer printout of an updated schedule for those activities that remain to be completed. Typically, the updated schedule will be submitted with the application for payment as specified below.

B. The updated schedule shall be submitted in the form, sequence, and number of copies requested for the initial schedule.

1.11 PROGRESS MEETINGS

For the monthly progress meeting, Contractor shall submit a revised CPM schedule and a three-week look-ahead schedule, showing all activities completed, in progress, uncompleted, or scheduled to be worked during the weeks. The three weeks include the current week plus the next two weeks. All activities shall be from the approved CPM and must be as shown on the CPM unless behind or ahead of schedule. One copy of the revised CPM schedule shall be submitted with each copy of that month's application for payment, six (6) copies minimum.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 33

COLOR AUDIO-VIDEO CONSTRUCTION RECORDS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Audio/Video DVDs of all work areas in the Contract shall be prepared by the Contractor.

B. Contractor To Prepare Audio/Video Recording - Prior to commencing the Work, the Contractor shall have a continuous color audio/video recording taken along the entire length of the Project including all affected project areas. Streets, easements, rights-of way, lots or construction sites within the Project must be recorded to serve as a record of pre-construction conditions. Two copies of the recordings and video log shall be submitted to the County. The ENGINEER shall designate those areas, if any, to be omitted from or added to the audio-visual coverage. All DVDs and written records shall become property of the County.

C. Scheduling Of Audio/Video Recording - No construction shall begin prior to review and approval of the recordings covering the Project construction area(s) by the County. The County shall have the authority to reject all or any portion of a recording not conforming to specifications and order that it be redone at no additional charge. The Contractor shall reschedule unacceptable coverage within seven days after being notified. Recordings shall not be made more than 30 days prior to construction in any area.

D. Professional Videographers - The Contractor shall engage the services of a professional videographer known to be skilled and regularly engaged in the business of preconstruction color audio-video documentation. The videographer through the Contractor shall furnish to the Engineer a list of all equipment to be used for the audio-video recording, i.e., manufacturer’s name, model number, specifications and other pertinent information.

E. Additional information to be furnished by the videographer is the names and addresses of two references that the videographer has performed color audio-video taping for on projects of a similar nature within the last 12 months. Engineer’s approval of the selected videographer is required prior to taking first audio-video recording.

F. Equipment - All equipment, accessories, materials and labor to perform this service shall be finished by the Contractor. The total audio-video

system shall reproduce bright, sharp, clear pictures with accurate colors and shall be free from distortion, tearing, rolls or any other form of imperfection. The audio portion of the recording shall reproduce the commentary of the camera operator with proper volume, clarity and be free from distortion and interruptions. In some instances, audio-video coverage may be required in areas not accessible by conventional wheeled vehicles. Such coverage shall be obtained by walking. The color video camera used in the recording shall be of Industrial Grade and shall have EIA Standard NTSC type color - 1.0V 75 OHMS. Video output from camera shall be capable of horizontal resolution of 350 lines at center and utilize a minimum of 8:1 zoom with a 2/3" Newvicon tube or CCD pick-up element for optimum color imagery plus minimum lag through of one foot candle. The recording shall be transferred to DVDs compatible for playback with any Region 1 American TV Standard DVD player.

G. Recorded Information, Audio - Each recording shall begin with the current date, project name and be followed by the general location, i.e., viewing side and direction of progress. Accompanying the video recording shall be a corresponding and simultaneously recorded audio recording. This audio recording, exclusively containing the commentary of the camera operator or aide, 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 conversations.

H. Recorded Information - Video - All video recordings must continuously display transparent digital information to include the date and time of recording. The date information shall contain the month, day and year. The time information shall contain the hour, minutes and seconds. Additional information shall be displayed periodically. Such information shall include, but not be limited to, project name, contract number, direction of travel and the viewing side. This transparent information shall appear on the extreme upper left hand third of the screen. Camera pan, tilt, zoom-in and zoom-out rates shall be sufficiently controlled such that recorded objects will be clearly viewed during video playback. In addition, all other camera and recording system controls, such as lens focus and aperture, video level, pedestal, chrome, white balance, and electrical focus shall be properly controlled or adjusted to maximize picture quality. The construction documentation shall be recorded in SP mode.

I. Viewer Orientation - 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 viewer, highly visible yellow flags shall be placed, by the Contractor, in such a fashion as to clearly indicate the proposed centerline of

construction. 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.

J. Lighting - All taping shall be done during time of good visibility. No taping shall be done during precipitation, mist or fog. The recording shall only be done when sufficient sunlight is present to properly illuminate the subjects of recording and to produce bright, sharp video recordings of those subjects.

K. Speed Of Travel - 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 areas zone of influence. The rate of speed in the general direction of travel of the vehicle used during taping shall not exceed 44 feet per minute.

L. Video Log/Index - All DVDs shall be permanently labeled and shall be properly identified by number and project title. Each DVD shall have a log of its contents. The log shall describe the various segments of coverage contained on the DVD in terms of the names of the streets or location of easements, coverage beginning and end, directions of coverage, video unit counter numbers, engineering survey or coordinate values (if reasonably available) and the date.

M. Area Of Coverage - Recording coverage shall include all surface features located within the zone of influence of construction supported by appropriate audio coverage. Such coverage shall include, but not be limited to, existing driveways, sidewalks, curbs, pavements, drainage system features, mailboxes, landscaping, culverts, fences, signs, Contractor staging areas, adjacent structures, etc. within the area covered by the project. Of particular concern shall be the existence of any faults, fractures, or defects. Coverage shall be limited to one side of the site, street, easement or right-of-way at any one time.

N. Costs Of Video Services - The cost to complete the requirements under this section shall be included in the contract items provided in the proposal sheet. There is no separate pay item for this work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 33 00

SHOP DRAWINGS, WORKING DRAWINGS, AND SAMPLES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The Contractor shall submit to the Engineer for review and approval, such Shop Drawings, Test Reports, and Product Data on materials and equipment (hereinafter in this Section called Data), and material samples (hereinafter in this Section called Samples) as are required for the proper control of work, including but not limited to those Shop Drawings, Data, and Samples for materials and equipment specified elsewhere in the Specifications and in the Drawings.

2. Within fourteen (14) calendar days after the Effective Date of the Agreement, the Contractor shall submit to the Engineer a complete list of preliminary data on items for which Shop Drawings are to be submitted. Included in this list shall be the names of all proposed manufacturers furnishing specified items. Review of this list by the Engineer shall in no way expressed or implied relieve the Contractor from submitting complete Shop Drawings and providing materials, equipment, etc., fully in accordance with the Contract Documents. This procedure is required in order to expedite final review of Shop Drawings.

3. The Contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the Owner and the Engineer. This log should include the following items:

   a. Submittal description and number assigned.

   b. Date to Engineer.

   c. Date returned to Contractor (from Engineer).

   d. Status of submittal (Approved, Approved as Noted, Amend and Resubmit, and Rejected).

e. Date of resubmittal and return (as applicable).

f. Date material release (for fabrication).

g. Projected date of fabrication.

h. Projected date of delivery to site.

i. Status of O&M manuals submittal.

j. Specification Section.

k. Drawings sheet number.

B. Related Requirements Described Elsewhere:

1. General Requirements: Division 01

2. Construction Schedule: Section 01 30 10.

3. Project Record Documents: Section 01 78 39.

1.02 CONTRACTOR'S RESPONSIBILITY

A. It is the responsibility of the Contractor to check all drawings, data and samples prepared before submitting them to the Engineer for review. Each and every copy of the Drawings and data shall bear the Contractor's stamp showing that they have been so checked. Shop drawings submitted to the Engineer without the Contractor's stamp will be returned to the Contractor for conformance with this requirement. Shop drawings shall indicate any deviations in the submittal from requirements of the Contract Documents. If the Contractor takes exception to the specifications, the Contractor shall note the exception in the letter of transmittal to the Engineer.

B. Determine and verify:

1. Field measurements.

2. Field construction criteria

3. Catalog numbers and similar data.

4. Conformance with Specifications.

C. The Contractor shall furnish the Engineer a schedule of Shop Drawing submittals fixing the respective dates for the submission of shop and working drawings, the beginning and ending of manufacture, testing, and installation of materials, supplies, and equipment. This schedule shall indicate those that are critical to the progress schedule.

D. The Contractor shall not begin any of the work covered by a Shop Drawing, Data, or a Sample returned for correction until a revision or correction thereof has been reviewed and returned to him, by the Engineer, with approval.

E. The Contractor shall submit to the Engineer all drawings and schedules sufficiently in advance of construction requirements to provide no less than thirty (30) calendar days for checking and appropriate action from the time the Engineer receives them.

F. All submittals shall be accompanied with a transmittal letter prepared in duplicate containing the following information:

1. Date.

2. Project Title and Number.

3. Contractor's name and address.

4. The number of each Shop Drawings, Project Data, and Sample submitted.

5. Notification of Deviations from Contract Documents.

   a. The Contractor shall indicate in bold type at the top of the cover sheet of submittal of shop drawing if there is a deviation from the Drawings, Specifications, or referenced specifications or codes.

   b. The Contractor shall also list any deviations from the Drawings, Specifications, or referenced specifications or codes and identify in green ink prominently on the applicable Shop Drawings.

6. Submittal Log Number conforming to Specification Section Number.

G. The Contractor shall submit five (5) copies of descriptive or product data information and Shop Drawings to the Engineer plus the number of copies which the Contractor requires returned.

H. The Contractor shall be responsible for and bear all costs of damages which may result from the ordering of any material or from proceeding with any part of Work prior to the completion of the review by the Engineer of the necessary Shop Drawings.

I. The Contractor shall be fully responsible for observing the need for and making any changes in the arrangement of piping, connections, wiring, manner of installation, etc., which may be required by the materials/equipment he proposes to supply both as pertains to his own work and any work affected under other parts, headings, or divisions of the Drawings and Specifications.

J. The Contractor shall not use Shop Drawings as a means of proposing alternate items to demonstrate compliance with the Drawings and Specifications.

K. Each submittal will bear a stamp indicating that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal. The Contractor stamp shall be similar to the sample given below.

(OWNER'S NAME)
(PROJECT NAME)
(PROJECT NUMBER)

SHOP DRAWING NO.:

SPECIFICATION SECTION: DRAWING NO._____

WITH RESPECT TO THIS SHOP DRAWING OR SAMPLE, I HAVE DETERMINED AND VERIFIED ALL QUANTITIES, DIMENSIONS, SPECIFIED PERFORMANCE CRITERIA, INSTALLATION REQUIREMENTS, MATERIALS, CATALOG NUMBERS, AND SIMILAR DATA WITH RESPECT THERETO AND REVIEWED OR COORDINATED THIS SHOP DRAWING OR SAMPLE WITH OTHER SHOP DRAWINGS AND SAMPLES AND WITH THE REQUIREMENTS OF THE WORK AND THE CONTRACT DOCUMENTS.

NO VARIATION FROM CONTRACT DOCUMENTS

VARIATION FROM CONTRACT DOCUMENTS AS SHOWN

(CONTRACTOR'S NAME)
(CONTRACTOR'S ADDRESS)

BY:

_____
_____ DATE:_____
AUTHORIZED SIGNATURE

L. Drawings and schedules shall be checked and coordinated with the work of all trades and sub-contractors involved, before they are submitted for review by the Engineer and shall bear the Contractor's stamp of approval as evidence of such checking and coordination. Drawings or schedules submitted without this stamp of approval shall be returned to the Contractor for resubmission.

1.03 ENGINEER'S REVIEW OF SHOP DRAWINGS

A. The Engineer's review of Shop Drawings, Data, and Samples as submitted by the Contractor will be to determine if the items(s) generally conforms to the information in the Contract Documents and is compatible with the design concept. The Engineer's review and exceptions, if any, will not constitute an approval of dimensions, connections, quantities, and details of the material, equipment, device, or item shown.

B. The review of drawings and schedules will be general, and shall not be construed:

1. As permitting any departure from the Contract Documents.

2. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials.

3. As approving departures from details furnished by the Engineer, except as otherwise provided herein.

C. If the drawings or schedules as submitted describe variations and show a departure from the Contract Documents which the Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in Contract Price or contract time, the Engineer may return the reviewed drawings without noting an exception.

D. "Approved As Noted" - Contractor shall incorporate Engineer's comments into the submittal before release to manufacturer. The Contractor shall send a letter to the Engineer acknowledging the comments and their incorporation into the Shop Drawing.

E. "Amend And Resubmit" - Contractor shall resubmit the Shop Drawing to the Engineer. The resubmittal shall incorporate the Engineer's comments highlighted on the Shop Drawing.

F. "Rejected" - Contractor shall correct, revise and resubmit Shop Drawing for review by Engineer.

G. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, to revisions other than the corrections requested by the Engineer on previous submissions. The Contractor shall make any corrections required by the Engineer.

H. If the Contractor considers any correction indicated on the drawings to constitute a change to the Drawings or Specifications, the Contractor shall give written notice thereof to the Engineer.

I. When the Shop Drawings have been completed to the satisfaction of the Engineer, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

J. No partial submittals will be reviewed. Submittals not deemed complete will be stamped "Rejected" and returned to the Contractor for resubmittal. Unless otherwise specifically permitted by the Engineer, make all submittals in groups containing all associated items for:

1. Systems.

2. Processes.

3. As indicated in specific Specifications Sections.

All drawings, schematics, manufacturer's product data, certifications, and other Shop Drawing submittals required by a system specification shall be submitted at one time as a package to facilitate interface checking.

K. Only the Engineer shall utilize the color "red" in marking Shop Drawing submittals.

L. Shop drawing and submittal data shall be reviewed by the Engineer for each original submittal and first resubmittal; thereafter review time for subsequent resubmittals shall be charged to the Contractor and the Contractor shall reimburse the Owner for services rendered by the Engineer as specified in the Supplementary Conditions.

1.04 SHOP DRAWINGS

A. When used in the Contract Documents, the term "Shop Drawing" shall be considered to mean Contractor's plans for materials and equipment which become an integral part of the Project. Shop Drawings shall be complete and detailed and shall consist of fabrication, erection, setting and schedule drawings, manufacturer's scale drawings, and wiring and control diagrams. Catalogs cuts, catalogs, pamphlets, descriptive literature, and performance and test data shall be considered only as supportive information to required Shop Drawings as defined above. As used herein, the term "manufactured" applies to standard units usually mass-produced;

and "fabricated" means items specifically assembled or made out of selected materials to meet individual design requirements.

B. Manufacturer's catalog sheets, brochures, diagrams, illustrations, and other standard descriptive data shall be clearly marked to identify pertinent materials, products, or models. Delete information which is not applicable to the Work by striking or cross-hatching.

C. Each Shop Drawing shall be submitted with an 8-1/2" by 11" cover sheet which shall include a title block for the submittal. Each Shop Drawing cover sheet shall have a blank area 3-1/2 inches high by 4-1/2 inches wide, located adjacent to the title block. The title block/cover sheet shall display the following:

1. Project Title and Number.

2. Name of project building or structure.

3. Number and title of the Shop Drawing.

4. Date of Shop Drawing or revision.

5. Name of Contractor and subcontractor submitting drawing.

6. Supplier/manufacturer.

7. Separate detailer when pertinent.

8. Specification title and Section number.

9. Applicable Drawing number.

D. Data on materials and equipment shall include, without limitation, materials and equipment lists, catalog data sheets, catalog cuts, performance curves, diagrams, verification of conformance with applicable standards or codes, materials of construction, and similar descriptive material. Materials and equipment lists shall give, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish, and all other pertinent Data.

E. For all mechanical and electrical equipment furnished, the Contractor shall provide a list including the equipment name, and address, and telephone number of the manufacturer's representative and service company so that service and/or spare parts can be readily obtained.

F. If drawings show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in his letter of transmittal. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. If the Contractor fails to describe such variations, he shall not be relieved of the responsibility for executing the Work in accordance with the Contract, even though such drawings have been reviewed.

G. All manufacturers or equipment suppliers who propose to furnish equipment or products shall submit an installation list to the Engineer along with the required shop drawings. The installation list shall include at least five (5) installations where identical equipment has been installed and has been in operation for a period of at least two (2) years unless specified otherwise in the Specification Section applicable.

1.05 WORKING DRAWINGS

A. When used in the Contract Documents, the term "Working Drawings" shall be considered to mean the Contractor's plan for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, forming and falsework for underpinning, and for such other work as may be required for construction but does not become an integral part of the Project.

B. Copies of working drawings as noted in paragraph 1.05 A. above, shall be submitted to the Engineer where required by the Contract Documents or requested by the Engineer, and shall be submitted at least thirty (30) calendar days (unless otherwise specified by the Engineer) in advance of their being required for the Work.

C. Working Drawings shall be signed by a registered Professional Engineer, currently licensed to practice in the State of Florida, and shall convey, or be accompanied by, calculations or other sufficient information to completely explain the structure, machine, or system described and its intended manner of use. Prior to commencing such work, working drawings must have been reviewed without specific exceptions by the Engineer, which review will be for general conformance and will not relieve the Contractor in any way from his responsibility with regard to the fulfillment of the terms of the Contract. All risks to new or existing work are assumed by the Contractor; the Owner and Engineer shall have no responsibility therefor.

1.06 SAMPLES

A. The Contractor shall furnish, for the approval of the Engineer, samples required by the Contract Documents or requested by the Engineer. Samples shall be delivered to the Engineer as specified or directed. The Contractor shall prepay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in the Work until approved by the Engineer.

B. Samples shall be of sufficient size and quantity to clearly illustrate:

1. Functional characteristics of the product, with integrally related parts and attachment devices.

2. Full range of color, texture, and pattern.

3. A minimum of two (2) samples of each item shall be submitted.

C. Each sample shall have a label indicating:

1. Name of Project.

2. Name of Contractor and subcontractor.

3. Material or equipment represented.

4. Place of origin.

5. Name of producer/supplier and brand (if any).

6. Location in Project.

7. Submittal and specification numbers.

(Samples of finished materials shall have additional marking that will identify them under the finished schedules.)

D. The Contractor shall prepare a transmittal letter and a description sheet for each shipment of samples. The description sheet shall contain the information required in Paragraphs 1.06B and C above. He shall enclose a copy of the letter and description sheet with the shipment and send a copy of the letter and description sheet to the Engineer. Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.

E. 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 the Work shall match the approved Samples. Samples which failed testing or were not approved will be returned to the Contractor at his expense, if so requested at time of submission.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 35 00

SPECIAL PROJECT PROCEDURES

PART 1 – GENERAL

1.01 EXISTING UTILITIES

A. Where existing utility lines (water, gas, telephone, power, etc.) are intersected by proposed Work, the Contractor shall give a minimum of forty-eight (48) hours notice to the owners of such utilities to permit them to locate their lines prior to construction. The "Call Sunshine" Utility Notification Center shall be contacted at 1-800-432-4770 at least forty-eight (48) hours prior to start of excavation. Utilities, which are not members of the Utility Notification Center, shall be contacted individually by the Contractor.

1.02 REPAIRS

A. WORK SCHEDULE AND EMERGENCY RESPONSE TIME

1. Emergency response by the Contractor will be required within one hour of notice by telephone of required repair. The arrival of a repair crew will be required within two hours of the Contractor's assessment of the emergency situation.

2. The County will furnish the Contractor with the size, approximate depth and general location of the proposed repair. The Contractor shall be required to commence work on each assignment within ten (10) consecutive calendar days after the date contained in each written Notification to Proceed (unless such time is extended in writing by the County), and will be obligated to pursue the Work on each assignment with expeditious continuity until completion. The County may order the Contractor to proceed with the Work at a faster rate should a backlog of projects develop. In all cases, the Contractor will be required to begin restoration work within two working days and complete restoration work within ten (10) consecutive calendar days following approval of the repair by the Engineer. At the County's option, the maximum number of repairs assigned to the Contractor at one time may be a maximum of fifteen (15).

3. Each notification to proceed shall be accompanied by or preceded by two copies of the appropriate Atlas Sheet(s), plus other information including photographs (when available).

B. Field Layout

1. The County supplied Atlas Sheet, street address and other pertinent information will identify the general location of the repair. If there is evidence of the defect visible from the surface, such as a depression, the Contractor shall center his excavation on the evidence. If there is any question as to the general location described by the County, the Contractor shall approach the Engineer and address the questions before beginning with the excavation.

C. Restoration Schedule

1. All restoration work must be completed within ten (10) consecutive calendar days following approval of work at any given site. If the restoration work does not progress to the satisfaction of the Engineer, the Contractor may be directed to cease repair operations until such time as the Engineer may deem the restoration work completed to a degree permitting the resumption of repair work or the County may elect to perform any such restoration work and bill the Contractor for same. (At Engineer's discretion, payment shall be made by the Contractor direct to the County, or a like amount deducted by the County from monies due the Contractor for Work completed under this Contract).

1.03 POTABLE WATER, RECLAIMED WATER AND SANITARY SEWER SYSTEM CONSTRUCTION

A. Starting Project

1. The Contractor shall notify the Pinellas County Inspector and the Engineer FORTY-EIGHT (48) HOURS prior to starting construction (Saturday, Sunday and Holidays excluded). Upon notification, a meeting will be scheduled between the Pinellas County Inspector and the Contractor to review the plans.

B. Required Field Documents

1. The Contractor MUST have the following on the job site at all times and readily available prior to any construction:

a. The Pinellas County approved "Contractor's Copy" of construction plans stamped by the Florida Department of Environmental Protection (FDEP) or other permitting agency.

2. All required permits including:

a. F.D.O.T.
b. County
c. Florida Department of Environmental Protection (FDEP)
d. City/Municipality

C. If field conditions require deviation from the approved plans, the Contractor shall notify the Project Engineer of the required change. The Project Engineer will make the necessary changes and submit a revised set of plans to the appropriate agency or agencies for approval.

D. All construction is subject to inspection and certain tasks require that the Pinellas County Inspector be on the site to properly document the procedure, test results and/or material used. On the occasions that the Pinellas County Inspector is required on site to observe these tasks, FORTY-EIGHT (48) hours advance notice will be required (Saturday, Sunday and Holidays excluded).

E. Should the Contractor suspend work on any given project, the Contractor shall provide written notification detailing the reason for the suspension to Pinellas County within two business days. Additionally, forty-eight (48) hours advance, written notice will be required for a restart of the project.

F. Should any materials be installed or backfilled prior to inspection by the Pinellas County Inspector, the facilities are subject to uncovering, exposing, and/or disassembly for inspection. It is preferred that all material expected to be required for the project be on site for initial material inspection prior to commencing the project. Material thus delivered to the job site will be protected and stored as to insure preservation of quality and fitness.

G. Meters shall not be installed on potable and reclaimed water systems until all cleanup work is completed and a final inspection has been made by the Pinellas County Utilities Inspector.

H. All projects requiring a or Florida Department of Environmental Protection Permit will not receive water service until the Pinellas County Utilities receives a SEALED copy of the Engineer's Certificate of Completion and Compliance (As-built plans, if applicable) and a Release Form from the Florida Department of Environmental Protection (FDEP). The following must also be provided, if applicable:

1. Deed and Agreement to Deed to pipelines and appurtenances as additions to Pinellas County Utilities.

2. Deed of Conveyance to pipelines

3. Release of Lien/Cost Statement

4. Easement

I. Taps

1. All taps on existing, in service, pressurized mains for development projects will normally be made by Pinellas County personnel. All taps for pressure testing and chlorination will be saddle taps, made by the Contractor.

2. The Pinellas County Inspector must be present when the Contractor is working on an existing, in service, pressurized main. The Contractor shall notify all Pinellas County customers (via doorknob hangers) forty-eight (48) hours in advance of any discontinuance of service associated with this work. UNDER NO CIRCUMSTANCES WILL THE CONTRACTOR PERFORM ANY TASK THAT INVOLVES AN EXISTING, IN SERVICE, PRESSURIZED MAIN WITHOUT THE PINELLAS COUNTY INSPECTOR PRESENT ON SITE.

3. On development projects, the Project Engineer and/or Contractor will be responsible for staking the location of taps after verifying that the field conditions will permit said location and obtaining concurrence of the Pinellas County Inspector. Following the inspector's field check of the tap location, the inspector will schedule the tap through Pinellas County providing all required paperwork is in order. The inspector will be notified of the day and time for the tap.

J. Additional Requirements for Tapping Asbestos Cement Pipe

1. All taps in asbestos cement (AC) pipe shall be made with the pipe under pressure using only a tap machine having a built-in flush valve and the flush valve must remain open during the entire procedure. All taps shall be made with the pipe in a wet condition. The pipe shall remain wet throughout the entire tapping process. Extreme care should be taken to prevent any cutting dust from becoming airborne and personal protective equipment should be worn as the condition warrants.

2. Coupons from the tapping procedure shall be placed in a "zip lock" type bag in the wet condition. The bag shall be marked with the address where the tap was made and kept for disposal.

3. Water samples shall be taken, as special situations arise or as determined necessary by Utilities Water Quality Management, from the closest in line point downstream from the tap position. Samples shall be taken from this same point before and after the tap has been completed.

4. Open sample source and let water run for three to five minutes. Collect sample in an approved container, available from the Utilities lab, marking the container with the same location information as the coupon. Fill out the chain of custody sheet, also available from the Utilities lab. and deliver sample to the Utilities lab. The Utilities lab will send the sample off for analysis.

5. Disposal of the removed coupons shall follow procedures issued by Pinellas County Utilities, Solid Waste Department. Removed and bagged coupons shall be delivered to Utilities General Maintenance facility located at 6730 142nd Avenue N. Largo, where an authorized disposal barrel shall be located. The person delivering the coupon shall be required to sign a drop off log.

K. Additional Requirements for Tapping Concrete Pressure Pipe

1. Requirements for tapping concrete pipe shall be addressed on a case-by-case basis and specifications for such shall be included in the Special Provisions. Specifications shall be developed based on the pipe manufacturer's recommendations for the specific application.

2. All requirements shall be in accordance with the pipe manufacturer's and the tapping device manufacturer's recommendations.

PART 2 – PRODUCT (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 01 42 01

REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Abbreviations and acronyms are used in the Contract Documents to identify reference standards.

1.02 QUALITY ASSURANCE

A. Application: When a standard is specified by reference, comply with requirements and recommendations stated in that standard, except when requirements are modified by the Contract Documents, or applicable codes establish stricter standards.

B. Publication Date: The publication in effect on the date of issue of Contract Documents, except when a specific publication date is specified.

1.03 ABBREVIATIONS, NAMES, AND ADDRESSES OF ORGANIZATIONS

A. Obtain copies of referenced standards direct from publication source, when needed for proper performance of Work, or when required for submittal by Contract Documents.

AA	Aluminum Association 900 19th Street NW Washington, DC 20006
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, NW Suite 249 Washington, DC 20001
ABPA	American Backflow Prevention Association PO Box 3051 Bryan, Texas 77805-3051
ACI	American Concrete Institute 38800 Country Club Drive Farmington Hills, MI 48331

AI	Asphalt Institute 2696 Research Park Drive Lexington KY 40511
AISC	American Institute of Steel Construction One East Wacker Drive Suite 3100 Chicago, IL 60601-2001
AISI	American Iron and Steel Institute 1140 Connecticut Avenue Suite 705 Washington DC 20036
ANSI	American National Standards Institute 1819 L Street, NW Washington, DC 20036
ASME	American Society of Mechanical Engineers Three Park Avenue New York, NY 10016-5990
ASTM	American Society for Testing and Materials 100 BarrHarbor Drive West Conshohoken, PA, 19428
AWWA	American Water Works Association 6666 W. Quincy Avenue Denver, CO 80235
AWS	American Welding Society 550 N.W. LeJeune Road Miami, FL 33126
CRSI	Concrete Reinforcing Steel Institute 933 N. Plum Grove Road Schaumburg, IL 60173-4758
CSI	Construction Specifications Institute 99 Canal Center Plaza, Suite 300 Alexandria, VA 22314
FS	Federal Specification General Services Administration Specifications and Consumer Information Distribution Section (WFSIS) 470 L'enfant Plaza – Suite 8100 Washington, DC 20407

NEMA	National Electrical Manufacturers' Association 1300 North 17th Street Suite 1847 Rosslyn, VA 22209
PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 60077
PCI	Prestressed Concrete Institute 209 W. Jackson Blvd. Chicago, IL 60606
SSPC	Society for Protective Coatings 40 24th Street,. 6th floor Pittsburgh, PA 15222
UL	Underwriters' Laboratories, Inc. 333 Pfingston Road Northbrook, IL 60062
USC	University of Southern California Foundation for Cross-connection Control and Hydraulic Research Los Angeles, CA 90089

B. The following terms when used within these specifications shall be defined as follows:

ADMINISTRATION – shall mean the Pinellas County Administration.

APPLICANT – Shall mean any person making a request for service to be rendered or furnished by the County.

BACKFLOW PREVENTION DEVICES – shall mean either double check valves (DPV) or reduced pressure (RP) principle devices which protect the potable water system at the service connection by isolating within the customers premises actual or potential pollution or contamination through cross-connection.

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP) – shall mean the particular agency that is the delegated authority for the Safe Drinking Water Act Program effective July 9, 2007 which includes all permitting and compliance for public drinking water programs..

PRIVATE FIRE LINES – shall mean unmetered fire lines installed on private property which serves fire hydrants, sprinkler systems or such intermittent usages.

PRESSURE REDUCING VALVE – shall mean a device utilized to reduce the pressure in a water or reclaimed water main to a preset value, usually to provide proper service pressures. Also known as a PRV.

WATER QUALITY DIVISION – shall mean that division of the Pinellas County Utilities that is responsible for the supervision of proper chlorination of new or existing water lines. Works in conjunction with the inspector to flush, chlorinate and draw samples for testing. They do not get involved past master meters, dual check valve assembly (DCVA)'s or domestic water lines.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 45 17

PIPELINE PRESSURE AND LEAKAGE TESTING REQUIREMENTS

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall pressure and leakage test all pressure pipelines as specified herein. All piping, and equipment shall be tested in the field in the presence of the Engineer or the County's representative.

B. Prior to testing, all mains shall be flushed and pigged to remove all sand and other foreign matter. Flushing shall be terminated at the direction of the Engineer or County's representative. The Contractor shall dispose of the flushing water without causing a nuisance or property damage and in compliance with the National Pollution Discharge Elimination System (NPDES) and all applicable jurisdictions.

C. No testing shall be done until all joints are restrained. Temporary thrust blocks or reverse deadmen may be used with the County's prior approval.

1.02 SCHEDULING

A. All leakage testing, as defined herein, shall be completed by the Contractor under the supervision of the Pinellas County Utilities Inspector.

B. All leakage tests must be scheduled through the Pinellas County Utilities Inspector, with twenty-four (24) hours minimum notice and ONLY AFTER THE CONTRACTOR ACHIEVES A SUCCESSFUL PRE-PRESSURE TEST.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. All corporation stops used for testing and service lines shall be installed by the Contractor prior to pressure testing.

B. All hydrant control valves must be open while pressure testing.

C. All blow-off standpipes and injection points shall be removed upon satisfactory completion of sampling and testing. Corporation stops shall remain in line.

D. Teflon tape shall be used on all threaded joints to avoid contamination (No pipe dope allowed).

E. It is the Contractor's sole responsibility to place sample points where designated by the Pinellas County Health Department.

F. The Contractor shall backfill all pipe and thrust blocking before pressure testing unless the Engineer directs certain joints or connections left uncovered. Where thrust blocking is provided the pressure test shall not be made until at least five days after the thrust blocking has been installed. A high early strength concrete may be used to reduce this time.

G. Each valved section of pipe shall be slowly filled with water and a pump shall be hooked to the pipe in a manner satisfactory to the Engineer to supply the test pressure. The pump, pipe connection and all necessary apparatus shall be furnished by the Contractor.

H. While the system is being filled with water, air shall be carefully and completely exhausted. If permanent air vents are not located at all high points, the Contractor shall install corporation stops or fittings and valves at such points so the air can be expelled as the pipe system is slowly filled with water. Service shall be tested as part of the main pipeline.

3.02 PRESSURE TEST FOR DUCTILE IRON AND PVC PIPE

A. All newly laid pipe, including fitting and valves shall be pressure tested by the Contractor, in accordance with AWWA C600 and C605 to verify the integrity of the pipeline before the leakage test is scheduled with the County.

B. Test pressures and durations shall be as follows:

		Pressure (psi)	Duration (hrs)
1.	Sewage force mains	150	2
2.	Reclaimed water mains	150	2
3.	Potable water mains	150	2
4.	Fire mains	200	2

C. All exposed pipe, fittings, valves, joints and appurtenances shall be carefully examined during the open-trench test. Any cracked or defective pipe, fittings, valves or appurtenances discovered in consequence of this test shall be removed and replaced with acceptable material and the test shall be repeated to the satisfaction of the Engineer.

3.03 LEAKAGE TEST FOR DUCTILE IRON AND PVC PIPE

A. A leakage test shall be conducted in the presence of the Engineer and County Inspector, after the pressure test has been satisfactorily completed. The Contractor shall, as before, furnish all pumps, pipe, connections and other items required to satisfactorily complete the leakage test. The leakage test shall have a duration of two hours at the pressure specified for the pressure test. No pipe installation will be accepted if the leakage is greater than that determined by the formula for mechanical and push-on joints per hour:

$$L = \frac{SDP^{1/2}}{148{,}000}$$

L= Allowable leakage [gph]
S= Length of pipe tested [feet]
D= Nominal diameter of pipe [inches]
P= Average pressure during test [psig]

150 psi (per 1000ft.)
(Table 5.4 AWWA C 600-05 & Table 2 C605-5)

2	0.17
4	0.33
6	0.50
8	0.66
10	0.83
12	0.99
16	1.32
18	1.49
20	1.66
24	1.99
30	2.48
36	2.98
42	3.48
48	3.97
54	4.47

B. The Engineer, or his duly authorized representative, shall witness these tests. The Contractor shall be responsible for finding and repairing leaks. No additional cost may be incurred by the County due to repairs because of failure of either test. The Engineer has the authority to determine the number of repairs that will be made within a given length of pipe and has the right to request the Contractor to remove and relay a section of pipe if such does not comply with the established leakage rates as calculated using the formula above.

C. For the duration of the test, the pressure in the main shall not be allowed to drop more than 5 psi below the test pressure per AWWA C600 & C605. Should the pressure drop 5 psi, makeup water shall be added to the line to restore the pressure to the test pressure. This makeup water shall be measured and shall be included in the total leakage measured. If loss is greater than 5 psi, the test fails.

3.04 PRESSURE AND LEAKAGE TESTS OF UNDERGROUND HDPE PRESSURE PIPING INCLUDING COMBINATIONS HDPE & PVC OR DUCTILE IRON

A. Filled pipelines shall be allowed to thermally stabilize such that the temperature of the water and the pipe are equal. At temperatures above one hundred (100) degrees F, the Engineer shall be consulted regarding the need to reduce the test pressure.

B. The piping shall be tested between valved sections to a maximum length of five thousand (5,000) feet.

C. For any test pressure from 1.0 to 1.5 times the system design pressure, the total test time including initial pressurization, initial expansion, and time at test pressure, shall not exceed eight hours. If the pressure test is not completed due to leakage, equipment failure or other reason, the test section shall be depressurized, and allowed to “relax” for at least eight hours before bringing the test section up to test pressure again.

D. The test procedure consists of initial expansion, and the test phase:

1. During the initial expansion phase, the test section is pressurized to 10 psi above the test pressure (see Table A for Expansion Pressure), and sufficient make-up water is added each hour for three hours to return to the expansion phase pressure.

2. After the initial expansion phase, about four hours after pressurization, the test phase begins.

3. During the test phase, the pipe is stabilized at the test pressure (see Table A). The pressure shall remain steady within five percent of this target value for two hours. If the pressure falls below five percent of the test pressure (see Table A), leakage or insufficient expansion is indicated, and the test shall be repeated after the pipe is allowed to “relax” as indicated above. Make-up water is not allowed during the test phase.

Table A

Pipe Class	Expansion Pressure	Test Pressure	5% Pressure Reduction
SDR 17	150 psi	140 psi	133 psi
SDR 13.5	170 psi	160 psi	152 psi
SDR 11	170 psi	160 psi	152 psi
SDR 9	210 psi	200 psi	190 psi

3.05 REPAIRS

A. The Contractor shall repair all leaks in the piping at no additional cost to the County.

END OF SECTION

SECTION 01 55 26

TRAFFIC REGULATION

PART 1 – GENERAL

1.01 WORK INCLUDED

A. This item will consist of providing, installing, moving, replacing, maintaining, cleaning and removal upon completion of Work, all signs, barricades, pavement markings, barriers, cones, lights, signals and other devices necessary for the safe movement of all vehicular and pedestrian traffic through and within the Project.

B. The Contractor shall arrange his work so that there will be as little disruption of traffic as possible.

C. The Contractor shall have a Certified Worksite Traffic Supervisor in accordance with the General Conditions.

1.02 REFERENCES

A. U.S. Department of Transportation (FHWA) Manual of Uniform Traffic Control Devices as adopted by the Florida Department of Transportation (latest edition).

B. Florida Department of Transportation Design Standards, latest edition.

C. Florida Department of Transportation Standard Specification for Road and Bridge Construction, latest edition.

1.03 SUBMITTALS

A. The Contractor shall obtain approval from the City, County or State Agency having jurisdiction over the road or highway for any road crossings and detours required.

B. Maintenance of Traffic (MOT) plans, if provided in the Contract Drawings, are considered a minimum requirement and it is the Contractor's responsibility to provide a safe traffic, pedestrian and working environment in accordance with the governing regulations. Contractor shall adjust the MOT plan as necessary to meet the field conditions at no additional cost to the County.

C. If MOT plans are not provided in the Contract Drawings, a detailed traffic control plan and MOT plan shall be developed and submitted by the Contractor to such Agencies having jurisdiction over the road for their approval, and said approval shall be obtained prior to commencing construction.

D. Any deviations from the Contract Drawings, or MOT plans specifically developed by the Contractor, shall be submitted to the applicable permitting entity for approval, and said approval shall be obtained, prior to commencement of construction. If the alternative MOT plan is deemed incomplete or unacceptable the Contractor will be required to submit a revised plan. This process will repeat itself until the revised plan is accepted by all parties. Contractor will not be granted or approved any costs or delay resulting from the review process or field adjustments.

E. All traffic control plans shall be prepared by a Florida Certified Traffic Planner.

PART 2 – PRODUCTS

2.01 INSTALLATION STANDARDS

A. All signs, barricades, pavement markings, traffic signals and channelizing devices used to handle traffic shall be provided for and erected in accordance with the FDOT Design Standards (latest edition) and to the details indicated in the above referenced standards. Traffic signs shall be high-intensity flat-surface reflective sheeting.

PART 3 – EXECUTION

3.01 GENERAL

A. In order that the Contractor may properly provide required traffic controls, the Contractor shall notify the appropriate agencies a minimum of two working days prior to any construction affecting traffic flow.

3.02 MAINTENANCE OF TRAFFIC LANE AND ROAD CLOSURES

A. The Contractor shall arrange his work so that there will be as little disruption of traffic as possible.

B. The Contractor shall be approved by the City, County or State Agency having jurisdiction over the road or highway for any road crossings and detours required. A detailed traffic control plan shall be submitted by the Contractor to such Agencies having jurisdiction over the road for their approval at least three weeks prior to commencing construction.

C. In the event that a road closure is approved by the permitting Agency, the Contractor will be responsible for any rerouting of traffic occasioned by the closure and will provide all necessary barricades, signs, guards, lights, etc. in accordance with the Agency's approval of such closure.

3.03 ACCESS TO PROPERTIES

A. When construction activities necessitate the closing of a street to through-traffic, the Contractor shall notify all affected emergency services entities of the closed road. If no other means of access is available, the Contractor shall maintain, at all times, a 10-foot-wide lane adjacent to the work area, free of construction equipment and obstructions, for the use of emergency vehicles.

B. The Contractor shall provide continuous access to properties adjacent to work areas.

3.04 LOCAL TRAFFIC

A. The roads shall be kept open to two-way traffic during construction, except one lane traffic will be permitted provided experienced flag personnel are used. Necessary barricades, safety vests and flags shall be used. No residences or places of business will be isolated. Suitable access shall be provided whenever construction interferes with the existing means of access.

3.05 PEDESTRIAN TRAFFIC

A. The Contractor shall take precautions to ensure the safety of pedestrians passing near work areas. This may entail the erection of a temporary fence on the construction side of pedestrian passageways to delineate out-of-bounds areas. The pedestrian passageways shall remain open and clean of dirt and debris at all times unless pedestrian safety cannot be assured, then the Contractor may close off the sidewalk(s) with signs and fences and shall direct pedestrians to use other suitable routes. Pedestrian passageways shall be cleared and swept in the vicinity of construction.

B. The Contractor shall pay close attention to the issue of pedestrian safety. The Contractor shall institute measures, including, but not limited to, temporary surfaces and channeling devices, to ensure the safe passage of pedestrians.

3.06 BUS STOPS

A. The Contractor shall take care to minimize disruption to existing bus stops. If a bus stop cannot be preserved, then the Contractor shall make provisions for its relocation. The Contractor shall be responsible for all coordination regarding the temporary relocation of bus stops

END OF SECTION

SECTION 01 57 00

CONTROL OF WORK

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The Work to be done consists of the furnishing of all labor, materials and equipment, and the performance of all Work included in this Contract.

B. The Contractor shall furnish all labor, superintendence, materials, plant, power, light, heat, fuel, water, tools, appliances, equipment, supplies and other means of construction necessary or proper for performing and completing the Work. He shall perform and complete the Work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the County, and in strict accordance with the Contract Documents. The Contractor shall clean up the Work and maintain it during and after construction, until accepted, and shall do all Work and pay all costs incidental thereto. He shall repair or restore all structures and property that may be damaged or disturbed during performance of the
Work.

C. The Contractor shall supervise and direct the Work in accordance with Pinellas County Utilities Standard Technical Specifications.

D. The cost of incidental work described in these Construction Specifications, for which there are no specific Contract Items, shall be considered as part of the general cost of doing the Work and shall be included in the prices for the various Contract Pay Items.

E. The Contractor shall provide and maintain such modern plant, tools, and equipment as may be necessary to perform in a satisfactory and acceptable manner all the Work required by this Contract. Only equipment of established reputation and proven efficiency shall be used. The Contractor shall be solely responsible for the adequacy of his workmanship, materials and equipment, prior approval of the County notwithstanding.

F. Public Utilities and Structures

1. Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes and all other appurtenances and facilities pertaining thereto whether owned or controlled by the County, other governmental bodies or privately owned by individuals, firms or corporations, used to serve the public with transportation, traffic control, gas, electricity,

telephone, sewerage, drainage, water or other public or private property which may be affected by the Work shall be deemed included hereunder. The Contractor shall protect all public utility installations and structures from damage during the Work, except those specifically designated to be removed or relocated. The Contractor shall so arrange his operations as to avoid any damage to any buried public utility installation or structure. All required protective devices and construction shall be provided by the Contractor at his expense. All existing public utilities damaged by the Contractor, which are shown on the Plans or have been located in the field by the utility, shall be repaired by the Contractor, at his expense. No separate payment shall be made for such protection or repairs to public utility installations or structures.

2. Public utility installations or structures owned or controlled by the County or other governmental body, which are shown on the Plans to be removed, relocated, replaced or rebuilt by the Contractor, shall be considered as a part of the general cost of doing the Work and shall be included in the prices Bid for the various contract items. No separate payment shall be made therefor.

3. Where public utility installations or structures owned or controlled by the County or other governmental body are encountered during the course of the Work, and are not indicated on the Plans or in the Specifications, and when, removal, relocation, replacement or rebuilding is necessary to complete the Work under this Contract, such work shall be accomplished by the utility having jurisdiction, or if required, by the Contractor.

4. The Contractor shall give written notice to governmental utility departments and other owners of public utilities of the locations of his proposed construction operations, at least forty-eight (48) hours in advance of breaking ground in any area or on any unit of the Work. This can be accomplished by making the appropriate contact with the "Underground Utility Notification Center for Excavators (Call Sunshine)."

5. The maintenance, repair, removal, relocation or rebuilding of public utility installations and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the utility and the County.

G. The Contractor shall not enter upon private property for any reason without securing prior permission from the property owner.

H. During the progress of the Work the Contractor shall keep the work site free from an accumulation of rubbish, waste materials or any type of debris resulting from the construction.

1.02 DRAWINGS AND SPECIFICATIONS

A. The Contractor shall furnish each of the subcontractors, manufacturers, and suppliers such copies of the Contract Documents as may be required for their work.

1.03 MATERIALS AND EQUIPMENT

A. All transactions with the manufacturers or subcontractors shall be through the Contractor.

B. All materials and equipment shall be new, unless otherwise provided. The Contractor shall furnish satisfactory evidence as to the type and quality of materials or equipment to be furnished and installed on this Project.

C. Materials of fabrication and construction to be furnished and permanently installed in the Project shall be of the best quality. The workmanship of construction, fit and finish on the Project shall be equal to the highest standards of the industry. As indicated above, all materials and equipment and/or components thereof shall be new and shall not have been in service at any other installation.

D. The Contractor shall deliver materials in ample quantities to insure the most speedy and uninterrupted progress of the Work so as to complete the Work within the allotted time. The Contractor shall also coordinate deliveries in order to avoid delay in, or impediment of, the progress of the work of any related Contractor. The Contractor shall replace, at his own expense, all such material(s) found to be damaged in shipment or handling or defective in manufacture. The cost of the replacement material and labor of installation for the replacement of previously installed material found to be defective prior to the final acceptance of the work shall also be the responsibility of the Contractor.

E. All materials and equipment to be incorporated into the Project shall be loaded and unloaded by a method that will provide protection against damage. Every precaution shall be taken to prevent damage or injury to the equipment and material during transporting and handling. Proper and suitable power equipment shall be used in the loading or unloading process. Under no condition shall any items of equipment be dropped or rolled from a truck or dragged over the ground after being unloaded. When a crane or similar type equipment is used in loading or unloading, a suitable lifting sling and hook shall be used.

F. It will be the responsibility of the Contractor to store delivered materials or equipment in a secure area. The Contractor will be responsible for any damages resulting from vandalism or other reasons. Replacement of materials or equipment lost, stolen, damaged or destroyed, due to careless or improper storage, will be the Contractor's responsibility. All stored materials shall be easily and readily accessible for inspection by the County's representative.

G. The Contractor shall, unless otherwise stated in the Contract Documents, furnish with each type, kind or size of equipment, one complete set of suitably marked high grade special tools and appliances which may be needed to adjust, operate, maintain or repair the equipment. Such tools and appliances shall be furnished in approved painted steel cases, properly labeled and equipped with good grade cylinder locks and duplicate keys.

H. Each piece of equipment shall be provided with a substantial nameplate, securely fastened in place and clearly inscribed with the manufacturer's name, year of manufacture, serial number, weight and principal rating data.

I. The Contractor shall have on hand sufficient proper equipment and machinery of ample capacity to facilitate the Work and to handle all emergencies normally encountered in work of this character.

J. Equipment shall be erected in a neat and workmanlike manner on the foundations at the locations and elevations shown on the Drawings. All equipment shall be correctly aligned, leveled and adjusted for satisfactory operation and shall be installed so that proper and necessary connections can be made readily between the various units.

K. The Contractor shall furnish, install and protect all necessary anchor and attachment bolts and all other appurtenances needed for the installation of the devices included in the equipment specified.Stainless steel anchor bolts shall be ample size and strength for the purpose intended. Substantial templates and working drawings for installation shall be furnished.

L. The Contractor shall, at his own expense, furnish all materials and labor for, and shall properly bed in non-shrink grout, each piece of equipment on its supporting base that rests on masonry foundations. Grout shall completely fill the space between the equipment base and the foundation. All metal surfaces coming in contact with concrete or grout shall receive a coat of coal tar epoxy.

M. Obtaining Materials From Pinellas County Utilities

1. Any material obtained from the Utilities Department shall be thoroughly inspected by the Contractor so as to determine any

defects, damage or unsoundness of the materials. Items accepted by the Contractor shall be signed for by his authorized representative, and the Contractor shall be responsible for such items from the time he picks them up to the time they are installed and accepted by the Utilities Department.

2. Upon acceptance of any material from Pinellas County Utilities, the Contractor shall be responsible for loading the material at the storage yard and unloading the material at the job site and for the safe transportation of the material between those locations

1.04 INSPECTION AND TESTING

A. The Contractor shall be fully responsible for the proper operation of equipment during tests and instruction periods and shall neither have, nor make any claim for damage, which may occur to equipment prior to the time when the County formally takes over the operation thereof.

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

C. As soon as conditions permit, the Contractor shall furnish all labor, materials, and instruments and shall make preliminary field tests. If the preliminary field tests reveal that the system does not comply with the requirements of the Contract Documents, the Contractor shall, prior to the acceptance tests, make all changes, adjustments and replacement required.

D. Upon completion of the Work and prior to final payment, all equipment and piping shall be subjected to acceptance tests as specified or required to prove compliance with the Contract Documents.

E. The Contractor shall furnish labor, fuel, energy, and all other materials, equipment and instruments necessary for all acceptance tests, at no additional cost. The Supplier shall assist in the final field tests as applicable.

F. Any defects in the materials and equipment or their failure to meet the tests, guarantee or requirements of the Contract Documents shall be promptly corrected by the Contractor. If the Contractor fails to make these corrections or if the improved materials and equipment, when tested, shall again fail to meet the guarantees or specified requirements, the materials and equipment may be rejected and removed from the site at the Contractor's expense.

1.05 FIRST AID

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

1.06 ADJACENT STRUCTURES AND PROPERTY

A. The Contractor shall also be entirely responsible and liable for all damage or injury as a result of his operations to all other adjacent public and private property, structures of any kind and appurtenances thereto met with during the progress of the Work. The cost of protection, replacement in their original locations and conditions or payment of damages for injuries to such adjacent public and private property and structures affected by the Work, whether or not shown on the Drawings or specified, shall be included in the various Contract Items and no separate payments will be made therefore.

B. Contractor is expressly advised that the protection of buildings structures, tunnels, tanks, pipelines, etc. and related work adjacent to and in the vicinity of his operations, wherever they may be, is solely his responsibility. Conditional inspection of buildings or structures in the immediate vicinity of the Project, which may reasonably be expected to be affected by the Work, shall be performed by and be the responsibility of the Contractor.

C. Contractor shall, before starting operations, make an examination of the interior and exterior of the adjacent structures, buildings, facilities, etc., and record by noted, measurements, photographs, etc., conditions which might be aggravated by open excavation and construction. Repairs or replacement of all conditions disturbed by the construction shall be made to the satisfaction of the County. This does not preclude conforming to the requirements of the Insurance Underwriters.

1.07 PROTECTION, REMOVAL AND REPLACEMENT OF TREES AND SHRUBS

A. The Contractor shall comply with all local tree ordinances. When, in the opinion of the Engineer, trees or shrubs can be protected in place, the Contractor shall endeavor to protect the trees or shrubs as necessary. When, in the opinion of the Engineer, trees must be removed to permit construction, the Contractor shall consider the price for removing, cutting, trimming, replacing trees and shrubs incidental to the laying of pipe and no additional payment shall be made unless specifically called for in the Contract Documents.

B. The Contractor is responsible for acquiring necessary permits and replacing trees as required by local ordinances and the Pinellas County Department of Environmental Management. The Contractor shall provide the services of an approved tree specialist when it is necessary to trim or cut a branch from a

tree.

1.08 PROTECTION OF WORK AND PUBLIC

A. Barriers and Lights

1. The Contractor shall provide and maintain proper and adequate barricades, construction signs, torches, flashers, construction tapes, flagmen, guards or other traffic control devices as may be necessary to provide the required safety and protection to the public at and around the perimeter of the construction areas. The Contractor shall provide suitable barricades, red lights, "danger" or "caution" or "street closed" signs and watchmen at all places where the work causes obstructions to the normal traffic or constitutes in any way a hazard to the public. The Contractor shall comply with all City, County or State regulations.

B. Smoke Prevention

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

C. Noise

1. The Contractor shall eliminate noise to as great an extent as practicable at all times. Air compressing plants shall be equipped with silencers and the exhaust of all gasoline, diesel, motors or other power equipment shall be provided with mufflers. The Contractor shall strictly observe all local regulations and ordinances covering noise control.

2. If mufflers and silencers cannot achieve the necessary noise reduction, other noise abatement procedures shall be instituted by the Contractor, such as installation of 3/4-inch plywood baffles positioned to break off line-of-sight from the noise source to affected residences and/or commercial structures.

D. Access to Public Services

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

E. Dust Prevention

1. It is the responsibility of the Contractor to control all dust problems that may occur during the construction, with required watering.. Dust control will be required seven days a week.

F. Safety

1. The Contractor will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Project. He will take all necessary precautions for the safety of and will provide the necessary protection to prevent damage, injury or loss to all employees on the Project and other persons who may be affected thereby, all the work and all material or equipment to be incorporated therein, whether in storage on or off the site.

2. The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. He will erect and maintain, as required by the conditions and progress of the work, all necessary safeguards for safety and protection. He will notify owners of adjacent utilities when prosecution of the work may affect them. The Contractor will remedy all damage, injury or loss of any property caused, directly or indirectly, in whole or in part, by the Contractor, any subcontractor or anyone directly or indirectly employed by any one of them or anyone for whose acts of any of them be liable.

3. In emergencies affecting the safety of persons or the work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the Engineer or Pinellas County Inspector, shall act to prevent threatened damage, injury or loss. He will give Pinellas County prompt written notice of any significant change in the Work or deviations from the approved plans required relating to the emergency.

4. It is the Contractor's responsibility to comply with the Occupational Safety and Health Administration safety standards.

5. Standard 29 CFR 1926.650, Subpart P, trench safety standards are in effect during the period of construction of the Project.

6. The Contractor shall comply with all Occupational Safety and Health Association (OSHA) requirements for work in confined spaces. This shall include, but not be limited to, provision of a force-ventilated working space.

7. Hard hats shall be worn at the work site by all personnel as required by all local, state and federal guidelines. The Engineer is authorized to halt the work if this requirement is not met.

G. Pollution Control

1. The Contractor shall provide for adequate protection against polluting any private or public lands, streams, ponds, lakes, sanitary or storm drainage systems, etc., by the disposal of surplus materials in the form of solids or liquids or any other deleterious materials (fuels, oils, bitumens, etc.)

1.09 CUTTING AND PATCHING

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

1.10 CLEANING

A. During construction of the Work, the Contractor shall, at all times, keep the site of the work and adjacent premises as free from material, debris and rubbish as is practicable and shall remove the same from any portion of the site.

B. At the conclusion of the Work, all erection plant, tools, temporary structures and materials belonging to the Contractor shall be promptly taken away, and he shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances.

C. The Contractor shall thoroughly clean all equipment and materials installed by him and shall deliver such materials and equipment undamaged in a bright, clean, polished and new operating condition.

1.11 EROSION CONTROL, WETLANDS AND STORM SEWERS

A. Protection Against Siltation and Bank Erosion

1. The Contractor shall arrange his operations to minimize siltation and bank erosion on construction sites and on existing or proposed water courses, drainage ditches, wetlands and other areas of concern.

2. The Contractor, at his own expense, shall remove any siltation deposits and correct any erosion problems, which result from his construction operations.

3. The Contractor shall be solely responsible for any fines resulting from

the encroachment of any environmentally protected areas.

B. Protection of Wetland Areas

1. The Contractor shall properly dispose of all surplus material, including soil, in accordance with Local, State and Federal regulations. Under no circumstances shall surplus material be disposed of in wetland areas as defined by the Florida Department of Environmental Protection, Southwest Florida Water Management District, U.S. Army Corps of Engineers, etc.

C. Sanitary & Storm Sewer Systems

1. The Contractor shall be entirely responsible for the satisfactory replacement of storm sewer and installation of sanitary sewer systems in substantial conformance to the approved Drawings. It is strongly recommended that no roadway base or paving be constructed until the Contractor has performed televising of these lines to his and the County's satisfaction, and all storm sewer and sanitary sewer invert grades are verified in the field. The lamping of lines and verification of elevations in no way absolves the Contractor from any of his contractual obligations.

1.12 RESTORATION OF PROPERTY

A. Responsibility. All damage as a result of construction work done to existing structures, wetland areas, roadway pavement, driveways, other paved areas, fences, utilities, traffic control devices and any other obstruction not specifically named herein, shall be repaired, restored or replaced by the Contractor unless otherwise specified.

B. Temporary Repairs. All damage named in Paragraph A above shall be at least temporarily repaired, restored or replaced immediately following construction efforts at that location. Temporary restoration shall mean putting the affected area back into a safe, usable condition. In no case shall trenches remain open over night within a street right-of-way unless specific approval is granted by the County.

C. Permanent Repairs. All damage named in Paragraph A above shall be permanently repaired, restored, or replaced before final completion. Permanent repairs shall be accomplished in a professional workmanship-like manner.

D. In all areas disturbed by the work, the Contractor shall grade and restore the site to a condition as good or better than existed before construction.

Sodded areas shall be sodded with sod matching the existing adjacent sod. Any drives, walks, pavements, structures, survey monuments, property corner markers, trees, shrubs, or any other public or private property damaged or destroyed by the work shall be restored or replaced at the Contractor's expense.

1.13 MAINTENANCE OF TRAFFIC

A. Maintenance of Traffic shall be in accordance with Specification 01 55 26, Traffic Control.

1.14 MATERIALS

A. All materials installed in the County’s easements or rights-of-way shall be approved in the County’s Materials Specification Manual regardless of whether these facilities are to be owned by the County or are to be privately owned.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 01 57 13

EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Take every reasonable precaution throughout construction to prevent the erosion of soil and the sedimentation of streams, bays, storm systems or other water impoundments, ground surfaces, or other property as required by State and Local regulations.

1.02 RELATED WORK

A. Provide protective covering for disturbed areas upon suspension or completion of land-disturbing activities. Permanent vegetation shall be established at the earliest practicable time. Temporary and permanent erosion control measures shall be coordinated to assure economical, effective, and continuous erosion and siltation control throughout the construction and post construction period.

1.03 REGULATORY REQUIREMENTS

A. Prevent damage to properties outside the construction limits from siltation due to construction of the project. Assume all responsibilities to the affected property owners for correction of damages, which may occur. Erosion control measures shall be performed conforming to the requirements of, and in accordance with plans approved by applicable state and local agencies and as per the erosion control portion of the construction drawings and these specifications. The Contractor shall not allow mud and debris to accumulate in the streets. Should the Contractor pump water from trenches during construction, appropriate siltation preventative measures shall be taken prior to discharge of pumped water into any storm drain or stream. The Contractor shall dispose of the water without causing a nuisance, property damage and in compliance with the National Pollution Discharge Elimination System (NPDES) and all applicable jurisdictions.

PART 2 - PRODUCTS

2.01 GENERAL

A. Open mesh biodegradable mulching cloth.

B. Fertilizer shall be 10-10-10 grade or equivalent.

C. Lime shall be Dolomitic Agricultural Ground limestone, per FDOT Section 982.

D. Provide permanent grass seed in accordance with Section 32 92 01.

E. Provide temporary grass seed in accordance with Section 32 92 01.

F. Silt fence shall consist of non-biodegradable filter fabric (Trevira, Mirafi, etc.), per FDOT Section 985, wired to galvanized wire mesh fencing and supported by wood or metal posts.

G. Floating turbidity barriers per FDOT Section 985 and FDOT Standard Index 103.

H. Staked turbidity barriers

I. Rock bags

J. Erosion Stone: FDOT Section 530
   1. Sand-Cement Riprap
   2. Concrete Block
   3. Rubble 20 to 300 pounds each

K. Filter Fabric for placement under Riprap shall meet the requirements FDOT Section 985.

L. Baled hay or straw in accordance with FDOT Section 104.

M. Drain pipe with sock (sedimentation control) shall be used to prevent and control soil erosion runoff and intrusion into stormwater drainage systems.

   1. Drain sock products such as “ADSSock” or approved equal.
   2. Sock material shall be on ultra-porous filter (synthetic wrap material) fitted snuggly over pipe. Material shall be 100 percent knitted polyester (or approved equal), equivalent opening size of 30 to 40, burst strength of 100-135 (ASTM D 3786), fiber size of 100-200 denier filament, 2.5 to 3.5 ounces per square yard (ASTM D 3776).
   3. Approval of material is required by County prior to use.
   4. Drain pipe with sock shall span the entire opening of the inlet.

PART 3 - EXECUTION

3.01 CLEARING

A. Clearing and grubbing shall be scheduled and performed in such a manner that subsequent grading operation and erosion control practices can follow immediately thereafter. Excavation, borrow, and embankment operations will be conducted as a continuous operation. All construction areas not otherwise protected shall be planted with permanent vegetative cover within 30 working days after completion of active construction.

3.02 STABILIZING

A. The angle for graded slopes and fills shall be no greater than the angle, which can be retained by vegetative cover or other adequate erosion control devices or structures. All disturbed areas outside of embankment left exposed will, within 30 working days of completion of any phase of grading, be planted or otherwise provided with either temporary or permanent ground cover, devices, or structures sufficient to restrain erosion.

3.03 REGULATORY REQUIREMENTS

A. Whenever land disturbing activity is undertaken on a tract, a ground cover sufficient to restrain erosion must be planted or other wise provided within 30 working days on that portion of the tract upon which further active construction is to be undertaken.

B. If any earthwork is to be suspended for any reason whatsoever for longer than 30 calendar days, the areas involved shall be seeded with vegetative cover or otherwise protected against excessive erosion during the suspension period. Suspension of work in any area of operation does not relieve the Contractor of the responsibility for the control of erosion in that area.

PART 4 - CONSTRUCTION PHASE

4.01 PRACTICES

A. Avoid dumping soil or sediment into any stream bed or watercourse.

B. Maintain an undisturbed vegetative buffer where possible between a natural watercourse and trenching and grading operations.

C. Avoid equipment crossings of streams, creeks, and ditches where practicable.

PART 5 - SEDIMENT CONTROL FEATURES

5.01 GENERAL

A. All devices (silt fences, retention areas, etc.), for sediment control shall be constructed at the locations indicated prior to beginning excavation on the site. All devices shall be properly maintained in place until a structure or paving makes the device unnecessary or until directed to permanently remove the device.

5.02 DESIGN APPLICATIONS

A. Mulch shall be used for temporary stabilization of areas subject to excessive erosion, and for protection of seed beds after planting where required.

B. Filter Fabric, drain pipe with sock, or other approved methods shall be placed and secured over the grates of each existing inlet, grating or storm pipe opening near the area of excavation to prevent silt and debris from entering the storm systems.

C. Silt fences, hay bales and floating turbidity barriers shall be used as shown on the plans or as directed by the Project Representative to restrict movement of sediment from the site.

D. Establish vegetative cover on all unpaved areas disturbed by the work.

1. Preparation of Seedbed. Areas to be seeded shall be scarified a depth of four inches until a firm, well pulverized, uniform seedbed is prepared. Fertilizer shall be applied during the scarification process in accordance with the following rates.
   a. Fertilizer - 10 to 15 pounds per 1,000 square feet
2. Seeding. Disturbed areas along embankments shall be permanently seeded with mix specified in Section 32-92-01.

3. Mulch all areas immediately after seeding. Mulch shall be applied and anchored as specified herein before.

5.03 MAINTENANCE

A. Maintain all temporary and permanent erosion control measures in functioning order. Temporary structures shall be maintained until such time as vegetation is firmly established and grassed areas shall be maintained until completion of the project. Areas which fail to show a suitable stand of grass or which are damaged by erosion shall be immediately repaired. No additional payment will be made to the

Contractor for the re-establishment of erosion control devices, which may become damaged, destroyed, or otherwise rendered unsuitable for their intended function during the construction of the Project.

B. Remove all silt, sediment and debris buildup on a regular basis to maintain functioning storm systems and erosion control devices.

5.04 REMOVAL OF SEDIMENT CONTROL DEVICES

A. Near completion of the project, when directed by the County's's agent, the Contractor shall dismantle and remove the temporary devices used for sediment control during construction. All erosion control devices in seeded areas shall be left in place until the grass is established. Seed areas around devices and mulch after removing or filling temporary control devices. Cleanup all areas.

END OF SECTION

SECTION 01 58 01

PROJECT IDENTIFICATION SIGNS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. Furnish, install and maintain project identification sign on Pinellas County Projects.

B. Remove sign on completion of construction.

1.02 PROJECT IDENTIFICATION SIGNS

A. Signs shall be not less than thirty-two (32) square feet in area, with painted graphic content to include the following and as shown on the following page:

1. Title of Project
2. Name of Owner
3. Names and titles of authorities as directed by County
4. Names and title of:
   a. Engineer
   b. Professional Consultants

5 Prime Contractor

6. Major subcontractors
7. Project Cost
8. Pinellas County Web Page
9. County logo
10. Other logos subject to the requirements of the Project.

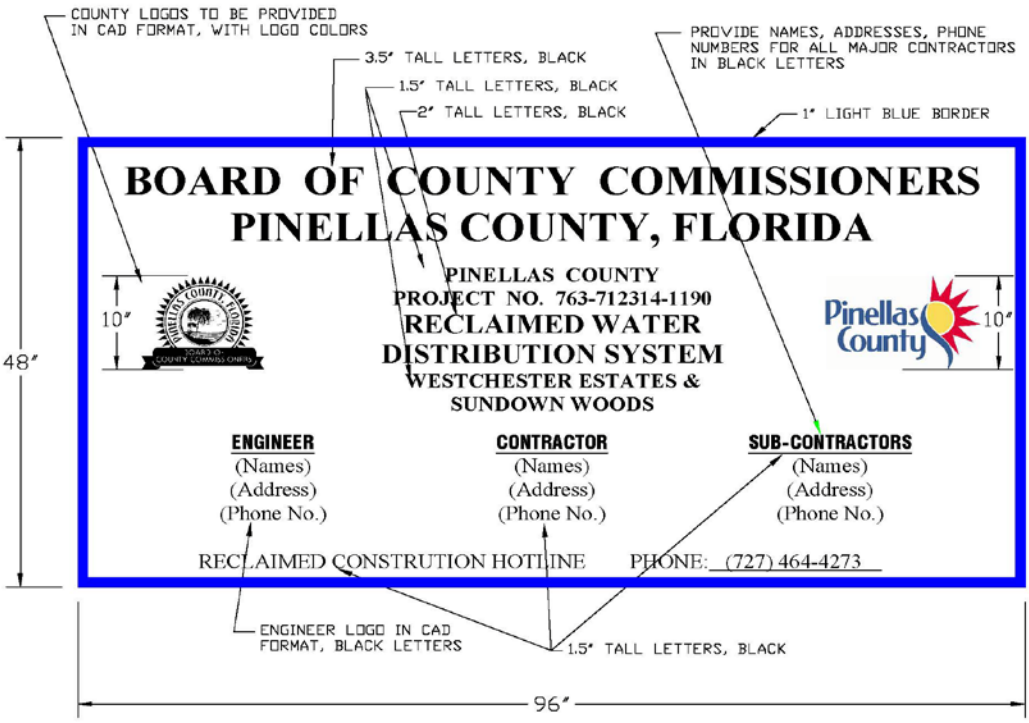
B. Graphic design, style of lettering and colors: As approved by the Engineer, subject to the approval of the County.

C. Erect on the site at a lighted location of high public visibility, as approved by the Engineer and the County.

1.03 QUALITY ASSURANCE

A. Sign Painter: Professional experience in type of work required.

B. Finishes, Painting: Adequate to resist weathering and fading for scheduled construction period.



PART 2 - PRODUCTS

2.01 SIGN MATERIALS

A. Structure and Framing: May be new or used, wood or metal, in sound condition, structurally adequate to work and suitable for specified finish.

B. Sign Surfaces: Exterior softwood plywood with medium density overlay, standard large sizes to minimize joints.

1. Thickness: As required by standards to span framing members, to provide even, smooth surface without waves or buckles.

C. Rough Hardware: Galvanized.

D. Paint: Exterior quality, as specified below.

1. Wood

a. Surface Preparation: Sand smooth, seal knots with white shellac (fill holes with vinyl putty after prime).

b. Prime: Painted trim and siding - white pigmented non-penetrating alkyd based primer appled at the rate of 3.0 mils dry film thickness.

c. Finish: Painted trim and face - apply two coats semi-gloss modified acrylic latex applied at a rate of at least 2.0 mils dry film thickness, per coat.

2. Steel

a. Surface Preparation: Commercial blast according to the Steel Structures Painting Council Specifications SP-6.

b. Prime: One coat of a combination of lead chromate rust inhibitive and synthetic pigmented alkyd resins, minimum 1.5 mils dry film thickness. If shop coat is damaged, reprime base areas in field.

c. Finish: Two coats of semi-gloss medium to long oil alkyd resin coating, 1.5 mils dry film thickness per coat.

3. Use Bulletin colors for graphics.

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 MAINTENANCE

A. Maintain signs and supports in a neat, clean condition; repair damages to structures, framing or sign.

3.03 REMOVAL

A. Remove signs, framings, supports and foundations at completion of Project.

END OF SECTION

SECTION 01 70 00

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Comply with requirements stated in Conditions of the Contract and in Specifications for administrative procedures in closing out the Work.

B. Related Requirements Described Elsewhere:

1. Project Record Documents: Section 01 78 39.
2. Warranties and Bonds: Section 01 78 36.

1.02 SUBSTANTIAL COMPLETION

A. The Work will not be substantially complete, and Contractor may not request substantial completion inspection unless the following submittals and work is completed:

1. Project Record Documents are complete and have been submitted and reviewed to the requirements of Section 01 78 39.

2. All areas to be used and occupied are safe, operable in automatic and complete.

3. All building occupancy certificates have been issued by the appropriate building permitting agency.

4. All painting, finishes, fencing, cleanup, final grading, grassing, planting, sidewalk construction, and paving shall have been completed and are ready for inspection.

5. All deficiencies noted on inspection reports or nonconformances are corrected or the correction plan approved.

B. When the conditions of paragraph 1.02 A. are met the Contractor shall submit to the Engineer:

1. A written notice that he considers the Work, or portion thereof, is substantially complete, and request an inspection.

2. A punchlist of items to be corrected. (Uncompleted work which is not related to the safe, effective, efficient use of the Project may be allowed on the punchlist with the Engineer's approval.)

C. Within a reasonable time after receipt of such notice, the Engineer will make an inspection to determine the status of completion.

D. Should the Engineer determine that the Work is not substantially complete:

1. The Engineer will promptly notify the Contractor in writing, giving the reasons therefor.

2. Contractor shall remedy the deficiencies in the Work and send another written notice of substantial completion to the Engineer.

3. The Engineer will within reasonable time, reinspect the Work. The Contractor will be liable for reinspection fees as described in Paragraph 1.04, herein.

E. When the Engineer finds that the Work is substantially complete, he will:

1. Schedule a walk-through of the facility to include the Owner. Engineer shall determine the completeness of the punchlist and readiness of the facility for occupancy by the Owner.

2. Prepare and deliver to Owner a tentative Certificate of Substantial Completion with the tentative punchlist of items to be completed or corrected before final inspection. A copy shall be provided to the District.

3. After consideration of any objections made by the Owner as provided in Conditions of the Contract, and when the Engineer considers the Work substantially complete, he will execute and deliver to the Owner and the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be completed or corrected. Any incomplete work allowed on a punchlist must be reinspected upon completion and any deficiencies found will be added to the punchlist.

1.03 FINAL INSPECTION

A. Prior to Contractor's request for a final inspection the following submittals and work must be complete:

1. Project Record Documents must be approved.

2. All spare parts and maintenance materials must be suitably delivered to the Owner per the requirements of the Technical Sections of the Specifications. Spare parts shall be properly stored by the Contractor until substantial completion is reached. Spare parts shall be delivered to the Owner at one time only as a complete set of spares.

3. Contractor to submit evidence of compliance with requirements of governing authorities.

B. After satisfying the requirements of Paragraph 1.03 A. and when Contractor considers the Work complete, he shall submit written certification that:

1. Contract Document requirements have been met.

2. Work has been inspected for compliance with Contract Documents.

3. Work has been completed in accordance with Contract Documents.

4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.

5. All punchlist items have been corrected or completed and the Work is ready for final inspection.

C. The Engineer will, within reasonable time, make an inspection to verify the status of completion after receipt of such certification.

D. Should the Engineer consider that the Work is incomplete or defective:

1. The Engineer will promptly notify the Contractor in writing, listing the incomplete or defective work.

2. Contractor shall take immediate steps to remedy the stated deficiencies, and send another written certification to the Engineer that the Work is complete.

3. The Engineer will, within a reasonable amount of time, reinspect the Work and the Contractor shall be liable for reinspection fees as described in Paragraph 1.04, herein.

E. When the Engineer finds that the Work is acceptable under the Contract Documents, the Contractor may make closeout submittals.

1.04 REINSPECTION FEES

A. Should the Engineer perform reinspections due to failure of the Work to comply with the claims of status of completion made by the Contractor:

1. Contractor will compensate the Owner for such additional services.

2. Owner will deduct the amount of such compensation from the final payment to the Contractor.

1.05 CONTRACTOR'S CLOSEOUT SUBMITTALS

A. Warranties and Bonds: To requirements of Section 01 78 36.

B. Evidence of Payment and Release of Liens: To requirements of General and Supplementary Conditions.

C. Certificate of Insurance for Products and Completed Operations.

1.06 FINAL ADJUSTMENT OF ACCOUNTS

A. Submit a final statement of accounting to the Engineer.

B. Statement shall reflect all adjustments to the Contract Sum:

1. The original Contract Sum.

2. Additions and deductions resulting from:

a. Previous change orders or written amendments.
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.

1.07 FINAL APPLICATION FOR PAYMENT

A. Contractor shall submit the final Application for Payment in accordance with procedures and requirements stated in the Agreement between City and Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 78 36

WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Related Work Described Elsewhere:

1. Contract Closeout: Section 01 70 00.

2. Shop Drawings, Working Drawings, and Samples: 01 33 00

1.02 SUBMITTAL REQUIREMENTS

A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.

B. Number of original signed copies required: Two (2) each.

C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.

1. Product of work item.

2. Firm, 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 or warranty or bond.

7. Contractor, name of responsible principal, address and telephone number.

1.03 FORM OF SUBMITTALS

A. Prepare in duplicate packets.

B. Format:

1. Size 8-1/2 inches by 11 inches, punch sheets for standard three (3) ring binder.

a. Fold larger sheets to fit into binders.

2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List:

a. Title of Project.
b. Name of Contractor.

C. Binders: Commercial quality, three (3) D-ring type binders with durable and cleanable white plastic covers and maximum D-ring width of two (2) inches. Binders shall be presentation type with clear vinyl covers on front, back, and spine. Binders shall include two sheet lifters and two horizontal inside pockets.

1.04 WARRANTY SUBMITTALS 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, unless otherwise specified, commencing at the time of final acceptance by the Owner.

B. The Contractor shall be responsible for obtaining certificates for equipment warranty for all major equipment. Electrical and which has at least 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.

C. In the event that the equipment manufacturer or supplier is unwilling to provide a one (1) year warranty commencing at the start of the Correction Period, the Contractor shall obtain from the manufacturer a two (2) year warranty commencing at the time of equipment delivery to the job site. This two (2) year warranty from the manufacturer shall not relieve the Contractor of the one (1) year warranty, starting at the time of Owner's acceptance of the equipment.

D. The Owner shall incur no labor or equipment cost during the guarantee period.

E. Guarantee shall cover all necessary labor, equipment, materials, and replacement parts resulting from faulty or inadequate equipment design, improper assembly or erection, defective workmanship and materials, leakage, breakage or other failure of all equipment and components furnished by the manufacturer or the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. Contractor shall maintain at the site one record copy of:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Engineer's field orders or written instructions.
6. Approved shop drawings, working drawings and samples.
7. Field test records.
8. Construction photographs.
9. Detailed Progress Schedule.

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store documents and samples in Contractor's field office apart from documents used for construction.

B. File documents and samples in accordance with CSI format.

C. Maintain documents in a clean, dry, legible, condition and in good order. Do not use record documents for construction purposes.

D. Make documents and samples available at all times for review by the Engineer and County.

E. As a prerequisite for monthly progress payments, the Contractor is to exhibit the currently updated “record documents” for review by the Engineer.

1.03 RECORDING

A. Label each document "PROJECT RECORD" in neat large printed letters.

B. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.

C. Drawings; Legibly mark to record actual construction:

1. Elevations of various structure elements in relation to grade.
2. All underground piping with elevations and dimensions. Changes in piping location. Horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements. Actual installed pipe material, class, etc.
3. Location of internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.
4. Field changes of dimension and detail.
5. Changes made by Field Order or by Change Order.
6. Details not on original Contract Drawings.
7. Equipment and piping relocations.
8. Intersection details: At least three ties to every valve and fitting, blowoff, fire hydrant and air release.
9. Services based on distance from main line pipe and property lines.
10. Backflow preventer assemblies locations, with ties to physical features.

D. All horizontal locations, if not in the right-of-way, must relate to easement.

E. All elevations shall be in feet and tenths, referenced to NAVD 1988.

F. Specifications and Addenda; Legibly mark each Section to record:

1. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed.
2. Changes made by Field Order or by Change Order.

1.04 SPECIAL REQUIREMENTS FOR MAIN REPAIRS

A. The Contractor will not be required to furnish as-built drawings for main repairs, but shall be required to furnish a complete "bill of materials" used at each repair, if requested by the County.

1.05 SPECIAL REQUIREMENTS FOR WATER MAINS, RECLAIMED WATER MAINS AND FORCE MAINS

A. In addition to that specified above, the following information shall be provided on the Record Drawings:

1. Location (vertical and any horizontal) at intervals not to exceed two hundred (200) feet and at all locations where the direction changes by more than ten (10) degrees.
2. Pipe size and material.

3. Air release manhole (rim and bottom elevation and horizontal location) i.e. ties to back of curb and nearest property corner or permanent control point.
4. Detailed location of valves (horizontal), i.e., ties to back of curb and nearest property corner or permanent control point.
5. Service connection locations for each designated meter.

B. All top of pipe elevations shall be accompanied by a finished grade elevation at the same location.

C. Horizontal location of the pipe shall be defined using ties to back of curb and nearest property corner, property line or permanent control point.

D. Should supplemental information be compiled or be available related to the "As-Built" condition of the Project, the Contractor shall provide that information, along with the "As-Built Record Drawing" documentation outlined above, which is required under the terms of the contract. Such supplemental information may include but not be limited to:

1. Length of pipe between fittings with depth every one hundred (100) feet.
2. Elevation of top of pipe at grade changes.
3. Manufacturer of pipe.
4. Manufacturer, number of turns to open and depth of valves
5. Define location of transition point between differing pipe materials
6. Flow capacity of fire hydrants if such field information was obtained during construction.

1.06 SPECIAL REQUIREMENTS FOR GRAVITY SEWER

A. In addition to that specified above, the following information shall be provided on the Record Drawings:

1. Manhole rim and invert elevations (include pipe inverts).
2. Manhole horizontal location (i.e. ties to back of curb and nearest property corner or permanent control point.)
3 Service laterals located from nearest down stream manhole (indicate any laterals out of manholes).
4. Distance between manholes.
5. Size and material of all pipe.

1.07 SPECIAL REQUIREMENTS FOR WASTEWATER PUMP STATIONS

A. In addition to that specified above, the following information shall be provided on the Record Drawings:

1. Location ties to back of curb and nearest property corner or permanent control point.
2. Wet well invert elevations.
3. Pipe invert elevations.
4. Valve vault inverts.
5. Top of slab elevations.
6. "As Built" elevations of all construction elevations shown on the Drawings.

1.08 SUBMITTAL

A. At Final Completion Date, deliver Record Documents to the Engineer.

B. Provide certified Record Drawings in electronic format (AutoCAD r14 or later version) meeting Pinellas County Standards and one hardcopy signed and sealed by a Florida registered surveyor and mapper.

C. Accompany submittal with transmittal letter in duplicate, containing:

1. Date.
2. Project title and number.
3. Contractor's name and address.
4. Title and number of each Record Document.
5. Signature of Contractor or his authorized representative.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 02 41 00

DEMOLITION

PART 1-GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. This section includes furnishing all labor, materials, equipment, and incidentals required for demolition of the existing pump station, adjacent vaults, and piping, equipment and electrical equipment as shown in the Drawings and as specified herein.

2. This section provides for the complete or partial removal and disposal of specified existing structures, foundations, slabs, piping mechanical, electrical, existing (to be abandoned) piping and miscellaneous appurtenances encountered during demolition operations.

3. The sequence of demolition of the existing structures will be in accordance with the approved Demolition and Removal Plan as specified in Paragraph 1.06 of this Section. The Contractor is solely responsible for the demolition sequencing of the work.

4. The Contractor shall be responsible for:

   a. Approximate locations and dimensions of piping and structures are shown in the Contract Drawings demolition plans. All piping and equipment to be demolished associated with the project shall be demolished and removed according to this Specification.

   b. Capping of all subsurface water piping as referenced in the Contract Drawings demolition plan.

   c. Termination and plugging of all subsurface water piping as referenced in the Contract Drawings demolition plans.

   d. Termination of all electric in accordance with local codes and NEC.

   e. Final grading and site restoration.

f. Disposal of non-salvageable and excess unacceptable materials as specified below.

g. All concrete slabs shall be removed before filling and compacting the depression with clean fill.

h. Water service shall not be disturbed, irrigation piping shall not be disturbed, and overhead electric shall not be disturbed except as noted above.

5. The Contractor shall examine the various drawings regarding the proposed site, visit the proposed site and determine for himself the extent of the work, the extent of the work affected therein and all conditions under which he is required to perform the various operations.

1.02 PERMITS AND NOTICES

A. Permits and Licenses: Contractor shall obtain all necessary permits and licenses performing the work and shall furnish a copy of same to the Engineer prior to commencing work. The Contractor shall comply with the requirements of the permits.

B. Notices: If applicable, Contractor shall issue written notices of planned demolition to companies or local authorities owning utility conduit, wires or pipes running to or through the project site. Copies of said notices shall be submitted to the Engineer.

C. Utility Services: If applicable, Contractor shall notify utility companies or local authorities furnishing gas, water, electrical, telephone or sewer service to remove equipment owned by them in structures to be demolished and to remove, disconnect, cap or plug their services to facilities demolition.

D. The Contractor shall obtain all necessary permits and shall submit all necessary notices as related to the demolition of asbestos and lead-based paint as required for performance of work. The Contractor shall comply with the requirements set forth in such permits.

1.03 CONDITIONS OR STRUCTURES

A. The Owner and the Engineer assume no responsibility for the actual condition of the structures to be demolished or modified.

B. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner insofar as practicable. However, variation within the structure may occur prior to the start of demolition work.

1.04 RULES AND REGULATIONS

A. The Standard Building Codes shall control demolition, modification or alteration of the existing buildings or structures.

B. No blasting shall be done on site. The Contractor shall not bring or store any explosives on site.

1.05 DISPOSAL OF MATERIAL

A. Salvageable material shall become the property of the Owner, if the Owner requests any specific item. The Contractor shall dismantle all materials to such a size that it can be readily handled, and deliver any of this salvageable material requested by the Owner to a storage area designated by the Owner.

B. The following type of materials are examples of what the Owner desires to keep:

1. Pipes and valves at the discretion of the Owner.

2. Equipment at the discretion of the Owner.

3. Miscellaneous metals and other materials at the discretion of the Owner.

C. Any materials that the owner rejects shall become the Contractor's property and must be removed from the site.

D. Concrete, concrete block and non-salvageable bricks shall be hauled to a waste disposal site by the Contractor.

E. All other material shall be hauled to a waste disposal site by the Contractor.

F. The storage, or sale, of removed items on the site will not be allowed.

G. The Contractor is responsible for the dewatering of pipelines.

1.06 SUBMITTALS

A. Submit to the Engineer for approval, two (2) copies of the proposed demolition and removal plan for the structures and modifications as shown on the Drawings or as specified herein prior to the start of work. Include in the schedule the coordination of shutoff, capping and continuation of utility service as required.

The demolition and removal plan shall include as a minimum, the following:

1. A detailed sequence of demolition and removal work to minimize interruptions of the Owner's operations, and to ensure the expeditious completion of the Contractor's work.

2. Evidence (by signature) of approval of the Owner's Inspector of the work plan.

B. Before commencing demolition work, all modifications necessary to bypass the affected structure will be completed. Contractor shall coordinate with the Owner's personnel to determine the locations of the affected utilities.

1.07 TRAFFIC AND ACCESS

A. Conduct demolition and modification operation, and the removal of equipment and debris to ensure minimum interference with roads, streets or walks both on-site and off-site and to ensure minimum interference with occupied or used facilities.

B. Special attention is directed towards maintaining safe and convenient access to the existing site.

C. Do not close or obstruct streets or walks without permission from the Owner and Engineer. Provide alternate traffic routes around closed or obstructed access ways.

1.08 DAMAGE

A. Promptly repair damage caused to adjacent facilities or structures within the project site by demolition operations and at no cost to the Owner.

1.09 UTILITIES

A. Maintain existing utilities to remain in service and protect against damage during demolition operations.

B. Do not interrupt existing utilities serving occupied or used facilities, except when authorized by the Owner and the Engineer. Provide temporary service during interruptions to existing utilities as acceptable to the Owner.

C. The Contractor shall cooperate with the Owner to shut off utilities serving structures of the existing facilities as required by demolition operations.

D. The Contractor shall be solely responsible for making all necessary arrangements and for performing any necessary work involved in connection with the discontinuance or interruption of all public and private utilities or services under this jurisdiction of utility companies.

E. All utilities being abandoned shall be disconnected and terminated at the service mains in conformance with the requirement of the utility companies or the municipality owning or controlling them.

1.10 POLLUTION CONTROL

A. For pollution control, use water sprinkling, temporary enclosures, and other suitable methods as necessary to limit the amount of dust and dirt rising and scattering in the air to the lowest level of air pollution practical for the conditions or work. Comply with the governing regulations.

B. Clean structures and improvements of all dust, dirt, and debris caused by demolition operations as directed by the Engineer. Return areas to conditions existing prior to the start of work.

1.11 QUALITY CONTROL

A. Protect all existing materials and equipment either in operation or to be salvaged or reused, from damage.

B. Cap, plug, and/or grout all lines to be abandoned as indicated on the Drawings. Place covers and label all junction boxes, conduits, and wire as abandoned.

C. Leave all exposed ends of all pipe and conduit or junction boxes covered and safe.

PART 2 – MATERIALS (NOT USED)

PART 3 – EXECUTION

3.01 SEQUENCE OF WORK

A. The sequence of demolition of the existing structures will be in accordance with the approved Demolition and Removal Plan as specified in Paragraph 1.06 of this Section.

3.02 REMOVAL OF EXISTING PROCESS EQUIPMENT, PIPING AND APPURTENANCES

A. Existing equipment, piping, buried and non-buried valving, and appurtenances shall be removed or abandoned in-place as shown or dictated or the Drawings, and/or specified herein.

B. All equipment piping and appurtenances shall be cleaned, flushed, and drained. Equipment to be retained by the Owner as specified in Paragraph 1.05 above shall be dismantled sufficiently to permit thorough cleaning and draining. All valves shall be left open.

3.03 STRUCTURES TO BE COMPLETELY DEMOLISHED

A. Existing structures shall be completely demolished as shown on the Drawings. Structures shall be demolished to make room for construction of new facilities, unless otherwise shown on the Drawings. All demolished material and equipment shall be removed from site.

3.04 MISCELLANEOUS CONCRETE SLABS, ROADWAYS AND SIDEWALKS

A. Remove concrete slabs, roadways and sidewalks where shown on the drawings or where necessary for the construction of the new structures or modifications of existing structures.

B. All areas where slabs are removed shall be filled with clean fill and sodded in open areas.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: The Contractor shall furnish all labor and materials required and install cast-in-place concrete complete as shown on the Drawings and as specified herein, or incidental to the proper execution of the work.

1.02 QUALITY ASSURANCE

A. Standards: Unless otherwise indicated, all materials, workmanship and practices shall conform to the requirements of the following standards:

1. American Concrete Institute (ACI)

a. ACI 304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete.

b. ACI 305 - Hot Weather Concreting.

c. ACI 306 - Cold Weather Concreting.

d. ACI 308 - Standard Practice for Curing Concrete.

e. ACI 309 - Guide for Consolidation of Concrete.

f. ACI 318 - Building Code Requirements for Reinforced Concrete.

g. ACI 347 - Guide for Concrete Formwork.

2. American Society for Testing and Materials (ASTM)

a. ASTM C33 - Concrete Aggregates.

b. ASTM C94 - Standard Specification for Ready-mix Concrete.

c. ASTM C143 - Slump for Portland Cement Concrete.

d. ASTM C150 - Standard Specification for Portland Cement.

e. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.

f. ASTM C173 - Air Content of Freshly Mixed Concrete by the Volumetric Method.

g. ASTM C231 - Air Content of Freshly Mixed Concrete by the Pressure Method.

h. ASTM C260 - Air Entraining Admixtures for Concrete.

i. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.

j. ASTM C494 - Chemical Admixtures for Concrete.

k. ASTM C618 - Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.

3. Building Codes

a. Standard Building Code (SBCCI).

b. Local Codes and Regulations.

B. Plant Qualification: Plant equipment and facilities shall meet all requirements of the Check List for Certification of Ready Mixed Concrete Production Facilities of the National Ready Mixed Concrete Association and ASTM C-94.

C. Evaluation And Acceptance Of Concrete: Evaluation and acceptance of concrete will be in accordance with ACI-318, Chapter 4.

1.03 SUBMITTALS

A. Materials and Shop Drawings: The following information shall be submitted for approval in accordance with Section 01 33 00: Shop Drawings, Work Drawings, and Samples. No concrete shall be furnished until submittal has been approved.

1. Plant Qualification: Satisfactory evidence shall be submitted indicating compliance with the specified qualification requirements.

2. Materials: Satisfactory evidence shall be submitted indicating that materials to be used, including cement, aggregates and admixtures meet the specified requirements. Provide catalog data, chemical and mechanical analysis, and conformance with ASTM requirements.

a. Sources of cement, pozzolan and aggregates.

b. Air-entraining admixture.

c. Water reducing admixture.

d. High range water-reducing admixture (plasticizer).

e. Sheet curing material.

f. Liquid curing compound.

3. Design Mix: Prior to placing any concrete, the Contractor shall submit for the Engineer's approval, a design mix, calculated by a recognized testing laboratory, and using the approved aggregates to produce a workable mix of the desired strength, together with certified copies of seven day and twenty-eight (28) day tests of cylinders taken from concrete made according to the design mix.

The mixes shall be designed to secure concrete having a minimum compressive strength at age twenty-eight (28) days as shown on the Plans or covered in other sections of these Specifications.

4. Ready Mix Concrete: Provide delivery tickets or weighmasters certificate per ASTM C-94, including weights of cement and each size aggregate, amount of water in the aggregate, and amount of water added at the plant. Write in the amount of water added on the job.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cement

1. Cement for all concrete shall be domestic Portland cement that conforms to the requirements of ASTM Designation C-150 Type I, Type II or Type III.

a. For general concrete construction, ASTM designation C-150, Type I or Type II, or Federal Specifications SS-C-192, Type I or II.

b. For construction of sewage treatment plan and pump station structures Type II cement shall be used.

c. Slag cement shall conform to ASTM designation C-465.

d. Slag cement may be used in the maximum ratio of one part of slag cement by weight to six parts of total cement by weight, if approval by the Engineer, is obtained prior to use

2. Only one (1) brand of cement shall be used in any individual structure unless approved by the Engineer. Cement which has become damaged, partially set, lumpy or caked shall not be used and the entire contents of the sack or container which contains such cement.

B. Concrete Bag Mix

1. Quickete 5000 High Early Strength Concrete Mix #1007 or Engineer approved equal.

2. Use of bag mix is strictly limited to non-structural use and Engineer designated locations only.

3. The Contractor is required to strictly adhere to the mixing and installation instructions set forth by the manufacturer.

4. Testing to be performed at Engineers discretion. Concrete not meeting design strength or not properly installed per the manufacturer is subject to removal and replacement at no additional cost to the County.

C. Pozzolan

1. Fly ash shall be Class C or F conforming to the requirements of ASTM C618, including the requirements of Table 1 except the loss of ignition, LOI, shall be limited to 3% maximum. Fly ash shall not exceed 20% of the cementitious content of the mix.

D. Flowable Fill

1. Cement Stabilized Fly Ash Fill (CSFAF) consisting of cement, fly ash, and water.

E. Aggregates

1. ASTM C-33. Coarse aggregates shall be size No. 67 (3/4 inch).

2. Where the cover over reinforcing is two inches or more, the maximum size of aggregate shall be one and one-half inches. Where the cover over reinforcing is less than 2-inches, the maximum size of aggregate shall be three-quarter inch. The maximum size of aggregate shall not exceed one-fifth of the narrowest dimension between forms nor three quarters of the minimum clear spacing between reinforcing bars. The grading of the coarse aggregate in the concrete shall be within the following limits: 32

	Percent Passing
Maximum size square mesh screen	97 - 100 percent
Maximum size square mesh screen	40 - 70 percent
No. 4 Sieve	0 - 6 percent

F. Water: Clean and free from injurious amounts of deleterious materials..

1. Water from any source other than a municipal water supply shall be shown by test to comply with Florida State Road Department requirements for mixing water.

G. Reinforcement

1. Reinforcing bars shall conform to the requirements of the latest revision of Federal Specification QQ-S-632 and shall be as follows unless indicated otherwise on the plans:

a. Bent:	Type II (deformed), Class B40
b. Straight:	Type II (deformed), Class B40
c. Column Ties:	Type I (plain), Class B40

2. Wire mesh, unless otherwise shown on the drawings or specified, shall be 6” x 6” No. 10 woven, or electrically welded wire fabric conforming to the requirements of ASTM designation A 185, latest revision.

3. Reinforcing steel shall be detailed, fabricated and placed according to the methods and standards recommended in the “Manual of

Standard Practice for Detailing Reinforced Concrete Structures" of the American Concrete Institute.

H. Joints

1. Water Stops

a. Materials for stops shall be 1/8-inch steel plate welded into a continuous strip, or an approved alternate material.

I. Grouting and Patching

1. Cement for use in grouting and patching shall be non-shrinking material free of stain-causing agents and matching the adjacent concrete in appearance.

2. Bonding Agent: To be structural epoxy adhesive conforming to ASTM-C881 Type I & II, Grade 2, Class B & C with a minimum bond strength of 1900 psi.

J. Air Entraining Admixture: ASTM C-260.

K. Water Reducing and Retarding Admixtures:

1. For concrete without superplasticizer: ASTM C-494, Type D, and shall contain no calcium chloride by weight of cement.

2. For concrete with superplasticizer

a. ASTM C-494, Type F or G. The admixture shall be a second generation type, free of chlorides and alkalis (except for those attributable to water) and composed of a synthesized sulfonated complex polymer. The concrete shall be capable of maintaining its rheoplastic state in excess of two (2) hours if necessary. Superplasticizers admix shall be induced at the batch plant only, job site redosage shall not be permitted without prior approval from the Engineer.

b. Approved Materials:

(1) Rheobuild 716as manufactured by MAC-USA, Inc., Boca Raton, Florida, telephone: (407) 368-0121 or Rheobuild 716 as manufactured by Master Builders Technologies, Cleveland, Ohio.

(2) Daracem 100 as manufactured by W.R. Grace & Co. Construction Products Division, Pompano Beach, Florida.

c. Manufacturer's job site representation: A competent field service representative from the manufacturer of each of the admixtures (superplasticizer) selected for use shall be available at the job site to provide advice and consultation on the use of the admixture materials, including the effect on the concrete in place. The representative shall be available on short call at any time requested by the Owner, Contractor, or concrete producer.

d. Manufacturer's representative will be responsible to recommend maximum discharge time for superplasticizer and to recommend method and procedure to induce superplasticizer into mixer.

e. Manufacturer's representative will be responsible to recommend quantities of admixtures to be used if variations are required because of temperature/humidity, wind, or other environmental considerations.

L. Curing Compound: ASTM C-309, Type 1. The compound shall contain no ingredient which will adversely affect the bond of coatings or toppings. Curing compound shall be approved for use in contact with potable water after 30 days.

1. Curing compound for exposed concrete not to receive special finishes, protective coatings and/or concrete toppings shall be "Super Rez-Seal", as manufactured by Euclid Chemical Co., Cleveland, Ohio or equal.

2. Curing compound for exposed concrete to receive special finishes, protective coatings and/or concrete toppings shall be "Kurez-DR", as manufactured by Euclic Chemical Co., Cleveland, Ohio or equal.

M. Mortar for Repair of Concrete: Mortar used for repair of concrete shall be made of the same materials as used for concrete, except that the coarse aggregate shall be omitted and the mortar shall consist of not more than one (1) part cement to two and one-half (2-1/2) parts sand by damp loose volume. The quantity of mixing water shall be no more than necessary for handling and placing.

N. Burlap Mats: Conform to AASHTO Specification M-182.

O. Epoxy Bonding Agent: Sikadur 32 Hi Mod, or equal.

2.02 MIXES

A. General Requirements:

1. Mix Design: Proportioning shall be on the basis of field experience and/or trial mixtures as specified in ACI-318, Section 4.3. Data on consecutive compression tests and standard deviation shall be submitted. Proportioning for small structures may be by the water/cement ratio under special approval by the Engineer. Concrete mix design shall comply with the Standard Building Code requirements.

2. Air Content: Range 3.5 to 6% for Class A and B.

3. Slump: 4 inches plus or minus 1 inch for Class A and B without superplasticizer.

   8 inches plus or minus 1 inch for concrete with superplasticizer.

   6 inches plus or minus 1 inch for tremie concrete.

4. Water cement ratio = 0.45 (Class A Concrete) without superplasticizer.

   = 0.55 (Class B Concrete) without superplasticizer.

   = 0.37 Concrete with superplasticizer.

5. Minimum Compressive Strength at 28 days:

   a. Class B, 3,000 psi: Slab on grade, driveways, concrete curbs, retaining walls, sidewalks, etc. not in contact with treated waters.

   c. Slab on grade shall include all slabs 10 inches thick or less and requires Class B 3000 psi concrete.

B. Production of Concrete:

1. General: Concrete shall be ready mixed and shall be batched, mixed and transported in accordance with ASTM C-94, except as otherwise indicated.

Time

a. The minimum time for mixing each batch after all materials are in the mixer shall be one minute for ½ to 1 ½ cubic yard mixers, and 1 ½ minutes for mixers over 1 ½ cubic yard capacity. The mixer shall revolve at a uniform speed, a minimum of twelve (12) revolutions after all materials have been placed therein.

b. Neither the speed, nor the volume capacity of the mixer, shall exceed those recommended by the manufacturer. Excessive over-mixing, requiring addition of water to preserve the consistency, will not be permitted.

2. Air Entraining Admixture: Air entraining admixture shall be charged into the mixture as a solution and shall be measured by means of an approved mechanical dispensing device. The liquid shall be considered a part of the mixing water.

3. Water Reducing and Retarding Admixture: Water reducing and retarding admixture shall be added and measured as recommended by the manufacturer. The addition of the admixture shall be separate from the air entraining admixture. The addition of the admixture shall be completed within one minute after addition of water to the cement has been completed, or prior to the beginning of the last three-quarters of the required mixing, whichever occurs first. Admixtures shall be stored, handled and batched in accordance with the recommendation of ASTM C-94.

C. Delivery Tickets: In addition to the information required by ASTM C-94, delivery tickets shall indicate the cement content and the water/cement ratio.

D. Temperatures: The temperature of the concrete upon delivery from the truck shall not exceed 95 degrees Fahrenheit (°F), otherwise ice shall be used to reduce the temperature of the concrete as recommended by ACI.

E. Modifications To The Mix: No modifications to the mix shall be made in the plant or on the job which will decrease the cement content or increase the water-cement ratio beyond that specified. No modifications of any kind shall be made except by a qualified and responsible representative of the concrete producer.

1. Any addition of water must be approved by the Engineer. Added water shall be incorporated by additional mixing of at least 35

revolutions. All added water shall be metered and the amount of water added shall be shown on each delivery ticket. Addition of water shall follow procedures of ASTM C-94 for slump adjustment.

PART 3 - EXECUTION

3.01 PREPARATION

A. Reinforcing Steel

1. The reinforcing fabricated to shapes and dimensions shown, shall be placed where indicated on the Drawings. Before placing, all reinforcements shall be thoroughly cleaned of rust, mill scale or coatings, which would reduce or destroy the bond.

2. Splices in reinforcing mats shall be staggered. Horizontal mats shall be supported on metal chairs with all sills or pads below subgrade. Spacers shall be provided for wall and column steel and shall be removed as the concrete is placed.

3. The concrete covering over sheet reinforcement shall be as shown on the Plans.

B. Preparations Before Placing: No concrete shall be placed until the approval of the Engineer has been received. Approval will not be granted until forms are thoroughly clean, and reinforcing and all other items required to be set in concrete have been placed and thoroughly secured. The Engineer shall be notified a minimum of 24 hours before concrete is placed.

C. Conveying:

1. General: Concrete shall be handled from the truck to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of ingredients to maintain the quality of the concrete. No concrete shall be placed more than 90 minutes after mixing has begun for that particular batch.

2. Buckets and Hoppers: Buckets and hoppers shall have discharge gates with a clear opening equal to no less than one-third of the maximum interior horizontal area, or five (5) times the maximum aggregate size being used. Side slopes shall be no less than 60 degrees. Controls on gates shall permit opening and closing during the discharge cycle. It is suggested the Contractor provide one (1) standby bucket and hopper for use in case of equipment failure.

3. Runways: Extreme care shall be exercised to avoid displacement of reinforcing during the placing of concrete.

4. Elephant Trunks: Hoppers and elephant trunks shall be used to prevent the free fall of concrete for more than 6 feet.

5. Chutes: Chutes shall be metal or metal lined, and shall have a slope not exceeding one vertical to two horizontal, and not less than one vertical to three horizontal. Chutes more than 20 feet long and chutes not meeting the slope requirements, may be used only if they discharge into a hopper before distribution.

6. Pumping Equipment: Pumping equipment and procedures, if used, shall conform to the recommendations contained in the report of ACI Committee 304 on "Placing Concrete by Pumping Methods", ACI 304.2R. The specified slump shall be measured at the point of discharge. The loss of slump in pumping shall not exceed 1-1/2 inches.

7. Conveying Equipment Construction: Aluminum or aluminum alloy pipe for tremies or pump lines and chutes, except for short lengths at the truck mixer shall not be permitted.

8. Cleaning: Conveying equipment shall be cleaned at the end of each concrete operation.

3.02 APPLICATION

A. Placing:

1. General: Concrete shall be deposited continuously, or in layer of such thickness (not exceeding 2 feet in depth) that no concrete will be deposited on concrete that has hardened sufficiently to cause the formation of seams or planes of weakness.

2. Supported Elements: At least 2 hours shall elapse after depositing concrete in columns or walls before depositing in beams, girders, or slabs supported thereon.

3. Segregation: Concrete shall be deposited as nearly as practicable in its final position to avoid segregation due to rehandling or flowing. Concrete shall not be subjected to procedures which will cause segregation.

4. Concrete Under Water: All concrete shall be placed in the dry.

B. Consolidating Concrete:

1. General: Concrete, with the exception of slabs less than 8 inches thick, shall be consolidated by means of internal vibrators operated by competent workmen.

   a. Concrete Slabs: Concrete for slabs less than 8 inches shall bE consolidate with vibrating screeds: slabs 8-inches to 12-inches thick shall be compacted with internal vibrators and (optionally) with vibrating screeds. Vibrators shall always to placed into concrete vertically and shall not be laid horizontally or laid over.

2. Vibrators: Vibrators shall have a minimum head diameter of at least 2 inches, a minimum centrifugal force of 700 and a minimum frequency of 8,000 vibrations per minute.

3. Vibrators for Confined Areas: In confined areas, the specified vibrators shall be supplemented by others having a minimum head diameter of 1-1/2 inches, a minimum centrifugal force of 300 pounds and a minimum frequency of 9,000 vibrations per minute.

4. Spare Vibrator: One (1) spare vibrator for each three (3) in use shall be kept on the site during all concrete placing operations.

5. Use of Vibrators: Vibrators shall be inserted and withdrawn at points approximately 18 inches apart. The duration of each insertion shall be from 5 to 15 seconds. Concrete shall not be transported in the forms by means of vibrators.

C. Slabs

1. No special concrete or cement mortar topping course shall be used for slab finish, unless shown on the drawings. The slab shall be brought to a true and even finish by power or hand-floating. Unless otherwise specified, the surface shall be floated to a true, regular surface with a wood float and shall be steel-troweled to a smooth finish. Troweling shall be the minimum to obtain a smooth, dense surface and shall not be done until the mortar has hardened sufficiently to prevent excess fine material from being worked to the surface. All floor surfaces except those which are to be painted, shall immediately, after troweling, be brushed lightly with a soft bristle janitor's push broom to produce a non-slip surface. The brushing shall be sufficient to mark the surface only, without appreciably disturbing the troweled finish.

D. Protection: Rainwater shall not be allowed to increase the mixing water, nor to damage the surface finish. Concrete shall be protected from construction overloads. Design loads shall not be applied until the specified strength has been attained.

E. Construction Joints: Except as otherwise indicated on the Drawings, horizontal construction joints shall be provided at top of foundation members and slabs on grade and at the soffit of supported slabs and beams. Other horizontal and vertical construction joints shall be located as indicated on the Drawings. Joints will not be permitted except in the locations shown, unless recommended by the Contractor and approved by the Engineer.

F. Bonding: Before depositing new concrete on or against concrete that has set, the surfaces of the set concrete shall be thoroughly cleaned so as to expose the coarse aggregate and be free of laitance, coating, foreign matter and loose particles. Forms shall be retightened. The hardened concrete of joints shall be dampened, but not saturated, and then thoroughly covered with a coat of cement grout of similar proportions to the mortar in the concrete. The grout shall be as thick as possible on vertical surfaces and at least 1/2 inches thick on horizontal surfaces. The fresh concrete shall be placed before the grout has attained its initial set.

G. Embedded Items: In addition to steel reinforcement, pipes, inserts and other metal objects as shown, specified or ordered shall be built into, set in or attached to the concrete. All necessary precautions shall be taken to prevent these objects from being displaced, broken or deformed. Before concrete is placed, care shall be taken to determine that all embedded parts are firmly and securely fastened in place as indicated. They shall be thoroughly clean and free from paint or other coating, rust, scale, oil, or any foreign matter. No wood shall be embedded in concrete. The concrete shall be packed tightly around pipes and other metal work to prevent leakage and to secure proper adhesion. Drains shall be adequately protected from intrusion of concrete.

H. Concrete Finishes: Complete concrete surfaces in accordance with the following schedule:

1. Finish Designation Area Applied

S-1 Slabs and floors not water bearing. Smooth steel trowel finish.

S-2 Slabs and floors which are water bearings. Slab Surfaces on which mechanical equipment moves. Steel trowel finish free from trowel marks and all irregularities.

S-3 Slabs and floors of structures or building exposed to view. Steel trowel finish without local depressions or high points and apply a light hair-broom finish. Do not use stiff bristle brooms or brushes. Leave hair-broom lines parallel to the direction of slab drainage.

S-4 Slabs and floors at slopes greater than 10 percent. Steel trowel finish without local depressions or high points. Apply a stiff bristle broom finish. Leave broom lines perpendicular to the direction of slope drainage.

E-1 Exposed edges of slabs, floors and tops of walls. Finish with a 1/4 inch radius edge if a chamfer is not indicated.

2. General: As soon as forms can safely be removed, all irregular projections shall be chipped off flush with the concrete surfaces. All voids produced by spacers or any honeycombing shall be pointed up with grout and troweled flush with the concrete surface immediately after removal of forms and water cured to prevent shrinkage. Honeycombing shall be cut out to expose a sound concrete surface prior to pointing. The use of mortar pointing or patching shall be confined to the repair of small defects in relatively green concrete. Where in the opinion of the Engineer substantial repairs are required, the defective concrete shall be cut out to sound concrete and repaired with gunite or the concrete shall be removed and reconstructed as directed.

3. All concrete slabs to be troweled shall receive a floated finish. After floating, all concrete slabs except as otherwise indicated and in areas to receive roofing, insulation, tile or topping shall be troweled and immediately light broom finished. Stair treads shall receive a light broomed finish.

4. Floated Finish: After concrete has been placed. Consolidated, struck off and leveled, it shall not be worked further until water sheen has disappeared and the surface has hardened sufficiently to permit floating, the planeness of the slab shall be checked with a 10 foot straightedge applied at no less than two (2) angles. All high spots shall be cut down and all low spots shall be filled to produce a surface having a Class B Tolerance throughout. The slab shall then be refloated to a uniform sandy texture.

5. Light Broomed Finish: After floating, slabs to receive a light broomed finish shall be power troweled and finished struck with a soft broom rag. The troweling shall produce a smooth surface,

relatively free of defects and a Class B Tolerance. Before the surface sets, the soft broom drag shall be passed over the surface to produce a surface uniform in texture and appearance.

6. Troweled Finish: After floating, slabs to receive a troweled finish shall be power troweled and finally hand troweled. The first troweling after power floating shall produce a smooth surface, relatively free of defects. Surfaces shall be hand troweled after the surface has hardened sufficiently. The final troweling shall be done by hand when a ringing sound is produced as the trowel is moved over the surfaces. Hand troweling shall produce a surface which is thoroughly consolidated, free from trowel marks, uniform in texture and appearance and plane to a Class B tolerance.

7. Finishing Tolerance: Surfaces shall be true planes within the following limits:

a. Class B: 1/4 inch in 10 feet is determined by a 10 foot straightedge placed anywhere on the slab in any direction.

I. Saw cut Joints: Joints that are to be saw cut shall be cut not sooner than 2 hours after the concrete is poured and not later than 8 hours after the pour.

3.03 PROTECTING

A. Curing:

1. All exposed surfaces, including slabs, walls, beams and columns shall receive a spray coat of curing compound applied in accordance with the manufacturer's recommendations. Exposed steel keyways and other embedded items shall be protected from the curing compound. Concrete surfaces to be exposed to wastewater and are to be coated with an epoxy system, shall be cured by the wet burlap method. Curing compounds shall not be used on surfaces to be coated and exposed to sewage or wastewater.

2. Curing compound shall be uniformly applied to the surfaces to be cured, in a single coat, continuous film by a mechanical sprayer. Application shall be in compliance with the manufacturer's recommendations.

3. Curing compound shall be applied in accordance with manufacturer's instructions. Should the film become damaged from any cause within the repaired curing period, the damaged

portions shall be required immediately with additional compound. Upon removal of forms, the newly exposed surfaces shall immediately be coated to provide a curing treatment equal to that provided for the surface.

B. Wet Burlap Curing Method: All concrete for wastewater/water retaining structures to be cured by the wet burlap method. All concrete shall be covered with a double thickness of burlap, cotton mats, or other approved material kept thoroughly saturated with water. The forms shall be kept wet until removed and upon removal, the curing specified herein shall be started immediately. Concrete shall be cured for a period of 7 days for normal Portland cement or 4 days for high early strength cement. Concrete poured in the dry shall not be submerged until it has attained sufficient strength to adequately sustain the stress involved nor shall it be subjected to flowing water across its surface until it has cured 4 days. Curing the gunite shall be started as soon as possible without damaging surface and not later than 2 hours after placing. Begin wet cure as soon as concrete attains an initial set and maintain wet cure 24 hours a day.

C. Sheet Material Curing: Cover entire surface with sheet material. Securely anchor sheeting to prevent wind and air from lifting the sheeting or entrapping air under the sheet. Place and secure sheet as soon as initial concrete set occurs.

D. Weather Protection

1. No concrete shall be mixed or placed when the air temperature in the shade and away from artificial heat is as low as forty (40) degrees Fahrenheit, and falling. Concrete may be mixed and placed when the air temperature in the shade, and away from artificial heat is thirty-five (35) degrees Fahrenheit, and rising.

2. Fresh concrete shall be protected from rain, flowing water and mechanical injury and all concrete shall be protected from injurious action by the sun.

3.04 REMOVAL OF FORMS

A. Except as otherwise specifically authorized by the Engineer, forms shall not be removed before the concrete has attained a strength of at least 70 percent of the 28 day compressive strength prescribed by the design.

B. Shores shall not be removed until the concrete has attained at least 60 percent of the specified strength and also sufficient strength to support safely its own weight and the construction live loads upon it.

3.05 TESTING

A. An independent testing laboratory employed by the Contractor will make such tests required.

B. Compressive strength tests shall be made by breaking standard 6-inch diameter by 12-inch high test specimens prepared, cured and broken in accordance with the American Society for Testing Materials Standard Methods, C-31 and C-39, latest revision. Four specimen test cylinders shall be taken from each concrete pour of five cubic yards or more. One additional test shall be taken from each thirty (30) cubic yards or fraction thereof, in each pour in excess of thirty (30) cubic yards. Test specimens shall be taken from manhole bottom pours of less than five cubic yards as directed by the Engineer. Test specimens shall be taken in the presence of the Engineer. One cylinder from each pour shall be broken at seven days, the remainder at twenty-eight (28) days. Additional test cylinders may be ordered for determining the characteristics of a new design mix or changes in equipment or methods, and under adverse weather, or curing conditions.

C. Slump test shall be made in accordance with ASTM C143, latest revision and shall be made whenever directed by the Engineer.

D. The laboratory will conduct tests of Class A and Class B concrete as it is discharged from the mixer at the point of placing. Slump tests will be made for each truckload of concrete. Slump tests may be made on any batch, and failure to meet specified slump requirements will be sufficient cause for rejection of the batch. If water is added after initial test then the "load" shall be tested.

E. Air content of the concrete mixture will be tested on every other truck in accordance with ASTM C173 or ASTM C231.

F. Historical strength/break data may be submitted with mix design and may be used in the approval process provided the mix design is otherwise acceptable. If the mix design required modifications, a test batch may still be required.

3.06 FIELD CONTROL

A. The Contractor shall advise the Engineer of his readiness to proceed at least twenty four (24) working hours prior to each concrete placement. The Engineer will inspect the preparations for concreting including the preparation of previously placed concrete, the reinforcing and the alignment and tightness of formwork. No placement shall be made without the prior approval of the Engineer.

1. The Contractor's Superintendent shall submit a certification that indicates preparedness to place concrete and is in accord with contract drawings and specifications. This certification shall be submitted on forms provided by the Engineer.

B. The Engineer may have cores taken from any questionable area in the concrete work such as construction joints and other locations as required for determination of concrete quality. The results of test on such cores shall be the basis for acceptance, rejection or determining the continuation of concrete work.

C. The Contractor shall cooperate in obtaining cores by allowing free access to the Work and permitting the use of ladders, scaffolding and such incidental equipment as may be required. The Contractor shall repair all core holes. The work of cutting and testing the cores will be at the expense of the Owner.

3.07 FAILURE TO MEET REQUIREMENTS

A. Should the strengths shown by the test specimens made and testing in compliance with the previous provisions fall below the values given in Section 2.02.A.5, the Engineer shall have the right to require changes in proportions outlined to apply on the remainder of the Work. Furthermore, the Engineer shall have the right to require additional curing on those portions of the structure represented by the test specimens which failed. The cost of such additional curing shall be at the Contractor's expense. In the event that such additional curing does not give the strength required, as evidenced by core and/or load tests, the Engineer shall have the right to require strengthening or replacement of those portions of the structure which fail to develop the required strength. The cost of all such core borings and/or load tests and any strengthening or concrete replacement required because strengths of test specimens are below that specified, shall be entirely at the expense of the Contractor. In cases of failure to meet strength requirements the Contractor shall adjust the concrete mix to meet contract requirements.

B. When the tests on control specimens of concrete fall below the required strength, the Engineer will permit check tests for strengths to be made by means of typical cores drilled from the structure in compliance with ASTM C42 and C39. In case of failure of the core, the Engineer, in addition to other recourses, may require, at the Contractor's expense, load tests on any one of the slabs, beams, piles, caps, and columns in which such concrete was used. Test need not be made until concrete has aged 60 days.

C. Should the strength of test cylinders fall below 85 percent of the required minimum 28 day strength, the concrete shall be rejected and shall be removed and replaced.

3.08 PATCHING

A. As soon as the forms have been stripped and the concrete surfaces exposed, fins and other projections shall be removed, recesses left by the removal of form ties shall be filled, and surface defect which do not impair structural strength shall be repaired. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete, to approval of the Engineer.

B. Immediately after removal of forms remove plugs and break off metal ties. Holes are then to be promptly filled upon stripping as follows: Moisten the hole with water, followed by a 1/16-inch brush coat of neat cement slurry mixed to the consistency of a heavy paste. Immediately plug the hole with a 1 to 1.5 mixture of cement and concrete sand mixed slightly damp to the touch. Compact the grout into the hole until dense and an excess of paste appears on the surface. Trowel smooth with heavy pressure. Avoid burnishing.

C. When patching exposed surfaces the same source of cement and sand as used in the parent concrete shall be employed. Adjust color if necessary by addition of proper amounts of white cement. Rub lightly with a fine Carborundum stone at an age of one to five days if necessary to bring the surface down to the adjacent concrete. Exercise care to avoid damaging or staining the surrounding concrete. Wash thoroughly to remove all rubbed matter.

3.09 REPAIRS

A. It is the intent of these Specifications to require quality work including adequate forming, proper mixture and placement of concrete and curing so completed concrete surfaces will not require patching.

B. Defective concrete and honeycombed areas as determined by the Engineer shall be repaired as specified.

1. General: Surface defects, including tie holes shall be repaired immediately after form removal. The areas to be patched and an area at least 6 inches wide surrounding it shall be dampened to prevent absorption of water from the patching mortar. The Engineer shall be notified prior to commencing operations.

2. Removal of Defective Concrete: All honeycombed and other defective concrete shall be removed down to sound concrete. Edges shall be cut perpendicular to the surface or slightly under cut. Sand blast surfaces to receive repair.

3. Bonding Grout: Surfaces to be patched shall be thoroughly dampened and shall receive a coat of bonding grout brushed into the surface. Grout shall consist of one part cement to one part fine sand passing a No. 30 sieve. Grout shall be the consistency of thick cream.

4. Placing Patching Mortar: After the bonding grout begins to lose its water sheen, a premixed patching mortar shall be applied. Patching mortar shall be thoroughly consolidated into place and stuck off so as to leave the patch slightly higher than the surrounding surface. It shall be left undisturbed for one hour to permit initial shrinkage and then finally finished.

5. Tie Holes: After being cleaned and thoroughly dampened, the tie holes shall be filled solid with patching mortar.

3.10 MISCELLANEOUS WORK

A. All bolts, anchors, miscellaneous metals or other sleeves and steel work required to be set in the concrete forms for attachment of masonry, structural, and mechanical equipment shall be set or installed under this Section. The Contractor shall be fully responsible for the setting of such materials in the forms and shall correct all such not installed in a proper location or manner at his own expense. Contractor shall coordinate the activities of other trades for installation of these items.

B. Pipes or conduits for embedment, other than those merely passing through shall not be larger in outside diameter than one-third the thickness of the slab, wall, or beam in which they are embedded, unless indicated on the Drawings, nor shall they be spaced closer than three (3) diameters on center, nor so located as to unduly impair the strength of the construction. The Engineer shall approve the location of all conduits and fixtures.

END OF SECTION

SECTION 03 48 00

PRECAST CONCRETE STRUCTURES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: The work under this Section includes furnishing and installing precast concrete units for manholes, wet wells, and valve vaults as indicated on the Drawings and specified herein.

B. Related Work Described Elsewhere:

1. Earthwork: Division 31.

2. Prefabricated Liners: Divison 33.

3. Concrete: Division 03.

4. Painting: Section 03 31 00.

5. Submersible Wastewater Pumps: Section 33 32 00.

6. Mechanical: Division 15.

1.02 SUBMITTALS

A. See Section 01 33 00 for a complete description of submittal requirements.

B. Shop drawings of the concrete units, including bottom and top slabs showing details of construction, reinforcing and joints shall be submitted to and approved by the Engineer prior to the manufacture of the units. The shop drawings shall include structural design calculations for all slabs and walls which do not have reinforcement detailed on the Drawings. The design calculations shall demonstrate compliance with the specified standards and shall be signed and sealed by a professional engineer licensed in the State of Florida.

C. Manufacturer's data sheets and shop drawings shall be submitted on the following:

1. Joint mastic and gaskets.

2. Grout material.

3. Pipe connections.

4. Castings.

5. Reinforcement.

1.03 INSPECTION

A. The quality of all materials, the process of manufacture and the finished sections shall be subject to inspection and approval by the Engineer. Such inspection may be made at the place of manufacture or at the site after delivery, or at both places and the sections shall be subject to Specification requirements; even though sample sections may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the job shall be marked for identification and shall be removed from the job at once. All sections which have been damaged after delivery will be rejected and, if already installed, shall be removed and replaced entirely at the Contractor's expense.

PART 2 - PRODUCTS

2.01 STRUCTURES

A. Circular precast concrete structures shall conform to the requirements of ASTM Designation C-478, Precast Reinforced Concrete Manhole Sections, except as otherwise specified or as shown on the Drawings. All circular precast concrete structures, including bottom slabs, walls, and top slabs, shall be designated to support an AASHTO H-20 loading plus all other soil and hydrostatic loads. Signed and sealed design calculations demonstrating compliance with these requirements shall be submitted in accordance with Paragraph 1.02. Details of precast sections shown on the Drawings shall supersede ASTM C-478 when such details are more stringent than ASTM C-478. The structures shall meet the following additional requirements.

1. Minimum wall thickness shall be as indicated on the Drawings.

2. Cement shall be Type II Portland Cement conforming to ASTM Designation C150.

3. Sections shall have tongue and groove joints. Joints shall be filled with preformed flexible plastic joint sealer. The sealer shall be "Ram-Nek" as manufactured by the Henry Co. or equal.

4. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of each precast section.

5. The tops of monolithic bases shall be suitably shaped to mate with the precast barrel section.

6. Lift rings or non-penetrating lift holes shall be provided for handling precast sections. Non-penetrating lift holes shall be filled with non-shrinking grout after installation of the structure.

7. Barrel and base sections shall be constructed with preformed openings properly located for making gravity sewer line connections. The diameter of such openings shall not be more than two inches larger than the outside diameter of the pipe or pipe bell to be connected. The distance between the crown of such openings and the shoulder of the barrel joint shall be six inches minimum.

8. Manholes to be installed around existing gravity sewers (doghouse manholes) shall consist of a cast-in-place or precast concrete base slab and precast concrete barrel and top sections. In such manholes, one (1) barrel section shall include inverted “U-shaped” slots to allow installation of the section over an existing pipe. Space between the existing pipe and slot shall be made water-tight with non-shrink grout. Flow channels shall be provided within the doghouse manholes as shown in the “Standard Manhole Details” provided on the Drawings. The existing pipe within the manhole shall be removed and the outlet plugged watertight with non-shrink grout once the new gravity sewers connected to the manhole are ready for service. External drops for doghouse manholes shall be provided as shown in the “Standard Manhole Details” provided on the Drawings; however, the “Tee” fitting at the top of the drop piping shall not be installed until the new gravity lines connected to the manhole are ready for service.

9. Where force main and drain piping penetrates a wall of a wet well, a Type 316 stainless steel wall sleeve, with intermediate wall collar, shall provided. The annular space between the carrier pipe and sleeve shall be sealed with a compression type wall seal with Type 316 stainless steel hardware.

B. Rectangular precast concrete structures shall comply with ASTM C-913-79 and ASTM C-890-78 except as otherwise specified or shown on the Drawings. All rectangular precast concrete structures including bottom

slabs, walls, and top slabs, shall be designed to support an AASHTO H-20 loading plus all other soil and hydrostatic loads. Signed and sealed design calculations demonstrating compliance with these requirements shall be submitted in accordance with Paragraph 1.02. Details shown on the Drawings shall supersede the stated ASTM standards when such details are more stringent than the referenced standards. The structures meet the following additional requirements.

1. Minimum wall thickness shall be as indicated on the Drawings.

2. Cement shall be Type II Portland Cement conforming to ASTM Designation C150.

3. Sections shall have tongue and groove joints. Joints shall be filled with preformed flexible plastic joint sealer. The sealer shall be "Ram-Nek" as manufactured by the Henry Co. or equal.

4. The date of manufacture and the name or trademark of the manufacturer shall be clearly marked on the inside of each precast section.

5. The tops of bases shall be suitably shaped to mate with the precast wall section.

6. Lift rings or non-penetrating lift holes shall be provided for handling precast sections. Non-penetrating lift holes shall be filled with non-shrinking grout after installation of the structure.

7. Where force main piping penetrates a valve vault wall, a Type 316 stainless steel wall sleeve, with intermediate wall collar, shall be provided. The annular space between the carrier pipe and sleeve shall be sealed with a compression type wall seal with Type 316 stainless steel hardware.

C. Exterior surfaces of all precast concrete structures shall have a protective coal tar epoxy coating in accordance with Section 09 91 00.

2.02 CASTINGS

A. Castings for manhole frames, covers, adjustment rings, and other items shall be of gray cast iron and conform to ASTM Designation A48, Class 30. The castings shall be true to pattern in form and dimensions and free of pouring faults and other defects which would impair their strength, or otherwise make them unfit for the service intended. The sealing surfaces between the frames and covers shall be machined to fit true. No plugging or filling will be allowed. Lifting or “pick” holes shall be provided, but shall

not penetrate the covers. Casting patterns shall conform to those shown on the Drawings. All manhole frames and covers shall be traffic bearing to accommodate AASHTO H-20 loadings. Frames shall be suitable for the future addition of a cast iron ring for upward adjustment of the top elevation. Manhole frames and covers shall be U.S. Foundry Model USF #225-AS, Vulcan Model V1357 or an approved equal. Air release valve vault covers shall be U.S. Foundry Model USF #7665 or an approved equal.

2.03 CEMENT MORTAR

A. Cement mortar shall be one part cement and three parts clean sharp sand to which may be added lime in the amount of not over ten percent volume of cement. It shall be mixed dry and then wetted to proper consistency for use. No mortars that have stood for more than one (1) hour shall be used.

2.04 ENCAPSULATION

A. The top of buried manholes, cone, riser rings, iron frame, cover and all joints shall be encapsulated with a heat shrink-wrap with a minimum thickness of 98 mils (2.5mm). The wrap shall have a cross-linked polyolefin backing coated with a protective heat activated adhesive. The wrap should effectively bond to the substrate via primer provided by the manufacturer, providing corrosion and moisture protection. The wrap shall be applied with a high intensity propane torch. Heat Shrink wrap for all barrel section joints of manholes shall be a minimum 9-inch width wrap and a minimum of 12-inch width wrap on the corbel section, riser rings and ring & cover. Adhesive tape materials shall not be allowed.

PART 3 - EXECUTION

3.01 INSTALLATION

A. All openings for gravity sewer pipes shall be sealed watertight by means of Kor-N-Seal or equal.

B. Precast structures shall be constructed to the dimensions shown on the Drawings and as specified herein. Install at elevations and locations shown on the Drawings or as otherwise directed by the Engineer.

C. Place the precast base unit on a thoroughly compacted gravel subbase. Drain all water from the bottom of the excavation before placing base.

D. Construct the floor of the wetwell and valve vault using cement mortar to the requirements of the Drawings.

E. Set precast concrete sections so that the sections are vertical and in true alignment with a 1/4-inch maximum tolerance allowed. Fill the outside and inside joint with a comparatively dry mortar (one part cement to two parts sand) and finish flush with the adjoining surfaces. Backfill in a careful manner, bringing the fill up evenly on all sides. The Contractor shall install precast sections in a manner that will result in a watertight joint.

F. Plug holes in the concrete sections made for handling or other purposes with a non-shrinking grout or by grout in combination with concrete plugs.

G. Manhole flow channels shall be as shown on the Drawings, with smooth and carefully shaped bottoms, build up sides, and benching constructed using cement and brick. Channels shall conform to the dimensions of the adjacent pipes and provide changes in size, grade, and alignment evenly. Cement shall be Portland Cement Type II.

H. Castings shall be fully bedded in mortar with adjustment brick courses placed between the frame and manhole. Bricking shall include a minimum of two (2) and a maximum four (4) courses. Mortar shall conform to ASTM C-270, Type M, and the bricks shall be clay and conform to ASTM C-216, Grade SW, size 3 1/2” (w) x 8” (l) x 2 1/4” (h).

I. The tops of manhole castings located in pavement, shouldered areas, and sidewalks shall be set flush with grade. The tops of manhole castings located outside paved areas shall be placed two (2) inches above grade.

J. Coatings shall be touched up after installation.

3.02 CLEANING

A. Newly constructed manholes shall be cleaned of any accumulation of silt, debris or foreign matter of any kind and shall be free from such accumulations at the time of final inspection.

3.03 TESTING

A. Testing of structure shall be completed prior to installation of any liners. Contractor shall test structure as specified in Section 03 80 00: Leakage Testing of Water Retaining Structures.

3.04 INSPECTION FOR ACCEPTANCE

A. The quality of materials, the process of manufacture and the finished sections shall be subject to inspection and approval by City. Such inspection may be made at the place of manufacture, at the site after delivery or at both places and the sections shall be subject to rejection at any time due to failure to meet any of the specification requirements; even though sample sections may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the job shall be marked for identification and shall be removed from the job at once. Sections that have been damaged after delivery will be rejected and if already installed, removed and replaced, entirely at the Contractor's expense.

B. At the time of inspection, the sections will be carefully examined for compliance with the specified ASTM designation and with the approved manufacturer's drawings. Sections shall be inspected for general appearance, dimension, "scratch-strength" blisters, cracks, roughness, soundness, etc. The surface shall be dense and closetextured.

C. Manholes shall be inspected by City and defective manholes replaced by the Contractor. Pressure grouting of manholes for repair shall not be accepted.

END OF SECTION

SECTION 03 60 00

GROUT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: The work included in this Section consists of grouting the various items listed hereinafter and indicated on the Drawings:

B. Related Work Described Elsewhere:

1. Cast-In-Place Concrete: Section 03 30 00.

1.02 SUBMITTALS

A. Materials and Shop Drawings: Manufacturer's literature shall be submitted for review on nonshrink grout data shall include grout properties, mixing, surface preparation and installation instructions.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Grouting materials shall be delivered and stored in unbroken containers with seals and labels intact as packaged by the manufacturer.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Nonshrink, Nonmetallic Grout: Sauereisen F-100 Level Fill or Master Builders Masterflow 713.

B. Nonshrink Metallic Grout: Master Builders Embeco 636 Grout pre-mixed type.

PART 3 - EXECUTION

3.01 PREPARATION

A. All bonding surfaces shall be clean and dust and oil free.

3.02 INSTALLATION

A. Nonshrink Grout:

1. Nonshrink, nonmetallic grout shall be used for grouting column base plates, anchor bolts, reinforcing bars, pipe sleeves, machinery supports and pump base plates.

2. Nonshrink grout shall be mixed and placed as recommended by the manufacturer.

3. Grout shall be mixed as close to the work area as possible and transported quickly to its final position in a manner which will not permit segregation of materials.

4. Nonshrink grout shall be cured with water saturated burlap for at least 3 days.

5. Machinery set on grout pads shall not be operated until the grout has cured for at least 36 hours.

END OF SECTION

SECTION 03 80 00

LEAKAGE TESTING OF WATER RETAINING STRUCTURES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Water tightness testing of reinforced concrete water retaining structures.

1.02 REFERENCE STANDARDS

A. American Concrete Institute (ACI)

1. ACI 350.1-01 – Tightness Testing of Environmental Engineering Concrete Structures.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide potable water, piping, and equipment required to test concrete structures for leakage.

PART 3 - EXECUTION

3.01 GENERAL

A. Hydrostatically test reinforced concrete structures which will contain water to requirements specified below, and are free of detectable leaks.

B. Do not start leak testing or cleaning of surfaces until concrete is cured and joint sealants have set and cured a minimum of 14 days.

C. Conduct testing before backfill is placed against walls.

D. Prior to testing, clean exposed surfaces by thorough hosing, and remove surface laitance and loose matter from walls and slabs. Remove wash water and debris by means other than washing through plant piping.

3.02 TEST PROCEDURE

A. Fill structure to be tested to the normal operating liquid level. Filling rate shall not exceed 4 feet of water per hour, and shall be at continuous uniform rate with continuous monitoring.

B. The exterior surface of the tank shall be monitored for flowing leaks. Repair any flowing leaks which occur before continuing filling.

C. The water shall be kept at the test level for at least three days prior to the actual test.

D. Measure the vertical distance to the water surface from a fixed point on the tank above the water surface. Record measurements at 24-hour intervals.

E. A drop of the water surface exceeding 1/20 of 1% of the normal volume of contained liquid will be considered failing.

F. The structure will have also be considered to have failed the test if flowing or seeping water is observed, or if moisture can be transferred to a dry hand from the exterior surface.

G. Independently measure change in water volume due to evaporation and precipitation using a 24 inch deep white, watertight container not less than 10 square feet of surface area. Position the container to experience environmental conditions similar to the structure being tested. The volume change of the structure shall be corrected based on the water volume change in the sample container.

H. Failing tanks which exhibit no visible signs of leaking or seepage may be permitted to be immediately retested.

I. Failing tanks will be drained, repaired, and retested until the tank has met the test requirements.

END OF SECTION

SECTION 09 91 00

PAINTING AND PROTECTIVE COATINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide all labor, materials, apparatus, scaffolding, and all appurtenant work in connection with painting and protective coatings, complete as indicated, specified and required.

B. Principal items include, but are not limited to:

1. All exposed piping, conduits, tanks, equipment and other metal surfaces, interior and exterior, except as hereinafter specifically excluded.

2. All submerged and intermittently submerged metal surfaces, except stainless steel.

3. All structural and miscellaneous steel.

4. Equipment furnished without factory finished surfaces.

5. Equipment, on which factory applied finishes have been marred, abraded, scratched, nicked, or otherwise damaged.

6. The interior of concrete tanks, manholes, and similar structures, unless otherwise lined.

7. Paint coatings on scheduled interior concrete walls and undersides of slabs.

8. Plasterwork, gypsum drywall surfaces, woodwork, and other architectural work as specified or shown on the Drawings.

9. Exposed steel lintels.

10. Interior and exterior CMU walls unless otherwise specified.

11. Exterior of concrete tanks.

12. Undersides of aluminum access hatches and aluminum checkered plate.

13. Fire hydrants, valve box lids, meter box lids, bollard/ guard post above ground meter and backflow assemblies.

14. All exterior wall surfaces of existing tanks and structures from 6-inches below grade to the top of the wall or structure.

C. The following surfaces, in general, shall not be painted:

1. Concrete surfaces subject to pedestrian or vehicular traffic, except as herein specified.

2. Nonferrous metals and stainless steel unless otherwise noted or indicated. Galvanized metal shall not be considered as a nonferrous metal.

3. Mechanical equipment with factory finish as specified herein.

4. Electrical and instrumentation equipment with approved factory finish or of stainless steel/nonferrous metal construction, unless otherwise specified.

5. Water proofing, dampproofing and roof covering work.

6. Anodized aluminum.

7. Aluminum handrails and ladders.

8. Fiberglass grating and tread plate.

9. Nuts and bolts.

10. Name tags and data tags.

D. Related work not included in this Section:

1. Pavement striping.

2. Sealants and caulking.

3. Waterproofing and dampproofing.

E. The Contractor shall furnish to the Engineer, at no charge for use during this project, one dry film thickness gages and one electrical flaw detection equipment system.

1.02 GUARANTEE

A. A three (3) year guarantee which commences on the date of acceptance against failure of all coatings shall be provided, unless more stringent requirements are specified hereinafter. Failure of any coating during the guarantee period shall be repaired by the Contractor who shall absorb all costs related to the repair of the coating. Failure shall be defined as peeling, blistering, delamination or loss of adhesion of any of the coatings.

1.03 REFERENCE SPECIFICATIONS AND STANDARDS

A. Without limiting the generality of other requirements of these Specifications, all cleaning, surface preparation, and coating shall conform to the applicable requirements of the referenced portions of the standards specified herein to the extent that the requirements therein specified are not in conflict with the provisions of this Section.

B. Unless otherwise specified, all work and materials for the preparation and coating of all metal surfaces shall conform to the applicable requirements specified in the Steel Structures Painting Manual, Volume 2, Systems and specifications Revised, latest edition, published by the Steel Structures Painting Council.

C. The following referenced surface preparation specifications of the Steel Structures Painting Council shall form a part of this Section.

1. White Metal Blast Cleaning (SSPC-SP5). Removal of all visible rust, mill scale, paint, and foreign matter by blast cleaning by wheel or nozzle (dry) using sand, grit, or shot. (For very corrosive atmosphere.)

2. Near-White Blast Cleaning (SSPC-SP10). Blast cleaning nearly to White Metal Cleanliness, until at least 95 percent of each element of surface area is free of all visible residues. (For high humidity, chemical atmosphere, marine or other corrosive environment.)

3. Commercial Blast (SSPC-SP6). Blast cleaning until at least 67 percent of each element of surface area is free of all visible residues.

4. Brush-Off Blast Cleaning (SSPC-SP7). Blast cleaning of all except tightly adhering residues of mill scale, rust and coatings, exposing numerous evenly distributed flecks of underlying metal.

5. Solvent Cleaning (SSPC-SP1). Removal of oil, grease, dirt, soil, salts, and contaminants by cleaning with solvent, vapor, alkali, emulsion or steam.

D. Quality Assurance. Evaluation of surface preparation for ferrous metals will be based upon NACE Standard TM-01-Visual Standard for Surface Preparation.

1.04 SUBMITTALS

A. Submittals shall be in accordance with the following:

1. Samples. Prepare and submit for Engineer's approval copies of color samples on 8-1/2" x 11" size cards for each paint and protective coating system. Each sample card shall clearly show each coat of the finish system, and shall be clearly marked with the manufacturer's name and product identification, and shall be submitted in sufficient time to allow for approval and, if necessary, disapproval and resubmittal without causing any delay of the project.

2. Coating Materials List.

a. The Contractor shall provide copies of a paint and coating materials list which indicates the manufacturer and paint number, keyed to the coating schedule herein, for approval by the Engineer prior to or at the time of submittal of samples required herein.

b. The Contractor shall include with his submittal, his protective coating schedule for shop and field coatings of items to receive protection. The schedule shall conform to the specified requirements for surface preparation, priming, and coating for items covered, and shall follow the same requirements for similar work where such work has not been specifically called-out. No bare ferrous nonworking surfaces shall be omitted from the schedule. Particular care shall be taken to cover in sufficient detail the coating of mechanical joints and other mechanical devices which shall conform to the recommended practice of the manufacturer of the joint or other mechanical devices.

c. Coatings to be used on plastic and fiberglass materials shall be certified as acceptable by all plastic and fiberglass manufacturers whose products are to be coated. Certification copies shall be submitted to the Engineer. The

Contractor shall be certified in writing by the painting and coating material manufacturers as qualified applicators of their products with copies of the certification submitted to the Engineer.

3. Product Data Sheets. Contractor shall submit paint and coatings material manufacturers' printed technical data sheets for products intended for use in each paint and coating system. Data sheets shall fully describe material as to its intended use, makeup, recommended surface preparation and application conditions, primers, material mixing and application (including recommended dry mil thickness recoat time), precautions, safety and maintenance cleaning directions.

4. Material Safety Data Sheets. Material Safety Data Sheets (MSDS) shall accompany all paint submittals and shall be prominently displayed at the job site during all painting activities.

1.05 PROTECTION OF WORK

A. The Contractor shall be responsible for any and all damage to his work or the work of others during the time his work is in progress.

1.06 EXTRA STOCK

A. One (1) gallon of each type and color of finish paint and coating used on the project shall be provided as extra stock. Extra stock paint shall be supplied in appropriate sealed containers and be clearly labeled as to paint type, formula, and color.

1.07 RIGHT OF REJECTION

A. The Engineer shall have the right to reject all material or work that is unsatisfactory, and require the replacement of either or both at the expense of the Contractor.

1.08 ONE MANUFACTURER

A. To the maximum extent possible, all products shall be the product of one manufacturer unless a specific specialty coating system is `specified. Without exception, all coatings for any service condition specified herein shall be by one manufacturer. Once a paint manufacturer has been selected by the Contractor and approved by the Engineer, the Contractor shall ensure that all equipment manufacturers prime their equipment with the same or a compatible primer. If this cannot be or is not done for any reason, the Contractor shall apply a "universal primer" and recoat with the approved manufacturer's product in the field.

1.09 JOB CONFERENCE

A. Prior to commencing painting work a pre-job conference shall be held for the purpose of reviewing the painting and coating requirements of the project. The County, Engineer, Contractor, Applicator, and the Coatings and Paint Manufacturer shall be present. A schedule of work to be accomplished will be established.

PART 2 - PRODUCTS

2.01 GENERAL

A. Surfaces to receive paint and protective coating materials as herein specified in this Section shall be coated in conformance with the applicable coating systems specified herein. All materials specified by name and/or manufacturer or approved for use under these Specifications, shall be delivered unopened at the job site in their original containers and shall not be opened until inspected by the Engineer.

B. Whenever a manufacturer's brand name is specified, it is intended to define the general type and quality of paint or coating desired. Other coatings or paints of equal quality may be used. Coating materials shall be a product of TNEMEC, unless otherwise specified, or approved equal. All paint and coatings shall be produced and applied as herein called for or, if not specifically called for, it shall be applied in accordance with the manufacturer's printed recommendations as approved by Engineer. So far as possible, all paint and coating materials shall be provided by a single source supplier. Coating materials shall meet Volatile Organic Compounds (VOC) requirements of not more than 3.5 lb./gal. as applied after thinning.

C. General.

1. Paint and protective coating materials shall be sealed in containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, manufacturer's directions, and name of manufacturer, all of which shall be plainly legible at the time of use. Pigmented paints shall be furnished in containers not larger than five (5) gallons. Materials shall conform to the specifications shown herein and to the requirements hereinafter specified.

2. Products shall be standard of recognized manufacturer engaged in production of such materials for essentially identical or similar applications in the water and wastewater treatment industry.

D. Compatibility. Only compatible materials shall be used in the work. Particular attention shall be directed to compatibility of primers and finish coats. If necessary, subject to approval of the Engineer, a compatible barrier coat shall be applied between all existing prime coat and subsequent field coats to ensure compatibility.

1. Ductile iron pipe that has an exterior bituminous coating shall not be painted unless the bituminous coating is removed by sand blasting or an appropriate, compatible, intermediate coat is applied before top coating in accordance with this specification.

E. Colors. All colors and shades of colors of all coats of paints and protective coating material shall be as identified in the architectural sketches or schedules or as modified/selected by the County. Each coat shall be of a slightly different shade, as directed by the Engineer to facilitate inspection of surface coverage of each coat.

2.02 SERVICE CONDITION A

A. Ferrous and galvanized metals, other than stainless steel, within wet wells or similar corrosive atmospheres, submerged or intermittently submerged in sludge, sewage, chemical mixtures or similar corrosive liquids shall be prepared and coated in accordance with the following requirements.

B. Surface Preparation. All metal surfaces shall be field sandblasted in accordance with Steel Structures Painting Council Specification SSPC-SP10 (Near White Blast Cleaning). Weld surface, edges, and sharp corners shall be ground smoothly and all weld splatter removed per SSPC-SP3 "Power Tool" or SP2 "Hand Tool" Cleaning. Galvanized metals shall be cleaned per SSPC SP-7 (brush off blast cleaning).

C. Application. Application shall be in strict conformance with the manufacturer's printed recommendations. All sharp edges, nuts, bolts, or other items difficult to coat shall receive a brush-applied coat of the specified coating prior to application of each coat.

D. Except as otherwise noted, the prime coat shall have a minimum thickness of 3 mils and the two finish coats shall have a minimum total dry film thickness of 13 mils. If the finish coat is not applied within manufacturer's recommended time period, an intermediate special surface conditioner shall be applied in advance of finish coats or a light brush blast. The total system shall have a minimum dry film thickness of 16 mils.

TNEMEC System: Shop Primer - Series 66-1211
Field Primer - Series 104

Finish Coats - Series 104

2.03 SERVICE CONDITION B

A. Ferrous and galvanized metals, other than stainless steel, subject to seacoast salt air exposures or equivalent chemical attack, shall be prepared and coated in accordance with the following requirements.

B. Surface Preparation. All surfaces shall be free of dirt, dust, grease, or other foreign matter before coating. Ferrous surfaces shall be cleaned in accordance with the Steel Structures Painting Council Specification SSPC-SP7 (Brush-Off Blast Cleaning), and galvanized surfaces shall be cleaned in accordance with SSPC-SP1 (Solvent Cleaning). Weld surface, edges and sharp corners shall be ground smooth and all weld splatter shall be removed per SSPC-SP3 or SP2. Galvanized metal shall be cleaned per SSPC SP-7 (brush off blast cleaning).

C. Application. Application shall be in strict conformance with the manufacturer's printed recommendations. All sharp edges, nuts, bolts, or other items difficult to coat shall receive a brush-applied coat of the specified coating prior to application of each coat.

D. Except as specified below, the prime coat shall have a minimum thickness of 3 mils, intermediate coat shall have a minimum thickness of 4 mils and one or more finish coats minimum total dry film thickness of 10.0 mils.

TNEMEC System:	Primer - Series 66
Intermediate Coat:	Series 66
Finish Coats:	Series 73

2.04 SERVICE CONDITION C

A. Ferrous and galvanized metals, other than stainless steel, subject to mild to moderately severe air exposures or equivalent chemical attack, shall be prepared and coated in accordance with the following requirements.

B. Surface Preparation. All surfaces shall be free of dirt, dust, grease, or other foreign matter before coating. Ferrous surfaces shall be cleaned in accordance with the Steel Structures Painting Council Specification SSPC-SP7 (Brush-Off Blast Cleaning), and galvanized surfaces shall be cleaned in accordance with SSPC-SP1 (Solvent Cleaning). Weld surface, edges and sharp corners shall be ground smooth and all weld splatter shall be removed per SSPC-SP3 or SP2. Galvanized metal shall be cleaned per SSPC SP-7 (brush off blast cleaning).

C. Application. Application shall be in strict conformance with the manufacturer's printed recommendations. All sharp edges, nuts, bolts, or other items difficult to coat shall receive a brush-applied coat of the specified coating prior to application of each coat.

D. Except as specified below, the prime coat shall have a minimum thickness of 3 mils, intermediate coat shall have a minimum thickness of 4 mils and one or more finish coats minimum total dry film thickness of 10.0 mils.

TNEMEC System:	Primer - Series 66
Intermediate Coat:	Series 66
Finish Coats:	Series H2
PORTER System:	Primer – PP286 or PP296
Intermediate Coat:	2200
Finish Coat:	2200

2.05 SERVICE CONDITION D

A. Coating aluminum and non-ferrous metal surfaces, including undersides of aluminum access hatches, frames, and checkered plate, subject to corrosive atmosphere and condensation shall be prepared and coated in accordance with the following requirements.

B. Surface Preparation. Clean non-ferrous surfaces in accordance with SSPC-SP7 (brush-off blast cleaning).

C. Application. Application shall be in strict conformance with manufacturer's printed recommendations, as approved by the Engineer.

D. The prime coat shall have a minimum 3.0 mil DFT and finish coast shall have a minimum 4 mil DFT for a minimum total dry mil thickness of 7 mils:

TNEMEC System:	Primer - Series 66
	Finish Coats - Series 66

2.06 SERVICE CONDITION E

A. Plastic and fiberglass reinforced plastic (FRP) products subject to seacoast salt air exposures shall be prepared and coated in accordance with the following requirements. Coatings to be used for piping and tankage shall be certified by the manufacturer to be completely acceptable and non-injurious.

B. Surface Preparation. Clean surfaces with SSPC-SP1 solvent cleaner. Lightly sand all surfaces.

C. Application. Application shall be in strict conformance with manufacturer's printed recommendations.

D. The prime coat shall have a minimum 3.0 mil DFT and finish coat shall have a minimum of 3.0 mil DFT for a minimum total dry film thickness of 6 mils.

TNEMEC System: Primer - Series 66
Finish Coat - Series 73

2.07 SERVICE CONDITION F

A. Concrete which is subject to submergence and intermittent submergence in water and groundwater shall be prepared and coated in accordance with the following requirements.

B. Surface Preparation. All surfaces shall be cleaned of all dirt, dust, oil, curing compounds, and other deleterious compounds. In general, the concrete shall be reasonably smooth and free of pockets and cavities. All surfaces shall be cleaned by brush blasting (NACE #4 or SSPC-SP7). All surfaces shall be completely dry before application of the coating.

For painting of existing structures, in addition to above, patch concrete with non-shrink grout, replace damaged stucco, and repair cracks in exterior concrete wall surfaces by epoxy injection.

C. Application. Application shall be in strict conformance with the manufacturer's printed recommendations. All coats shall be applied within 24 hours of the previous coat.

D. The prime coat shall have a minimum dry film thickness of 3 mils and intermediate and finish coat shall have a minimum total dry film thickness of 5 mils each. The total system shall have a minimum dry film thickness of 13 mils.

TNEMEC System: Primer - Series 66
Intermediate Coat - Series 66
Finish Coat I - Series 66

2.08 SERVICE CONDITION G

A. Concrete sanitary sewer manholes or similar corrosive atmospheres which are subject to submergence and intermittent submergence in domestic sewage, water and groundwater shall be prepared and coated in accordance with the following requirements.

1. Surface Preparation. All surfaces shall be cleaned of all dirt, dust,

oil, curing compounds, and other deleterious compounds. In general, the concrete shall be reasonably smooth and free of pockets and cavities.

2. Allow new concrete to cure for 28 days. All surfaces shall be cleaned by brush blasting (NACE #6 or SSPC-SP13). All surfaces shall be completely dry before application of the coating.

3. For painting of existing structures, in addition to above, patch concrete with non-shrink grout, repair cracks in concrete wall surfaces by epoxy injection.

B. Application. Application shall be in strict conformance with the manufacturer's printed recommendations. All coats shall be applied within 24 hours of the previous coat.

C. A prime coat is not required on concrete. Coating can be applied in one or two coats. When applied in two coats each coat shall have a minimum dry film thickness of 8 to 10 mils. The total system shall have a minimum dry film thickness of 15 to 20 mils.

TNEMEC System:	Primer – Not required
	Intermediate Coat - Series 46H-413
	Finish Coat I – Series 46H-413

2.09 ARCHITECTURAL PAINT FINISHES

A. Manufacture. Unless otherwise noted, products listed below are the products of TNEMEC coatings. Approved equivalent products will be acceptable.

B. Interior Finishes:

1. Interior Wet Concrete Surfaces (Non-Aggressive Areas)
Surface Preparation: Prefer SSPC-SP7: Brush off Blast Cleaning. If brush off Blast Cleaning is not possible, a double acid etching is recommended. Properly prepared surface should have a profile similar to 100 grit sandpaper. A test patch is recommended when applying epoxy coatings over old, existing coatings.

Materials:
Primer: TNEMEC Series 66 @ 3.0 - 5.0 mils
DFT 2nd Coat: TNEMEC Series 66 @ 4.0 - 6.0 mils DFT (optional)
Finish: TNEMEC Series 66 @ 4.0 - 6.0 mils DFT 11.0 - 17.0 mils DFT

2. Concrete Block Walls (Non-aggressive Environment)
Surface Preparation: Cure 14 days. Remove mortar spatter. Surfaces must be clean and dry.

Materials:
Filler: TNEMEC Series 130 or 54-562 @ 80 SF/Gal
Finish Ct.: TNEMEC Series 113 or 114 @ 4.0 - 6.0 mils DFT

3. Poured Concrete Walls (Non-aggressive Environment)
Surface Preparation: Cure for 28 days. All surfaces must be clean and dry.

Materials:
Primer: TNEMEC Series 113 or 114 @ 4.0 - 6.0 mils DFT.
Finish: TNEMEC Series 113 or 114 @ 4.0 - 6.0 mils DFT.

C. Concrete in aggressive areas (CBW)

1. Surface Preparation. Surfaces shall be cured for 28 days, clean, dry and free from curing compounds, oil, grease, dirt or chalk.

2. Filler. TNEMEC Series 54-660 (block walls only).

3. Prime Coat. One coat of TNEMEC Series 66 applied at 5 mils DFT.

4. Finish Coats. Two coats of TNEMEC Series 66 applied at 5 mils DFT per coat.

D. Concrete Sealed (ECB). Huls Chem-Trete PB at a rate of between 50 and 100 sf/gal. Application shall be sufficient to guarantee complete water repelling for five (5) years.

E. Concrete Waterproof (CWP). One coat, minimum 2lbs. per square yard of Thoroseal by Thoro System Products or approved equal.

2.10 PATCH COAT FOR GALVANIZED SURFACES

A. All galvanized surfaces which are scratched, marred, or otherwise damaged shall be patched with TNEMEC Series 90-97 @ 2.5 - 3.5 mils DFT.

2.11 PRIMER OVER BITUMINOUS COATING

A. Two coats, TNEMEC Series 66, at 4 mils DFT each. Allow bituminous coating to bleed through on first coat. Apply second coat, third coat shall be per service condition schedule.

2.12 UNIVERSAL PRIMER

A. The "universal-primer" shall be a primer which can be applied over any other type of solvent based primer, and be compatible with alkyds, epoxies and urethane finish coats.

PART 3 - EXECUTION

3.01 MANUFACTURER'S RECOMMENDATIONS

A. Unless otherwise specified herein, the paint and coating manufacturer's printed recommendations and instructions for thinning, mixing, handling, applying, and protection of his coating materials; for preparation of surfaces for coating; and for all other procedures relative to coating shall e strictly observed. No substitutions or other deviations will be permitted without written permission of the Engineer.

3.02 DELIVERY AND STORAGE

A. Materials shall be delivered in manufacturer's original, sealed containers, with labels and tags intact. Coating materials and equipment shall be stored in designated areas. Coating containers shall be opened only when required for use. Coatings shall be mixed only in designated areas and in the presence of the Engineer, unless otherwise directed. Coatings shall be thoroughly stirred or agitated to uniformly smooth consistency and prepared and handled in a manner to prevent deterioration and inclusion of foreign matter. Unless otherwise specified or approved, no materials shall be reduced, changed, or used except in accordance with the manufacturer's label or tag on container.

3.03 SAFETY REQUIREMENTS

A. In accordance with the requirements of applicable OSHA Regulations for Construction, the Contractor shall provide and require the use of personal protective equipment for all persons working in or about the project site.

B. Respirators shall be worn by all persons engaged in, and assisting in, spray painting. In addition, workers engaged in or near the work during sandblasting shall wear eye and face protection devices meeting the requirements of A7NSI Z87.1 latest revisions, and approved OSHA Regulations for sand blasting operations and equipment including approved air-purifying, half-mask or mouthpiece respirator with appropriate filter.

C. Ventilation. Where ventilation is used to control potential exposure to workers as set forth in Section 1910.94 of the OSHA Regulations for Construction. Ventilation shall be adequate to reduce the concentration of the air contaminant to the degree that a hazard to the worker does not exist. Methods of ventilation shall meet the requirements set forth in ASNI-Z9.2, latest revision.

D. Sound Levels. In accordance with Sections 1926.52 and 1926.101 of OSHA Regulations for Construction, whenever the occupational noise exposure exceeds maximum sound levels as set forth in Table D-2 ear protective devices shall be fitted and used, and a continuing, effective hearing conservation program shall be administered.

E. Cloths and cotton waste that might constitute a fire hazard shall be placed in closed metal containers or destroyed at the end of each workday.

3.04 STORAGE, MIXING AND THINNING

A. Paint and coating materials shall be protected from exposure to cold weather, and shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Materials of different manufacturers shall not be mixed together. Packaged materials shall be thinned immediately prior to application in accordance with the manufacturer's directions.

3.05 WORKMANSHIP

A. Skilled craftsmen and experienced supervision shall be used on all work.

B. All paint and coatings shall be applied in a workmanlike manner so as to produce an even film of specified uniform thickness. Edges, corners, crevices, and joints shall receive special attention to ensure that they have been thoroughly cleaned and that they receive an adequate thickness of paint. The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. The hiding shall be so complete that the addition of another coat of paint would not increase the hiding. All coats shall be applied so as to produce a film of uniform thickness. Special attention shall be given to ensure that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas, and installations shall be protected by the use of drop cloths or other approved precautionary measures.

3.06 PREPARATION FOR PAINTING AND PROTECTIVE COATING

A. All surfaces to receive paint and protective coatings shall be cleaned as specified herein prior to application of coating materials. The Contractor shall examine all surfaces to be coated, and shall correct all surface defects before application of any coating material. Beginning the work of

this Section without reporting unsuitable conditions to the Engineer constitutes acceptance of conditions by the Contractor. Any required removal, repair, or replacement of this work caused by unsuitable conditions shall be done at no additional cost to the County. All marred or abraded spots on shop-primed and factory-finished surfaces shall receive touch-up restoration prior to any other coating application.

B. Mildew shall be removed and neutralized by scrubbing affected areas thoroughly with a solution made by adding two (2) ounces of tri-sodium phosphate and eight (8) ounces of sodium hypochloride to one (1) gallon warm water. Use a scouring powder, if necessary, to remove mildew spores. Rinse with clean water and allow to dry thoroughly before painting.

3.07 ITEMS NOT TO BE COATED

A. Hardware (including all nuts, bolts, shafts, and bolt heads on CV plates), aluminum, stainless steel, switch and receptacle plates, escutcheons, hardware accessories, name plate data tags, machined surfaces and similar items shall be removed or masked prior to surface preparation and painting operations. Following completion of coating of each piece, removed items shall be reinstalled. Such removal and installation shall be done by workmen skilled in the trades involved.

3.08 SANDBLASTING

A. All sandblasting shall be done in strict accordance with the referenced specifications of the Steel Structures Painting Council.

B. When items are to be shop primed or shop primed and finish coated in the shop, surface preparation shall be as specified in this Section. The County or his representative shall have the right to witness, inspect, and reject any sandblasting done in the shop.

C. When sandblasting is done in the field, care shall be taken to prevent damage to structures and equipment. Pumps, motors, and other equipment shall be shielded, covered, or otherwise protected to prevent the entrance of sand. No sandblasting may begin before the Engineer inspects and approves the protective measures.

D. After sandblasting, dust and spent sand shall be removed from the surfaces by brushing or vacuum cleaning.

3.09 APPLICATION OF PROTECTIVE COATINGS

A. Shop Coating. Fabricated metalwork and equipment which requires coating shall be shop primed with specified primer. Any such work

delivered to the job site with any other shop coat shall either have this coating removed or shall be recoated with "universal-primer", and the specified coating applied in the field. Manufactured equipment with approved corrosion resistant factory finishes and galvanized finishes shall be exempt from this requirement.

B. Application of Field Coatings.

1. Except where in conflict with the manufacturer's printed instructions, or where otherwise specified herein, the Contractor may use brush, roller, air spray, or so-called airless spray application; however, any spray painting must first have the approval of the Engineer. Rollers for applying enamel shall have a short nap. Areas inaccessible to spray coating or rolling shall be coated by brushing or other suitable means.

2. The Contractor shall give special attention to the work to ensure that edges, corners, crevices, welds, bolts, and other areas, as determined by the Engineer, receive a film thickness at least equivalent to that of adjacent coated surfaces.

3. All protective coating materials shall be applied in strict accordance with the manufacturer's printed instructions.

4. Prime coat shall be applied to all clean surfaces within a four hour period of the cleaning, and prior to deterioration or oxidation of the surface, and in accordance with the manufacturer's recommendations. Drift from sand-blasting procedures shall not be allowed to settle on freshly painted surfaces.

5. All coatings shall be applied in dry and dust-free environment. No coating or paint shall be applied when the surrounding air temperature, measured in the shade, is below 40 degrees F. No coating or paint shall be applied to wet or damp surfaces and shall not be applied in rain, fog or mist, or when the relative humidity exceeds 90 percent. No coating or paint shall be applied when it is expected that the relative humidity will exceed 90 percent or that the air temperature will drop below 40 degrees F within 8 hours after the application of the coating or paint. Dew or moisture condensation should be anticipated and if such conditions are prevalent, coating or painting shall be delayed until mid-morning to be certain that the surfaces are dry. The day's coating or painting shall be completed well in advance of the probable time of day when condensation will occur, in order to permit the film sufficient drying time prior to the formation of moisture.

6. Each coat shall be applied evenly, at the proper consistency, and free of brush marks, sags, runs, and other evidence of poor workmanship. Care shall be exercised to avoid lapping paint on glass or hardware. Coatings shall be sharply cut to lines. Finished coated surfaces shall be free from defects or blemishes. Protective coverings shall be used to protect floors, fixtures, and equipment. Care shall be exercised to prevent paint from being spattered onto surfaces from which such paint cannot be removed satisfactorily. Surfaces from which paint cannot be removed satisfactorily shall be painted or repainted as required to produce a finish satisfactory to the Engineer. Whenever two (2) coats of a dark colored paint are specified, the first cost shall contain sufficient powdered aluminum to act as an indicator of proper coverage, or the two (2) coatings shall be of a contrasting color.

7. Touch-up of all surfaces shall be performed after installation.

8. All surfaces to be coated shall be clean and dry at the time of application.

C. Time of Coating.

1. Sufficient time shall be allowed to elapse between successive coats to permit satisfactory recoating, but, once commenced, the entire coating operation shall be completed without delay. No additional coating of any structure, equipment, or other items designated to be painted shall be undertaken without specified permission of the Engineer until the previous coating has been completed for the entire structure, piece of equipment, or other items.

2. Piping shall not be finish coated until it has been pressure tested and approved.

D. Thickness of Coating. The dry film mil-thickness specified shall be achieved and verified for each coat.

E. Safety Color Coatings. Existing surfaces to remain which have been previously safety-color coated to identify a potential tripping or low head-room area shall be prepared and recoated with a similar safety color scheme unless directed otherwise by the Engineer.

Any newly constructed areas which will present a potential tripping or low head-room area shall be coated safety yellow in accordance with the appropriate coating system as directed by the Engineer.

3.10 TESTING AND INSPECTION

A. Inspection Devices. The Contractor shall furnish, until final acceptance of coating and painting, inspection devices in good working condition for detection of holidays and measurement of dry-film thickness of coatings and paints. The Contractor shall also furnish U.S. department of Commerce, National Bureau of Standards certified thickness calibration plates to test accuracy of dry-film thickness gauge and certified instrumentation to test accuracy. Dry-film thickness gauges shall be made available for the Engineer's use at all times until final acceptance of application.

B. The Contractor shall conduct film thickness measurements and electrical inspection of the coated surfaces with equipment furnished by him and shall recoat and repair as necessary for compliance with the Specifications.

C. After repaired and recoated ferrous metals areas have cured, final inspection tests will be conducted by the Engineer with equipment provide by the Contractor. Coating thickness specified in mils on ferrous substrates will be measured with a nondestructive magnetic type dry-film thickness gage such as the Elecometer, manufactured by Gardner Laboratories, Inc. Discontinuities, voids, and pinholes in the coatings will be determined with a nondestructive type electrical holiday detector. Epoxy coatings and other thin film coatings will be checked for discontinuities and voids with a low voltage detector of the wet-sponge type, such as Model M1 as manufactured by Tinker and Rasor. Use a non-sudsing type wetting agent, such as Kodak Photo-Flo, which shall be added to the water prior to wetting the sponge. A high voltage, low current, spark type detector such as Model EP, manufactured by Tinker and Rasor, will be used for electrical inspection of only coal tar enamel. Tape type coatings will be inspected for holidays using a device designed for use in detecting such flaws. All pinholes shall be marked, repaired in accordance with the manufacture's printed recommendations and retested. No pinholes or other irregularities will be permitted. Film thickness discrepancies shall be measured and verified with a micrometer or other approved measuring instrument with 5 readings taken every 100 ft^2 of painted surface. Coatings not in compliance with the Specifications will not be acceptable and shall be replaced, and reinspected at Contractor's expense until the Specifications are met.

D. On non-ferrous surfaces, dry film thickness readings shall be taken at random locations with a Tooke Gauge at the rate of approximately five readings per 100 square feet of surface. Grooves cut into coatings shall be repaired by application of all coats of paint or coating film being tested. The average of all readings for a given area or surface shall be within required dry film thickness range and no individual reading shall be more

than 20 percent below the recommended dry film thickness. Any areas that are found to be below standard shall be marked and recoated to obtain proper film thickness.

3.11 CLEAN-UP

A. Upon completion of the work, staging, scaffolding, and containers shall be removed from the site or destroyed in an approved manner. Paint spots, oil, or stains upon adjacent surfaces shall be removed.

3.12 PAINT AND COATING SCHEDULE

A. General. The following schedule shall indicate the coating systems to be used and applies to all new and renovated facilities, unless otherwise specified. Color selection shall be as selected by the County. The list shall not be construed as a complete list of all surfaces to be coated but rather as a guide as to the application of the various coating systems. All surfaces shall be painted except those specifically excluded herein. Where reference is made to ferrous metal in this schedule, it shall not include stainless steel.

B. General Coating System. The following table shall indicate the coating system. For the coating systems, "Piping" shall be defined as all pipes, valves, fittings, supports, and guides. Mechanical equipment shall include all motors, pumps and accessory equipment requiring a protective coating.

TABLE I

COATING SYSTEM SCHEDULE

Item	Service Condition
Exposed ferrous and galvanized metal piping and equipment (interior and exterior).	B
Exterior exposed ferrous metal, Fire hydrants, valve box lids, meter box lids, ballard/ guard post, above ground meter and backflow assemblies not exposed to a corrosive atmosphere	C
Exposed plastic and FRP pipe, conduit, and tankage.	E
Exterior of manholes, storm inlets, and interior/exterior of reject pond intake structure.	F
Exterior exposed wall surfaces of new and existing concrete tank or structure walls	F
Interior of sanitary manholes.	G
Guard posts (bollards) and hydrants.	B
Interior concrete and concrete block surfaces.	FDB
Exterior new and existing stucco surfaces	FDB

END OF SECTION

SECTION 22 05 29

PIPE HANGERS AND SUPPORTS FOR PROCESS PIPING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Furnish all labor, materials, equipment and incidentals and install pipe hangers, supports, concrete inserts, and anchor bolts including all metallic hanging and supporting devices for supporting exposed piping.

B. Related Work Described Elsewhere:

1. Concrete is included in Division 3.

2. Painting is included in Section 09 91 00.

3. Pipe and fittings are included in respective sections of Division 33.

1.02 QUALITY ASSURANCE

A. Hangers and supports shall be approved in accordance with the Pinellas County Material Specification Manual and be adequate to maintain the supported load in proper position under all operating conditions. The minimum working factor of safety for pipe supports shall be five (5) times the ultimate tensile strength of the material, assuming 10 feet of water filled pipe being supported.

B. All pipe and appurtenances connected to equipment shall be supported in such a manner as to prevent any strain being imposed on the equipment. When manufacturers have indicated requirements that piping loads shall not be transmitted to their equipment, the Contractor shall submit a certification stating that such requirements have been complied with.

1.03 SUBMITTALS

A. Materials and Shop Drawings:

1. Submit to the Engineer for approval, as provided in Section 01 33 00: Shop Drawings, Working Drawings, and Samples, shop drawings of all items to be furnished under this Section.

2. Submit to the Engineer, for approval, samples of all materials specified herein.

1.04 WARRANTY AND GUARANTEES

A. Provide equipment warranty in accordance with Section 01 78 36: Warranties and Bonds.

PART 2 - PRODUCTS

2.01 GENERAL

A. All pipe and tubing shall be supported as required to prevent significant stresses in the pipe or tubing material, valves, and fittings and to support and cure the pipe in the intended position and alignment. All supports shall be designed to adequately secure the pipe against excessive dislocation due to thermal expansion and contraction, internal flow forces, and all probable external forces such as equipment, pipe, and personnel contact. All pipe supports shall be approved prior to installation.

B. The Contractor shall select and design all piping support systems within the specified spans and component requirements. Structural design and selection of support system components shall withstand the dead loads imposed by the weight of the pipes filled with water, plus any insulation. Commercial pipe supports and hangers shall have a minimum safety factor of 5.

C. No attempt has been made to show all required pipe supports in all locations, either on the Drawings or in the details. The absence of pipe supports and details on any drawings shall not relieve the Contractor of the responsibility for providing them throughout the site.

D. All support anchoring devices, including anchor bolts, inserts and other devices used to anchor the support onto a concrete base, roof, wall or structural steel works, shall be of the proper size, strength and spacing to withstand the shear and pullout loads imposed by loading and spacing on each particular support.

E. All materials used in manufacturing hangers and supports shall be capable of meeting the respective ASTM Standard Specifications with

regard to tests and physical and chemical properties, and be in accordance with MSS SP-58.

F. Hangers and supports shall be spaced in accordance with ANSI B31.1.0 except that the maximum unsupported span shall not exceed 10 feet unless otherwise specified herein.

G. Unless otherwise specified herein, pipe hangers and supports shall be as manufactured by ITT Grinnel Co., Inc., Carpenter and Patterson, Inc., or equal. Any reference to a specific figure number of a specific manufacturer is for the purpose of establishing a type and quality of product, and shall not be considered as proprietary. Any item comparable in type, style, quality, design and performance will be considered for approval.

2.02 MATERIALS AND EQUIPMENT

A. Saddle Supports for Ductile Iron Forcemain Pipe

1. Pipe Supports equal to detail K 5 of the Pinellas County Material Specification Manual shall be used to support above ground horizontal forcemain piping, valves, and appurtenances.

B. Pipe Hangers and Supports for Metal Pipe:

1. Suspended single pipes shall be supported by hangers suspended by steel rods from galvanized concrete inserts, beam clamps, or ceiling mounting bolts as follows:

a. Hangers

Pipe Size, Inches	Grinnel Fig. No.
Less than 1/2	138R
1/2 through 1	97C
1-1/4 through 4	104
6 through 12	590
14 through 30	171

b. Hanger rods shall be rolled steel machine threaded with load ratings conforming to ASTM Specifications and the strength of the rod shall be based on root diameter. Hanger rods shall have the following minimum diameters:

Pipe Size, Inches	Min. Rod Diameter, In.
Less than 2-1/2	3/8
2-1/2 to 3	1/2

4	5/8
6	3/4
8 to 12	7/8
14 to 18	1

c. Where applicable, structural attachments shall be beam clamps. Beam clamps, for rod sizes 1/2-inch through 3/4-inch shall be equal to Grinnel Fig. No. 229, and for rod sizes 7/8-inch through 1-1/4 inches shall be equal to Grinnel Fig. No. 228, or equal.

d. Concrete inserts for pipe hangers shall be; continuous metal inserts designed to be used in ceilings, walls or floors, spot inserts for individual pipe hangers, or ceiling mounting bolts for individual pipe hangers and shall be as manufactured by Unistrut Corp., Wayne, Michigan; Carpenter and Patterson, Inc., Laconia, New Hampshire; Richmond or equal and shall be as follows:

1) Continuous concrete inserts shall be used where applicable and/or as shown on the Drawings and shall be used for hanger rod sizes up to and including 3/4-inch diameter. Inserts to be used where supports are parallel to the main slab reinforcement shall be Series P3200 by Unistrut Corp., Fig 1480 Type 2 by Carpenter and Patterson, Inc., or equal. Inserts to be used where supports are perpendicular to the main slab reinforcement shall be Series P3300 by Unistrut Corp., Fig. 1480 Type I by Carpenter and Patterson, Inc. or equal.

2) Spot concrete inserts shall be used where applicable and shall be used for hanger sizes up to and including 7/8-inch diameter. Inserts shall be Fig. 650 by Carpenter and Patterson, Inc. for hanger rod sizes 1/2-inch through and including 3/4-inch, and Fig. 266 by Carpenter and Patterson Inc., for 7/8-inch hanger rods.

3) Ceiling mounting bolts shall be used where applicable and be for hanger rod sizes l-inch through and including 1-1/4 inches and shall be Fig. 104M as manufactured by Carpenter and Patterson, Inc., or equal.

e. All pipe hangers shall be capable of vertical adjustment under load and after erection. Turnbuckles, as required and where applied, shall be equal to Grinnel Fig. No. 230.

2. Wall or column supported pipes shall be supported by welded steel brackets equal to Grinnel Fig. 194, 195 and 199 as required, for pipe sizes up to and including 20-inch diameter. Additional wall bearing plates shall be provided where required.

a. Where the pipe is located above the bracket, the pipe shall be supported by an anchor chair and U-bolt assembly supported by the bracket for pipes 4 inches and larger and by a U-bolt for pipes smaller than 4 inches. Anchor chairs shall be equal to Carpenter Patterson Fig. No. 127. U-bolts shall be equal to Grinnel Fig. No. 120 and 137.

b. Where the pipe is located below the bracket, the pipes shall be supported by pipe hangers suspended by steel rods from the bracket. Hangers and steel rods shall be as specified above.

3. Floor supported pipes 3-inches and larger in diameter shall be supported by either cast-in-place concrete supports or adjustable pipe saddle supports as directed by the Engineer. In general, concrete supports shall be used when lateral displacement of the pipes is probable (unless lateral support is provided), and adjustable pipe saddle type supports shall be used where later displacement of pipes is not probable.

a. Each concrete support shall conform to the details shown on the Drawings. Concrete shall be poured after the pipe is in place with temporary supports. Concrete piers shall conform accurately to the bottom 1/3 to 1/2 of the pipe. Top edges and vertical corners of each concrete support shall have l-inch bevels. Each pipe shall be secured on each concrete support by a wrought iron or steel anchor strap anchored to the concrete with cast-in-place bolts or with expansion bolts. Where directed by the Engineer, vertical reinforcement bars shall be grouted into drilled holes in the concrete floor to prevent overturning or lateral displacement of the concrete support. Unless otherwise approved by the Engineer, maximum support height shall be five (5) feet.

b. Concrete piers used to support base elbows and tees shall be similar to that specified above. Piers may be square or rectangular.

c. Each adjustable pipe saddle support shall be screwed or welded to the corresponding size 150 pound companion flanges or slip-on welding flanges respectively. Supporting pipe shall be of Schedule 40 steel pipe construction. Each flange shall be secured to the concrete floor by a minimum of two (2) expansion bolts per flange. Adjustable saddle supports shall be equal to Grinnel Fig. No. 264. Where used under base fittings, a suitable flange shall be substituted for the saddle.

4. Vertical piping shall be supported as follows:

a. Where pipes change from horizontal to vertical, the pipes shall be supported on the horizontal runs within 2 feet of the change in direction by pipe supports as previously specified herein.

b. For vertical runs exceeding 15 feet, pipes shall be supported by approved pipe collars, clamps, brackets, or wall rests at all points required to insure a rigid installation.

c. Where vertical piping passes through a steel floor sleeve, the pipe shall be supported by a friction type pipe clamp which is supported by the pipe sleeve. Pipe clamps shall be equal to Grinnel Fig. 262.

5. Anchor bolts shall be equal to Kwik-Bolt as manufactured by the McCullock Industries, Minneapolis, Minnesota, or Wej-it manufactured by Wej-it Expansion Products, Inc., Bloomfield, Colorado.

6. All rods, hangers, inserts, brackets, and components shall be furnished with galvanized finish.

C. Pipe Hangers and Supports for Plastic Pipe:

1. Single plastic pipes shall be supported by pipe supports as previously specified herein.

2. Multiple, suspended, horizontal plastic pipe runs, where possible, and rubber hose shall be supported by ladder type cable trays such as the Electray Ladder by Husky-Burndy, the Globetray by the Metal Products Division of United States Gypsum, or equal. Ladder shall be of mild steel construction. Rung spacing shall be approximately 18 inches for plastic pipe and 12 inches for rubber

hose. Tray width shall be approximately 6-inch for single runs of rubber hose and 12 inches for double runs of rubber hose. Ladder type cable trays shall be furnished complete with all hanger rods, rod couplings, concrete inserts, hanger clips, etc. required for a complete support system. Individual plastic pipes shall be secured to the rungs of the cable tray by strap clamps or fasteners equal to Globe Model M-CAC, Husky-Burndy Model SCR or approved equal. Spacing between clamps shall not exceed 9 feet. The cable trays shall provide continuous support along the length of the pipe.

3. Individual clamps, hangers, and supports in contact with plastic pipe shall provide firm support but not so firm as to prevent longitudinal movement due to thermal expansion and contraction.

D. Pipe Supports for Small Diameter PVC and Steel Pipe:

1. Small diameter Schedule 80 PVC piping 3-inches in diameter and smaller, and steel piping 2-inches in diameter and smaller shall be supported with "SUSPORT" system arrangements as manufactured by Universal Suspension Systems Inc. of Gillette, New Jersey or an equal approved by the Engineer. Clamping halves for the pipe support shall be manufactured of molded polypropylene and shall support and fit closely for 360° around the pipe. To support piping carrying non-corrosive fluids or gases and located in noncorrosive, indoor environments, all hardware for the "SUSPORT" system shall be nickel chrome plated carbon steel. To support piping carrying corrosive fluids or gases, piping located in corrosive environments or piping located outdoors, all hardware for the system shall be manufactured of Type 304 stainless steel.

2. In some cases, to adequately support small diameter PVC or steel piping, a metal frame support structure may be required for support of the "SUSPORT" system specified above. Where required, metal frame support structures shall be constructed using channels, fittings, brackets, hardware and other accessories as manufactured by B-Line Systems, Inc. of Highland, Illinois, or an equal approved by the Engineer. If located in indoor, non-corrosive environments, the materials for the frame structure shall be carbon steel with an epoxy coating applied by a cathodic, electro-deposition process which is equal to "Dura-a-Green" by B-Line Systems, Inc. For corrosive or outdoor environments, the materials for the frame structure be Type 316 stainless steel unless otherwise noted on the Drawings. Hardware used to construct the frame support structure shall be cadmium plated for carbon steel supports or Type 316 stainless steel for stainless steel supports.

3. Pipe supports for small diameter PVC and steel piling shall be located wherever necessary in the opinion of the Engineer to adequately support the pipe, however, they shall have a maximum spacing as specified below for straight pipe runs. Adequate supports shall especially be used adjacent to valves and fittings in pipelines. The following table is based on spacing requirements for Schedule 80 PVC or Standard Weight (Schedule 40) steel pipe carrying a fluid with a Specific Gravity of 1.0 at a temperature not exceeding 120°F. Support spacing for PVC or steel piping carrying fluids with Specific Gravities or temperatures exceeding those stated above shall be approved by the Engineer.

Nominal Pipe Diameter, Inches	Support Spacing, Feet PVC Pipe	Steel Pipe
1/2"	3.5	4.5
3/4"	4.0	5.0
1"	4.5	5.5
1-1/4"	5.0	6.5
1-1/2"	5.0	7.5
2"	5.5	8.0
2-1/2"	5.5	-
3"	6.0	-

2.03 ACCESSORIES (NOT APPLICABLE)

2.04 SPARE PARTS (NOT APPLICABLE)

2.05 QUALITY CONTROL

A. Contractor shall follow Manufacturer's and Supplier's recommended product quality control specifics as required for this project.

PART 3 - EXECUTION

3.01 PREPARATION

A. Prior to prime coating, all pipe hangers and supports shall be thoroughly clean, dry and free from all mill-scale, rust, grease, dirt, paint and other foreign substances to the satisfaction of the Engineer.

B. All submerged pipe supports shall be prime coated with Koppers 654 Epoxy Primer or approved equal. All other pipe supports shall be prime coated with Rustinhibitive Primer No. 621 as manufactured by Koppers Company, Inc., Pittsburgh, Pa., or equal.

C. Finish coating shall be compatible with the prime coating used and shall be applied as specified in Section 09 91 00: Painting and Protective Coatings.

3.02 INSTALLATION

A. All pipes, horizontal and vertical, shall be rigidly supported from the building structure by approved supports. Supports shall be provided at changes in direction and elsewhere as shown in the Drawings or specified herein. No piping shall be supported from other piping or from metal stairs, ladders, and walkways, unless it is so indicated on the Drawings, or specifically directed or authorized by the Engineer.

B. All pipe supports shall be designed with liberal strength and stiffness to support the respective pipes under the maximum combination of peak loading conditions to include pipe weight, liquid weight, liquid movement, and pressure forces, thermal expansion and contraction, vibrations, and all probable externally applied forces. Prior to installation, all pipe supports shall be approved by the Engineer.

C. Pipe supports shall be provided to minimize lateral forces through valves, both sides of split type couplings, and sleeve type couplings and to minimize all pipe forces on pump housings. Pump housings shall not be utilized to support connecting pipes.

D. Pipe supports shall be provided as follows:

1. Cast iron and ductile iron shall be supported at a maximum support spacing of 10 feet, 0-inches with minimum of one support per pipe section at the joints.

2. All vertical pipes shall be supported at each floor or at intervals of at least 15 feet by approved pipe collars, clamps brackets or wall rests, and at all points necessary to insure rigid construction.

E. Effects of thermal expansion and contraction of the pipe shall be accounted for in pipe support selection and installation.

F. Inserts for pipe hangers and supports shall be installed on forms before concrete is poured. Before setting these items, all Drawings and figures shall be checked which have a direct bearing on the pipe location. Responsibility for the proper location of pipe supports is included under this Section.

G. Continuous metal inserts shall be embedded flush with the concrete surface.

H. Standard Pipe Supports:

1. Horizontal Suspended Piping:

a. Single Pipes: Adjustable swivel-ring, splint-ring, or clevis hangers.

b. Grouped Pipes: Trapeze hanger systems.

c. Furnish galvanized steel protection shield and oversized hangers for all insulated pipe.

d. Furnish precut sections of rigid insulation with vapor barrier at hangers for all insulated pipe.

2. Horizontal Piping Supported From Walls:

a. Single Pipes: Wall brackets or wall clips attached to wall with anchors. Clips attached to wall mounted framing also acceptable.

b. Stacked Piping:

1) Wall mounted framing system and clips acceptable for piping smaller than 3-inch minimal diameter.

2) Piping clamps which resist axial movement of pipe through support not acceptable.

c. Wall mounted piping clips not acceptable for insulated piping.

3. Horizontal Piping Supported From Floors:

a. Stanchion Type:

1) Pedestal type; adjustable with stanchion, saddle, and anchoring flange.

2) Use yoke saddles for piping whose centerline elevation is 18 inches or greater above the floor and for all exterior installations.

3) Provide neoprene waffle isolation pad under anchoring flanges, adjacent to equipment or where otherwise required to provide vibration isolation.

b. Floor Mounted Channel Supports:

1) Use for piping smaller than 3-inch nominal diameter running along floors and in trenches at piping elevations lower than can be accommodated using pedestal pipe supports.

2) Attach channel framing to floors with anchor bolts.

3) Attach pipe to channel with clips or pipe clamps.

c. Concrete Cradles: Use for piping larger than 3-inch along floor and in trenches at piping elevations lower than can be accommodated using stanchion type.

4. Vertical Pipe: Support with wall brackets and base elbow or riser clamps on floor penetrations.

5. Standard Attachments:

a. To Concrete Ceilings: Concrete inserts.

b. To Steel Beams: I-beam clamp or welded attachments.

c. To Wooden Beams: Lag screws and angle clips to members not less than 2-1/2 inches thick.

d. To Concrete Walls: Concrete inserts or brackets or clip angles with anchor bolts.

6. Existing Walls and Ceilings: Install as specified for new construction, unless shown otherwise.

3.03 INSPECTION AND TESTING (NOT APPLICABLE)

3.04 START-UP AND INSTRUCTION (NOT APPLICABLE)

END OF SECTION

SECTION 26 05 00

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: General administrative, procedural requirements, and installation methods for electrical installations specified in Division 16.

B. The Drawings are schematic and are not intended to show every detail of construction.

1. In general, conduits/raceways, transitions and offsets shown on Drawings indicate approximate locations in plan and elevation where the systems are intended to be run.

2. CONTRACTOR shall fully coordinate electrical Work with other trades to avoid interferences.

3. In the event of interferences, CONTRACTOR shall request clarification from ENGINEER in writing.

B. Related Documents: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Sections, apply to Work of this Section.

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with requirements of Section 01 33 00, Shop Drawings covering the items included under this Section of Work. Shop Drawing submittals shall include:

1. Submit product data covering the items included under this Section of Work.

B. Conforming to Construction Drawings: Submit a complete set of Drawings showing the locations of the piping, ductwork, etc., as actually installed. Such Drawings shall be submitted to ENGINEER on tracing cloth, mylar, or sepia paper from which blueprints can be obtained.

C. Operation and Maintenance Manuals: Submit the following information for equipment items:

1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.

2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.

3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.

4. Servicing instructions and lubrication charts and schedules.

1.03 RECORD DOCUMENTS

A. Prepare Record Documents in accordance with requirements in Section 01 78 39. In addition, CONTRACTOR shall submit, prior to final payment, Drawings conforming to construction records of systems it has installed. Vendor drawings shall be sized as manufacturers' standard.

B. Provide typewritten data sheets on motor control circuits with following information on each branch feeder: Load name, horsepower or KVA (transformer), fuse size, starter size, service factor of motor, motor nameplate currents, power factor correction capacitor size (if used), and thermal overload part number.

1.04 QUALITY ASSURANCE

A. National Electrical Code: Comply with NFPA 70, National Electrical Code.

B. UL Compliance and Labeling: Use products and components labeled by UL.

1.05 PERMITS, INSPECTIONS, AND LICENSES

A. CONTRACTOR shall procure all necessary permits and licenses, observe and abide by all applicable laws, codes, regulations, ordinances, and rules of the State, territory, or political subdivision thereof, wherein Work is done, or any other duly constituted public authority, and further agrees to hold OWNER harmless from liability or penalty which might be imposed by reason of an asserted violation of such laws, codes, regulations, ordinances, or other rules.

1. Upon completion of Work, CONTRACTOR shall secure certificates of inspection from the inspector having jurisdiction and shall submit 3 copies of the certificates to OWNER. CONTRACTOR shall pay the fees for the permits, inspections, licenses, and certifications when such fees are required.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to Project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification. Equipment shall be packaged to prevent damage during shipment, storage, and handling. Do not install damaged units; replace, and remove damaged units from Site.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 GENERAL ELECTRICAL INSTALLATION

A. Provide electrical materials and equipment enclosures appropriate for areas in which they are installed. Each area will be designated on Drawings with a type of construction such as NEMA 4, 7 , 9 or 12 if it is other than NEMA 4X. An area designated by a name and elevation includes space bounded by floor, ceiling, and enclosing walls.

1. Exception: Provide manufacturer's standard construction for indoor or outdoor application where equipment is not manufactured to NEMA specifications (e.g., switchgear, transformers, high voltage capacitors, bus duct, and light fixtures; materials and equipment used in finished areas such as offices, laboratories, etc.).

B. Provide nonmetallic electrical materials and equipment enclosures in NEMA 4X areas; watertight NEMA 4 and equipment enclosures for outdoor applications and indoor applications below grade.

C. Coordinate with power company metering requirements. Furnish, install, and connect metering equipment not furnished, installed or connected by power company.

D. Supporting devices and sleeves shall be set in poured-in-place concrete and other structural components as they are constructed.

E. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide maximum headroom possible. Coordinate connection of electrical systems with exterior underground and overhead utilities

and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

F. Install systems, materials, and equipment to conform with approved submittal data, including coordination Drawings, to greatest extent possible. Conform to arrangements indicated by Drawings recognizing that portions of Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to ENGINEER.

G. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components where installed exposed in finished spaces.

H. As much as practical, connect equipment for ease of disconnecting with minimum of interference with other installations.

I. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

3.02 RACEWAY INSTALLATION

A. Outdoors, use the following materials:

1. Exposed Conduit: Rigid Aluminum.

2. Underground Direct Buried Conduit: Schedule 80 PVC.

3. Underground Concrete Encased Conduit: Schedule 40 PVC.

4. Conduit Used to Connect to Vibrating Equipment including transformers and hydraulic, pneumatic or electric solenoid or motor-driven equipment: Liquidtight flexible metal conduit.

B. Minimum size conduit shall be 3/4 inch unless shown otherwise.

C. Instrument Signal Conduit Requirements: Shielded signal wires for 4-20 mA type instruments or thermocouple wires assigned to the same control panel may be run in the same conduit. Shielded instrument signal wires, thermocouple wires, and shielded 2-wire intercom wires may be run in the same conduit. No other wires will be permitted in an instrument signal/2-wire intercom conduit.

D. Install expansion fittings in all exposed rigid nonmetallic conduit runs of 20 feet or more.

E. Install expansion/deflection fittings where conduit passes a building expansion joint or where conduits are attached to two structures joined by a concrete expansion joint.

F. Exposed Raceways: Install parallel and perpendicular to nearby surfaces or structural members and follow the surface contours as much as practical. Make bends and offsets so the inside diameter is not effectively reduced. Keep the legs of a bend in the same plane and the straight legs of offsets parallel. Conduits shall slope away from loads to keep moisture from entering the load. Run parallel or banked raceways together. Make bends in parallel or banked runs from the same centerline so that the bends are parallel. Factory elbows may be used in banked runs only where they can be installed parallel. This requires that there be a change in the plane of the run, such as from wall to ceiling and that the raceways be of the same size. In other cases, provide field bends for parallel raceways. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot water pipes. Install horizontal raceway runs above water and steam piping.

G. Space raceways, fittings, and boxes 0.25 inch from mounting surface in NEMA 4 areas. Spacers shall be one-piece construction of stainless steel, galvanized steel, PVC, ABS, or other noncorrosive material.

H. Sleeves: Install in concrete floor slabs except where conduit passes through a housekeeping pad. Install in exterior walls below grade.

I. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment with an adjustable top or coupling threaded inside for plugs and set flush with the finished floor. Extend conductors to equipment with rigid metal conduit; flexible metal conduit may be used 6 inches above the floor. Where equipment connections are not made under this Contract, install screwdriver-operated threaded flush plugs with floor.

J. Flexible Connections: Use short length (maximum 6 feet for lighting fixtures; maximum 3 feet for all other equipment) of flexible conduit for recessed and semi-recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement, and all motors. Use liquidtight flexible conduit in wet locations and rated flexible connections for hazardous locations. Install separate ground conductor across flexible connections.

K. Join raceways with fittings designed and approved for the purpose and make joints tight. Where joints cannot be made tight, use bonding jumpers to provide electrical continuity of the raceway system. Where terminations are subject to vibration, use

bonding bushings or wedges to assure electrical continuity. Where subject to vibration or dampness, use insulating bushings to protect conductors.

L. Use raceway fittings that are of types compatible with the associated raceway and suitable for the use and location. For intermediate metal conduit, use threaded rigid metal conduit fittings. For PVC externally coated rigid metal conduit, use only factory-coated fittings approved for use with that material. Patch all nicks and scrapes in PVC coating after installing conduit.

M. Install raceway sealing fittings in accordance with the manufacturer's written instructions. Locate fittings at suitable, approved, accessible locations and fill them with UL listed sealing compound. For concealed raceways, install each fitting in a flush metal box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points and elsewhere as indicated:

1. Where conduits enter or leave hazardous locations.

2. Where conduits enter or leave NEMA 4X areas.

3. Where conduits pass from warm locations to cold locations, such as the boundaries of refrigerated spaces and air-conditioned spaces.

4. Where required by the NEC.

N. Install electrical boxes in those locations which ensure ready accessibility to enclosed electrical wiring. Provide knockout closures to cap unused knockout holes where blanks have been removed.

O. Position recessed outlet boxes accurately to allow for surface finish thickness.

P. Fasten electrical boxes firmly and rigidly to substrates or structural surfaces to which attached, or solidly embed electrical boxes in concrete masonry.

Q. Provide fire-retardant barriers in all pull and junction boxes containing circuits that are otherwise continuously separated in conduit. Securely fasten these barriers within box. Size barriers so that space between barrier and box wall does not exceed 0.125 inch anywhere around the perimeter of barrier.

R. Support exposed raceway within 1 foot of an unsupported box and access fittings. In horizontal runs, support at box and access fittings may be omitted where box or access fittings are independently supported and raceway terminals are not made with chase nipples or threadless box connectors.

S. In open overhead spaces, cast boxes threaded to raceways need not be supported separately except where used for fixture support; support sheet metal boxes directly from building structure.

T. Terminations: Where raceways are terminated with locknuts and bushings, align the raceway to enter squarely and install the locknuts with dished part against the box. Where terminating in threaded hubs, screw the raceway or fitting tight into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align the raceway so the coupling is square to the box and tighten the chase nipples so no threads are exposed.

U. Complete installation of electrical raceways before starting installation of conductors within raceways and prevent foreign matter from entering raceways by using temporary closure protection. Cap spare conduit. Protect stub-ups from damage where conduits rise from floor slabs. Arrange so curved portion of bends is not visible above the finished slab.

V. Install pull wires in empty raceways: Use No. 14 AWG zinc-coated steel or monofilament plastic line having not less than 200-pound tensile strength. Leave not less than 12 inches of slack at each end of the pull wire.

3.03 WIRE AND CABLE INSTALLATION

A. Use pulling means including fish tape, cable, rope, and basket weave wire/cable grips which will not damage cables or raceways. Pull conductors simultaneously where more than one is being installed in same raceway. Use UL listed pulling compound or lubricant where necessary.

B. Keep branch circuit conductor splices to minimum. Splice feeders only where indicated. Use a standard kit. No splices are allowed for instrument and telephone cables except at indicated splice points.

C. Install splice and tap connectors which possess equivalent or better mechanical strength and insulation rating than conductors being spliced. Use splice and tap connectors which are compatible with conductor material and are UL listed as pressure type connectors.

D. Provide adequate length of conductors within electrical enclosures and train conductors to terminal points with no excess. Bundle multiple conductors, with conductors larger than No. 10 AWG cabled in individual circuits. Make terminations so there is no bare conductor at terminal.

E. Terminate power conductors at equipment using pressure-type terminals specifically designed for type of terminations to be made. Terminate no more than 2 conductors No. 8 AWG and smaller within the same pressure-type terminal. These

2 conductors shall be no more than 4 wire gauge sizes apart. Terminate no more than 1 conductor larger than No. 8 AWG within any pressure-type terminal.

1. Exception: Power factor correction capacitor conductors may be terminated at the motor disconnect switch load terminals.

F. Seal wire and cable ends until ready to splice or terminate.

3.04 EQUIPMENT CHECKOUT AND TESTING

A. In addition to testing recommended by equipment or material supplier and called for in equipment or material specification, perform the following.

B. Motor Testing: Motor insulation shall be tested by using a 500 VDC (minimum) megger and applying test until a constant megohm reading of the following magnitude is obtained:

$R_{min.} = 4 (KV + 1)$ at 25 degrees C winding temp.
$R_{min.} = IV + 1$ at 40 degrees C winding temp.

1. If motors do not meet requirements of megger test, blow hot air through motors to dry out and repeat until test is passed. If desirable, drying can be done by applying an electrical potential to equipment. However, in no case, induced or direct, shall voltage or current exceed continuous rating of equipment being dried.

2. After passing megger test, motors shall be hi-pot tested at 200 percent rated voltage for a minimum of 1 minute.

C. Equipment Testing: The following tests which are applicable for a particular item of equipment shall be performed:

1. Megger bus work phase-to-phase and phase-to-ground. Minimum acceptable steady-state value is 100 megohms.

2. Megger power circuit breakers and circuits supplied phase-to-phase and phase-to-ground (100 megohms minimum).

3. Test current transformer circuits by applying current to secondary wiring at current transformer terminals until contactor trips.

4. Test, time, and set protective relays. Relays shall be timed at various multiples (minimum of 3 points) of the pick-up value to determine agreement with published curves and adjust as necessary to agree with coordination study required settings. Exact tests to be performed vary with type of relay. Manufacturer's instructions for relay shall be complied with.

5. After Work has been completed, demonstrate to OWNER's Representative that entire electrical installation is in proper working order and will perform functions for which it was designed by functional testing.

6. Make any specific tests required by the manufacturer's installation instructions.

D. Check-out Procedures. In general, check-out procedures (as listed below) which are applicable for a particular item of equipment shall be performed:

1. Vacuum interior of cubicles and remove foreign material.

2. Wipe clean with a lint-free cloth insulators, bushings, bus supports, etc.

3. Check and adjust time delay, under-voltage devices, phase relay, over-current relays, etc., as required by coordination study or ENGINEER.

4. Fill motor bearings requiring oil.

5. Check and change, as required, thermal overload heater elements to correspond with motor full-load current and service factors of installed motor.

6. Check direction of rotation of motors and reverse connections if necessary. Check rotation with motor mechanically uncoupled where reverse rotation could damage equipment.

7. Equipment with two or more sources of power connected by tie breakers, transfer switches, or generator receptacles shall be checked for rotation from each possible combination of power sources. Power sources must have the same phase sequence for each source throughout entire facility.

8. Check exposed bolted power connections for tightness.

9. Check operation of breakers, contactors, etc., and control and safety interlocks.

10. Check tightness of bolted structural connections.

11. Check leveling and alignment of enclosures.

12. Check operating parts and linkages for lubrication, freedom from binding, vibration, etc.

13. Check tightness and correctness of control connections at terminal blocks, relays, meters, switches, etc.

14. Clean auxiliary contacts and exposed relay contacts after vacuuming.

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes the following:

1. Low-Voltage Wire and Cable.
2. Instrument Cable.

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01 33 00, Shop Drawings covering the items included under this Section. Include Shop Drawings of wires, cables, connectors, splice kits, and termination assemblies.

1.03 QUALITY ASSURANCE

A. UL Compliance: Provide components which are listed and labeled by UL. For cables intended for use in air handling space comply with applicable requirements of UL Standard 710, "Test Method for Fire and Smoke characteristics of cables used in Air Handling Spaces."

B. NEMA/ICEA Compliance: Provide components which comply with following standards:

1. NEMA WC 70-1999/ICEA S-95-658-1999, Nonshielded Power Cables Rated 2,000 Volts or Less for the Distribution of Electrical Energy.

C. IEEE Compliance: Provide components which comply with the following standard.

1. Standard 82, Test procedures for Impulse Voltage Tests on Insulated Conductors.

D. Labeling: Handwritten labels are not acceptable. All labels shall be machine printed on clear or opaque tape, stenciled onto adhesive labels, or typewritten onto adhesive labels. The font shall be at least 1/8 inch in height, block characters, and legible. The text shall be of a color contrasting with the label such that is may be easily read. If labeling tape is utilized, the font color shall contrast with the background. Patch panels shall exhibit workstation numbers or some type of location identifier, in sequential order, for all workstations or devices attached. Each Network cable segment shall be labeled at each end with its respective identifier.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Low-Voltage Wire and Cable:
   a. American Insulated Wire Corp.
   b. General Cable.
   c. The Okonite Co.
   d. Southwire Co.

2. Connectors for Low-Voltage Wires and Cable Conductors:
   a. AMP.
   b. O-Z/Gedney Co.
   c. Square D Company.
   d. 3M Company.

3. Instrument Cable:
   a. Belden (Trade Nos. 1120A and 1118A).

2.02 LOW-VOLTAGE WIRES AND CABLES

A. Conductors: Provide stranded conductors conforming to ASTM Standards for concentric stranding, Class B. Construction of wire and cable shall be single conductor (1/c) unless multiconductor cable is shown by notation in form (x/c) where x indicates the number of separate insulated conductors per cable.

B. Conductor Material: Copper. Minimum size power wire shall be No. 12 AWG.

C. Insulation: Provide RHW/USE insulation for power conductors used in single- and 3-phase circuits with more than 120 volts to ground. Provide RHW/USE, XHHW, or THWN/THHN insulation for power conductors used in single- and 3-phase circuits with 120 volts or less to ground:

1. Provide RHW, THHN/THWN, or XHHW insulation for grounding conductors installed in raceways.

2. Provide THHN/THWN insulation for control conductors.

2.03 CONNECTORS FOR LOW-VOLTAGE WIRES AND CABLES

A. Provide UL listed factory fabricated, solderless metal connectors of sizes, ampacity ratings, materials, types, and classes for applications and services indicated. Use connectors with temperature ratings equal to or greater than those of the wires upon which used.

2.04 INSTRUMENT CABLE

A. Instrument Cable: 600 volt minimum insulated shielded cable with two or more twisted No. 16 or No. 18AWG stranded copper conductors; PVC, nylon, or polyethylene outer jacket; and 100 percent foil shielding.

2.05 MULTICONDUCTOR CONTROL CABLE

A. Multiconductor Control Cable: Concentrically cabled No. 14 AWG stranded copper conductors with saturated interstitial fillers; overall binder of nylon or similar material; and PVC jacket. Quantity of conductors shall be as indicated on Drawings. Provide Type 2010 individual conductor insulation unless otherwise indicated on Drawings as one of the following:

1. Type ISS: 15 mils polyethylene with 5 mils nylon.

2. Type 2010: 20 mils polyethylene with 10 mils PVC.

3. Type 3015: 30 mils polyethylene with 15 mils PVC.

PART 3 - EXECUTION

3.01 FIELD QUALITY CONTROL

A. Prior to energizing, check installed 480 volt, 3-phase power circuits and higher wires and cables with a 1,000-volt megohm meter to determine insulation resistance levels to assure requirements are fulfilled. Minimum acceptable megohm meter reading is 100 megohms held at a constant value for 15 seconds. A certified copy of megohm meter tests shall be submitted to ENGINEER. Test reports shall include ambient temperature and humidity at time of testing. Notify ENGINEER 48 hours prior to test with schedule.

B. Reports (non-LAN cable): Testing organization shall maintain a written record of observations and tests, report defective materials and workmanship, and retest corrected defective items. Testing organization shall submit written reports to ENGINEER.

END OF SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Electrical grounding and bonding Work as follows:

1. Solidly grounded.

B. Applications of electrical grounding and bonding Work in this Section:

1. Underground metal piping.
2. Underground metal water piping.
3. Underground metal structures.
4. Metal building frames.
5. Electrical power systems.
6. Grounding electrodes.
7. Separately derived systems.
8. Raceways.
9. Service equipment.
10. Enclosures.
11. Equipment.
12. Lighting standards.

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01 33 00, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:

1. Product Data: Submit manufacturer's data on grounding and bonding products and associated accessories.

1.03 QUALITY ASSURANCE

A. Codes and Standards:

1. UL Compliance: Comply with applicable requirements of UL Standards No. 467, "Electrical Grounding and Bonding Equipment," and No. 869, "Electrical Service Equipment," pertaining to grounding and bonding of systems, circuits, and equipment. In addition, comply with UL Standard 486A, "Wire Connectors

and Soldering Lugs for Use with Copper Conductors." Provide grounding and bonding products which are UL listed and labeled for their intended usage.

2. IEEE Compliance: Comply with applicable requirements and recommended installation practices of IEEE Standards 80, 81, 141, and 142 pertaining to grounding and bonding of systems, circuits, and equipment.

PART 2 - PRODUCTS

2.01 GROUNDING AND BONDING

A. Materials and Components:

1. Except as otherwise indicated, provide electrical grounding and bonding systems indicated; with assembly of materials including, but not limited to, cables/wires, connectors, solderless lug terminals, grounding electrodes and plate electrodes, bonding jumper braid, surge arresters, and additional accessories needed for complete installation. Where more than one type component product meets indicated requirements, selection is Installer's option. Where materials or components are not indicated, provide products which comply with NEC, UL, and IEEE requirements and with established industry standards for those applications indicated.

2. Conductors: Electrical copper grounding conductors for grounding system connections that match power supply wiring materials and are sized according to NEC.

3. Ground Bus: 0.25 inch by 1 inch minimum copper ground bus where indicated.

4. Service Arrester: 3-pole, 3 phase, 120/240 volts, No. 14 AWG 4-wire including ground, 18-inch leads, with watertight enclosure.

5. Service Arrester: Electrical service arrester, pellet type, 120/240 volt, l phase, 3-wire, for exterior mounting.

6. Service Arrester: Electrical service arrester, 480 volts, 3-phase, 4-wire, for exterior mounting.

7. Grounding Electrodes: Steel with copper welded exterior, 3/4-inch diameter by 10 feet.

8. Electrical Grounding Connection Accessories: Provide electrical insulating tape, heat-shrinkable insulating tubing, welding materials, bonding straps, as recommended by accessories manufacturers for type services indicated.

PART 3 - EXECUTION

3.01 INSTALLATION OF ELECTRICAL GROUNDING AND BONDING SYSTEMS

A. Connect grounding conductors to underground grounding electrodes using exothermic weld process or mechanical compression type connectors.

B. Ground electrical service system neutral at service entrance equipment to grounding electrodes.

C. Ground each separately derived system neutral to effectively grounded metallic water pipe, effectively grounded structural steel member, and separate grounding electrode.

D. Connect together system neutral, service equipment enclosures, exposed noncurrent carrying metal parts of electrical equipment, metal raceway systems, grounding conductor in raceways and cables, receptacle ground connectors, and plumbing systems.

E. Terminate feeder and branch circuit insulated equipment grounding conductors with grounding lug, bus, or bushing.

F. Connect grounding electrode conductors to 1-inch diameter or greater, metallic cold water pipe using a suitably sized ground clamp. Provide connections to flanged piping at street side of flange.

G. Connect building reinforcing steel, building steel beam, building steel roof and walls and duct bank and vault reinforcing steel to ground mat using No. 4/0 AWG bare copper grounding cable.

H. Bond bare No. 4/0 AWG grounding cable in duct banks to grounding cable in vaults and to power equipment ground bus at ends of each duct bank.

I. Bond strut and other metal inside of electrical manholes and vaults to bare No. 4/0 AWG grounding cable carried in duct bank.

J. Bond grounding cables to both ends of metal conduit or sleeves through which such cables pass.

K. Tighten grounding and bonding connectors and terminals, including screws and bolts, in accordance with manufacturer's published torque-tightening values for

connectors and bolts. Where manufacturer's torquing requirements are not indicated, tighten connections to comply with tightening torque values specified in UL 486A to assure permanent and effective grounding.

L. Install braided type bonding jumpers with code-sized ground clamps on water meter piping to electrically bypass water meters.

M. Route grounding connections and conductors to ground and protective devices in shortest and straightest paths as possible while following building lines to minimize transient voltage rises. Protect exposed cables and straps where subject to mechanical damage.

N. Apply corrosion-resistant finish to field connections, buried metallic grounding and bonding products, and places where factory applied protective coatings have been destroyed and are subjected to corrosive action.

END OF SECTION

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Secure support from the building structure for electrical items by means of hangers, supports, anchors, sleeves, inserts, seals, and associated fastenings.

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01 33 00, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:

1. Product data for each type of product specified.

1.03 QUALITY ASSURANCE

A. Electrical components shall be listed and labeled by UL, ETL, CSA, or other approved, nationally recognized testing and listing agency that provides third-party certification follow-up services.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Slotted Metal Angle and U-Channel Systems:
   a. Allied Tube & Conduit.
   b. American Electric.
   c. B -Line Systems, Inc.
   d. Cinch Clamp Co., Inc.
   e. GS Metals Corp.
   f. Haydon Corp.
   g. Kin-Line, Inc.
   h. Unistrut Diversified Products.

2. Conduit Sealing Bushings:
   a. Bridgeport Fittings, Inc.

b. Cooper Industries, Inc.
c. Elliott Electric Mfg. Corp.
d. GS Metals Corp.
e. Killark Electric Mfg. Co.
f. Madison Equipment Co.
g. L.E. Mason Co.
h. O-Z/Gedney.
i. Producto Electric Corp.
j. Raco, Inc.
k. Red Seal Electric Corp.
l. Spring City Electrical Mfg. Co.
m. Thomas & Betts Corp.

2.02 COATINGS

A. Coating: Supports, support hardware, and fasteners shall be protected with zinc coating or with treatment of equivalent corrosion resistance using approved alternative treatment, finish, or inherent material characteristic. Products for use outdoors, in NEMA 4 areas, or embedded in concrete shall be hot-dip galvanized.

2.03 MANUFACTURED SUPPORTING DEVICES

A. Raceway Supports: Clevis hangers, riser clamps, conduit straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring steel clamps.

B. Fasteners. Types, materials, and construction features as follows:

1. Expansion Anchors: Carbon steel wedge or sleeve type.

2. Toggle Bolts: Steel springhead type.

3. Hanger Rods: 0.375-inch diameter minimum, steel.

C. Conduit Sealing Bushings: Factory fabricated, watertight conduit sealing bushing assemblies suitable for sealing around conduit or tubing passing through concrete floors and walls. Construct seals with steel sleeve, malleable iron body, neoprene sealing grommets or rings, metal pressure rings, pressure clamps, and cap screws.

D. Cable Supports for Vertical Conduit: Factory fabricated assembly consisting of threaded body and insulating wedging plug for nonarmored electrical cables in riser conduits. Provide plugs with number and size of conductor gripping holes as required to suit individual risers. Construct body of malleable iron casting with hot-dip galvanized finish.

E. U-Channel Systems: 12 gauge or 0.105-inch-thick stainless steel channels, with 9/16-inch-diameter holes, at a minimum of 8 inches on center in top surface. Provide fittings and accessories that mate and match with U-channel and are of same manufacturer.

2.04 FABRICATED SUPPORTING DEVICES

A. Shop- or field-fabricated supports or manufactured supports assembled from U-channel components.

B. Steel Brackets: Fabricated of angles, channels, and other standard structural shapes. Connect with welds and machine bolts to form rigid supports.

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 26 05 33

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Raceways for electrical wiring. Types of raceways in this Section include the following:

1. Flexible metal conduit.
2. Liquidtight flexible conduit.
3. Rigid metal conduit.
4. Rigid nonmetallic conduit.
5. Wireway.
6. Conduit bodies.

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01 33 00, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:

1. Product data for the following products:

a. Wireway and fittings.
b. Conduit.
c. Conduit bodies.

1.03 QUALITY ASSURANCE

A. Codes and Standards:

1. NEMA Compliance: Comply with applicable requirements of NEMA standards pertaining to raceways.

2. UL Compliance and Labeling: Comply with applicable requirements of UL standards pertaining to electrical raceway systems. Provide raceway products and components listed and labeled by UL, ETL, or CSA.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with requirements, manufacturers offering products which may be incorporated in Work include:

1. Conduit:
   a. Allied Tube.
   b. Carlon.
   c. Johns Manville.
   d. Occidental Coatings.
   e. Orangeburg.
   f. Perma-Cote Industries.
   g. Republic Steel.
   h. Robroy Industries.
   i. Steelduct Co.
   j. Triangle Conduit.
   k. Wheatland Tube.
   l. Youngstown Sheet and Tube.

2. Liquidtight Conduit:
   a. Anamet, Inc.
   b. Carlon.
   c. Electric-Flex.
   d. Thomas and Betts.

3. Conduit Bodies:
   a. Adalet-PLM.
   b. American Electric.
   c. Appleton Electric Co.
   d. Carlon.
   e. Crouse-Hinds Division, Cooper Industries, Inc.
   f. Delta Industrial Products.
   g. Killark Electric Mfg. Co.
   h. Kraloy Products Co.
   i. O-Z/Gedney Co.
   j. Perma-Cote Industries.
   k. Robroy Industries.
   l. Spring City Electrical Mfg. Co.

4. Conduit Thread Paint:
   a. CRC Chemicals, USA.
   b. Sherwin Williams.
   c. ZRC Chemical Products Co.

5. Wireway:
   a. Alrey-Thompson Co.
   b. Anchor Electric Co.

c. Hoffman Engineering Co.
d. Keystone/Rees, Inc.
e. Robroy Industries, Inc.
f. Square D Company.

2.02 METAL CONDUIT AND TUBING

A. Rigid Aluminum Conduit: ANSI C 80.1, hot-dip galvanized.

B. Liquidtight Flexible Metal Conduit and Fittings: UL 360. Fittings shall be specifically approved for use with this raceway.

2.03 NONMETALLIC CONDUIT AND DUCTS

A. Rigid Nonmetallic Conduit (RNC): NEMA TC 2 and UL 651, Schedule 40 or 80 PVC.

B. Liquidtight Flexible Nonmetallic Conduit and Fittings: UL 1660. Fittings shall be specifically approved for use with this raceway.

C. Fiberglass-Reinforced Conduit and Fittings: CSA B196.1 and B1089 A.

2.04 CONDUIT BODIES

A. Provide matching gasketed covers secured with corrosion-resistant screws. Use cast covers in NEMA 4 areas and stamped steel covers in NEMA 1 and 12 areas. Use nonmetallic covers in NEMA 4X areas and threaded, ground joint covers in NEMA 7 and NEMA 9 areas.

B. Metallic Conduit and Tubing: Use metallic conduit bodies as follows:

1. Rigid Metal Conduit: Use cast or malleable iron conduit bodies with zinc electroplating, aluminum enamel or lacquer finish, and threaded hubs.

2. Nonmetallic Conduit and Tubing: Use nonmetallic conduit bodies conforming to UL 514 B.

2.05 WIREWAYS

A. Fittings and accessories including but not limited to couplings, offsets, elbows, expansion joints, adapters, hold-down straps, and end caps shall match and mate with wireway as required for complete system. Where features are not indicated, select to fulfill wiring requirements and comply with applicable provisions of NEC.

B. Wireway covers shall be hinged type.

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

Section Includes: Identification of electrical materials, equipment, and installations. It includes requirements for electrical identification components including, but not limited to, the following:

1. Buried electrical line warnings.

2. Identification labeling for cables and conductors.

3. Operational instruction signs.

4. Warning and caution signs.

5. Equipment labels and signs.

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01 33 00, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:

1. Product Data for each type of product specified.

PART 2 - PRODUCTS

2.01 ELECTRICAL IDENTIFICATION PRODUCTS

A. Colored Adhesive Marking Tape for Wires and Cables: Self-adhesive, vinyl tape not less than 3 mils thick by 1 inch to 2 inches in width.

B. Pre-tensioned Flexible Wraparound Colored Plastic Sleeves for Cable Identification: Flexible acrylic bands sized to suit raceway diameter and arranged to stay in place by pre-tensioned gripping action when coiled around the cable.

C. Underground Line Marking Tape: Permanent, bright colored, continuous printed, plastic tape compounded for direct-burial service not less than 6 inches wide by 4 mils thick. Printed legend indicative of general type of underground line below.

D. Wire/Cable Designation Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound, cable/conductor markers with pre-printed numbers and letter.

E. Aluminum, Wraparound Cable Marker Bands: Bands cut from 0.014-inch-thick aluminum sheet, fitted with slots or ears for securing permanently around wire or cable jacket or around groups of conductors. Provide for legend application with stamped letters or numbers.

F. Engraved, Plastic Laminated Labels, Signs, and Instruction Plates: Engraving stock melamine plastic laminate, 1/16 inch minimum thick for signs up to 20 square inches or 8 inches in length; 1/8-inch thick for larger sizes. Engraved legend in white letters on black face and punched for mechanical fasteners.

G. Baked Enamel Warning and Caution Signs for Interior Use: Pre-printed aluminum signs, punched for fasteners, with colors, legend, and size appropriate to the location.

H. Exterior Metal-Backed Butyrate Warning and Caution Signs: Weather-resistant, nonfading, pre-printed cellulose acetate butyrate signs with 20-gauge galvanized steel backing, with colors, legend, and size appropriate to location. Provide 1/4-inch grommets in corners for mounting.

I. Fasteners for Plastic Laminated and Metal Signs: Self-tapping stainless steel screws or Number 10/32 stainless steel machine screws with nuts and flat and lock washers.

J. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking nylon cable ties, 0.18 inch minimum width, 50-pound minimum tensile strength, and suitable for a temperature range from minus 50 to 350 degrees F. Provide ties in specified colors when used for color coding.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Lettering and Graphics: Coordinate names, abbreviations, colors, and other designations used in electrical identification Work with corresponding designations specified or indicated. Install numbers, lettering, and colors as approved in submittals and as required by Code.

B. Underground Electrical Line Identification: During trench backfilling for exterior nonconcrete encased underground power, signal, and communications lines, install continuous underground plastic line marker located directly above line at 6 to 8

inches below finished grade. Where multiple lines installed in a common trench, do not exceed an overall width of 16 inches; install a single line marker.

C. Install line marker for underground wiring, both direct buried and in raceway.

D. Use conductors with color factory applied entire length of conductors except as follows:

1. The following field applied color coding methods may be used in lieu of factory-coded wire for sizes larger than No. 10 AWG.

a. Apply colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last 2 laps of tape with no tension to prevent possible unwinding. Use 1-inch-wide tape in colors as specified. Do not obliterate cable identification markings by taping. Tape locations may be adjusted slightly to prevent such obliteration.

b. In lieu of pressure-sensitive tape, colored cable ties may be used for color identification. Apply 3 ties of specified color to each wire at each terminal or splice point starting 3 inches from the terminal spaced 3 inches apart. Apply with a special tool or pliers, tighten for snug fit, and cut off excess length.

E. Power Circuit Identification: Securely fasten identifying metal tags of aluminum wraparound marker bands to cables, feeders, and power circuits in vaults, pull boxes, junction boxes, manholes, and switchboard rooms with 1/4-inch steel letter and number stamps with legend to correspond with designations on Drawings. If metal tags are provided, attach them with approximately 55-pound test monofilament line or one-piece self-locking nylon cable ties.

F. Install wire/cable designation tape markers at termination points, splices, or junctions in each circuit. Circuit designations shall be as indicated on Drawings.

END OF SECTION

SECTION 26 28 16

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.01 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01 33 00, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:

1. Product data for each type of product specified.

B. Operation and Maintenance Manuals: Submit operation and maintenance manuals for items included under this Section, including circuits and motor disconnects as specified herein and in accordance with the sections within Divisions 26.

1.02 QUALITY ASSURANCE

A. Codes and Standards:

1. Electrical Component Standards: Provide components which are listed and labeled by UL. Comply with UL Standard 98 and NEMA Standard KS 1.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Allen-Bradley.
2. Appleton.
3. Eaton Corporation.
4. Furnas Electric Co.
5. ~~General Electric Co.~~
6. Siemens, Inc.
7. Schneider Electric.

2.02 CIRCUIT AND MOTOR DISCONNECT SWITCHES

A. Provide NEMA 4Xenclosure to match the rating of the area in which switch is installed. For motor and motor starter disconnects through 100 horsepower, provide units with horsepower ratings suitable to loads. For motor and motor starter

disconnects above 100 horsepower, clearly label switch, "DO NOT OPEN UNDER LOAD."

CAPACITY GREATER THAN 100,000 RMS SYMMETRICAL AMPERES AT 240-VOLTS OR LESS.

B. Fusible Switches: (Heavy-duty) switches, with fuses of classes and current ratings indicated. See Section "Fuses" for specifications. Where current limiting fuses are indicated, provide switches with non-interchangeable feature suitable only for current limiting type fuses.

C. Circuit Breaker Switches: Where individual circuit breakers are required, provide factory-assembled, molded-case circuit breakers with permanent instantaneous magnetic and thermal trips in each pole, and with fault-current limiting protection, ampere ratings as indicated. Construct with overcenter, trip-free, toggle type operating mechanisms with quick-make, quick-break action and positive handle indication. Provide push-to-trip feature for testing and exercising circuit breaker trip mechanism. Construct breakers for mounting and operating in any physical position and in an ambient temperature of 40 degrees C. Provide with AL/CU-rated mechanical screw type removable connector lugs.

D. Non-fusible Disconnects: (Heavy-duty) switches of classes and current ratings as indicated.

E. Service Switches: (Heavy-duty) fusible/circuit breaker switches. UL listed for use as service equipment under UL Standard 98 or 869.

2.03 ACCESSORIES

A. Special Enclosure Material: Provide special enclosure material as follows for switches indicated:

1. Stainless Steel for NEMA 4X switches.

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 26 29 23

VARIABLE-FREQUENCY MOTOR CONTROLLERS

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Provide complete variable frequency drive (VFD) units and appurtenances to provide a complete operating system.

B. Variable frequency drive unit shall be furnished by the control panel manufacturer and installed by the control panel manufacturer.

C. VFD units shall be manufacturer's standard technology and in production for a minimum of 2 years.

D. Provide control system operation, input and control signals, status signals and devices in accordance with the electrical drawings and Division 40 and Division 26 specs.

E. Provide Underwriter's Laboratories listed drive components where applicable.

F. Each VFD unit to be provided is to exhibit less than 5% voltage total harmonic distortion and less than 3% voltage distortion on each harmonic at their immediate upstream distribution bus as verified by calculation and testing. Harmonic current distortion to be in accordance with Table 2.02A. This bus to be referred to as the point of common coupling (PCC).

1.02 REFERENCES:

A. Underwriter's Laboratories Inc. (U.L.):

1. UL-508 Electrical Industrial Control Equipment.

B. National Electrical Manufacturers Association (NEMA): MG 1.

C. National Fire Protection Association (NFPA):

1. NFPA-70 National Electric Code.

1.03 SUBMITTALS:

A. Shop Drawings: Submit the following Shop Drawings and Submittals:

1. Shop Drawings: Provide a complete list of equipment components, and materials, including manufacturer's descriptive and technical literature, and catalog cuts. Provide complete wiring, system interconnection and schematic diagrams for the equipment and controls furnished including external interlocked and controlled components, equipment layout, time versus current curves for protective devices and any other details required to demonstrate that the system and the required external controls has been coordinated and will properly function as designed.

   a. Provide enclosure drawings and details showing all dimensions and construction details.

2. Submit information relative to location and expertise of local service office and personnel.

3. Submit manufacturer’s printed installation instructions.

4. Spare Parts Data: Submit a list of recommended spare parts for the VFD.

5. Operating and Maintenance Instruction Manuals:

   a. Furnish:

      (1) Operating instruction manuals outlining step-by-step procedures required for system startup and operation.

      (2) Manufacturer's name, model number, service manual parts list.

      (3) Brief description of equipment and basic operating features.

      (4) Maintenance instruction manuals outlining maintenance procedures.

      (5) Troubleshooting guide listing possible breakdown and repairs.

      (6) Point-to-point connection wiring diagram for the system.

      (7) Performance Test Reports: Upon completion of installed system, submit in booklet form all shop and field tests performed to prove compliance with specified performance criteria.

1.04 DELIVERY, STORAGE AND HANDLING:

A. Shipping:

1. Ship equipment and materials, except where partial disassembly is required by transportation regulations or for protection, complete with identification and quantity of items.

B. Storage:

1. Inspect and inventory items upon delivery to site.
2. Store and safeguard equipment, material and spare parts.

PART 2 - PRODUCTS

2.01 MANUFACTURERS:

A. Manufacturer shall have at least five years commercial experience in the manufacture, operation and servicing of equipment of type, size, quality, performance, and reliability equal to that specified.

B. Variable Frequency Drive Units:

1. Allen Bradley.
2. Schneider Electric.
3. Eaton.
4. Or approval equal.

2.02 PROVISIONS:

A. Service Conditions:

1. Ambient Temperature Range: 0 deg. C to 110 deg. F.

2. Operational Humidity: Up to 95 percent non-condensing.

3. Environment: Located in Control panel enclosure as designated on Drawings.

4. Altitude: Below 3,300 ft. above sea level.

5. Input Power:

a. Nominal voltage - 460 volts (plus 10 percent or minus 10 percent), 3-phase, 3 wire

b. Nominal Frequency - 60 Hertz (plus or minus 2 Hz.)

c. Service provided from feeder breaker in control panel.

B. Drive System:

1. General:

a. Furnish solid state variable frequency, microprocessor type with Pulse Width Modulated (PWM) output wave form converter. The VFD shall employ a full wave rectifier to prevent input line notching, a DC bus choke, DC bus capacitors and Insulated Gate Bipolar Transistors (IGBT) as the output switching device to convert nominal 480 volts, 3 phase, 60 Hertz, 3 wire input power into adjustable-frequency 3 wire system at 0 to 480 volts, 3 phase, 0 to 60 Hertz output power. Provide output speed control of required motor under variable torque load or constant torque as required by the driven equipment.

b. Motor control circuits shall be wired in accordance with the requirements specified herein or indicated on the Drawings. Where not indicated, the control circuits shall be standard two-wire “start-stop” and the Contractor shall furnish wiring accordingly.

c. The Contractor and variable frequency drive system manufacturer are cautioned regarding the review and compliance with the total Contract Documents. Typical examples are circuit breakers, motor circuit protectors, magnetic starters, relays, timers, control and instrumentation products, pilot devices including pushbuttons, selector switches and pilot lights, enclosures, conduit, disconnect switches, terminal boxes, and other equipment.

d. Provide flux vector control type drives, also known as field-oriented control, with hard-wired motor speed feedback encoder or tachometer, for full torque at zero speed capability.

e. Provide VFD control which ensures accurate zero to full load torque control at low frequencies, including zero speed, with torque repeatability accuracy of 2% or better and torque response time less than 20 ms.

f. Provide 6 pulse drives with 3% impedance input line reactor.

g. All components of the drive shall be designed and sized for the abnormal condition of continuous operation of the driven equipment specified herein at loads up to 15% above rated full load.

h. RMS harmonic output of the drive not to provide more than 5 percent increase in motor heating over similar operation of the motor with zero harmonics in the current.

i. The unit shall withstand drive output terminal line-to-line and line-to-ground short circuits without component failure during start-up and during operation. Drive to safely shutdown until short is cleared.

(1) For motors with base rating voltage less than or equal to 600 volts, the peak instantaneous voltage must be limited to 1600 volts or less, with a voltage rise time greater than or equal to 0.1 micro-seconds.

j. The VFD manufacturer shall guarantee that the above voltage limits will be met with the motor installed up to 100 cable feet from the VFD drive unit. If the VFD manufacturer is not able to guarantee that the above voltage limits will be met, provide a drive output filter or reactor, appropriately rated, located within the VFD enclosure and near the VFD output terminals, which shall ensure that the limitations listed above are maintained. A device located at the motor terminals is not acceptable.

k. The drive unit shall be of modular design to provide for ease and speed of maintenance.

l. Control circuits shall be isolated from power circuits. Unit to accept a 4-20 mA DC speed control signal from an isolated, ungrounded transmitter with unit in remote mode and from local door-mounted manual speed potentiometer or micro-processor type keypad with unit in local mode. The input 4-20 mA signal to be optically isolated from the drive run control circuit. Manual speed potentiometer or keypad controls to have adjustable minimum speed setting of 10 to 80% of full speed and maximum speed setting of 50 to 100% of full speed. The total speed setting to follow a linear time ramp, adjustable from 1-300 seconds for acceleration and deceleration control.

m. Provide trap filters for the drive unit to meet the requirements of the harmonic study under paragraph 2.02. Filters shall be provided with contractors and controlled by the VFD to remove them from the line when the drive is not operating. Contractors shall be provided with spare contacts for remote alarm and to energize status lamp at VFD enclosure.

n. VFD shall be capable of full rated output when powered by incoming voltage with Total Harmonic Distortion (THD) in excess of 10%.

o. Furnish series choke and capacitors on dc bus to reduce ripple in rectifier output and to reduce harmonic distortion reflected into incoming power feeders.

p. Provide conformal coating of internal circuitry.

2. Performance characteristics:

a. Output amps: 110 percent of rated, continuous.

b. Current limit: Range 0 to 130% for constant torque applications, 0 to 110% for variable torque applications, for 1 minute minimum.

c. Acceleration time to top speed, 1-300 seconds, minimum, adjustable.

d. Deceleration time from top speed, 1-300 seconds, minimum, adjustable.

e. Frequency stability: +/- 0.5% (at 25 degrees C, +/10 degrees C) after reaching operating temperature.

f. Output voltage: Proportional to frequency with low speed boost.

g. Combined drive/and filtering efficiency, defined as motor shaft KW divided by VFD input KW, shall meet the following minimum requirements at the specified operating points:

(1) 97 percent at 60 Hz VFD output and 100 percent load.

h. VFD fundamental power factor shall be 0.98 or higher at all speeds and loads.

i. The VFD shall be capable of sustaining continued operation with a 30% dip in nominal line voltage. Output speed may decline only if current limit rating of the VFD is exceeded.

j. Losses to be utilized in drive system efficiency calculation shall include the input isolation transformer, harmonic filter and power factor correction if applicable. Auxiliary controls such as internal VFD control boards and cooling fans shall be included in all loss calculations.

3. Drive Protection:

a. General:

(1) Fault detection and trip circuits shall protect VFD and connected motor against line voltage transients, single-phase, power line overvoltage and undervoltage, output overvoltage and overcurrent, and VFD overtemperature. The VFD shall employ three (3) current limit circuits to provide trip free operation. The slow current regulation limit circuit shall be adjustable to a minimum 125% of the VFD's variable torque current rating. The rapid current regulation limit shall be adjustable to a minimum 170% of the VFD's variable torque current rating. The current switch off limit shall be fixed at a minimum 225% of the VFD's variable torque current rating.

b. Internal Protection: Minimum circuitry as follows:

(1) Current limiting, fast acting, semiconductor input fuses for protection of internal power semiconductors.

(2) Instantaneous output overcurrent trip max. - 200 percent.

(3) DC bus and control circuit transformer fusing.

(4) Grounded control chassis.

(5) Under and over voltage trip, 3 phases.

(6) Motor overload protection, with solid state relays.

(7) Fault reset push button.

(8) Line to ground faults.

(9) Input metal oxide varistor and input line reactor for transient protection.

(10) VFD overtemperature.

c. Troubleshooting: Diagnostic aids to indicate cause of fault; used to assist in troubleshooting circuit problems. Isolated Form C contacts for remote indication of alarms to include the following:

(1) Over/under voltage indication.

(2) Overcurrent trip indication.

(3) DC bus charged indication.

(4) Fault detection indication.

(5) Recycle start indication (to indicate that the unit tried to pick up load for three previous tries and failed).

d. Provide power loss ride through capability which will allow the logic to maintain control due to load inertia without faulting.

e. Provide a programmable automatic restart function which will provide a minimum with time delays between restarts of 3 restarts following a fault condition other than a ground fault, short circuit, internal fault, or user programmable fault condition. Restart type to be programmable for time delay or coasting motor restart.

C. Minimum Control Features:

1. LOCAL-AUTO selection of Start/Stop control.

2. LOCAL/REMOTE selection of Speed Control.

3. Accept a grounded, isolated, 4-20 mA input remote speed control signal from an external device.

4. Provide a 4-20 mA output signal proportion to VFD output frequency for remote speed feedback.

5. Provide Ethernet TCP/IP communication module.

D. Devices:

1. Provide operating, monitoring or alarm indicating devices, on keypad, with minimum as follows:

a. System control selector switch (RUN/OFF/REMOTE) (When in RUN position drive will run).

b. System speed control selector switch (LOCAL/REMOTE) (When in LOCAL position, speed controlled by manual speed potentiometer).

c. Keypad controls to set speed in manual mode.

d. Speed indicating meter in percent speed to indicate speed of the converter powered motor.

e. Run time meter.

f. Alarm and status lights.

PART 3 – EXECUTION

3.01 INSPECTION:

A. Maintain variable frequency drive in upright position at all times.

B. Protect variable frequency drive against damage. Store drive in clean, dry environment with temperature and humidity within range as specified by drive manufacturer. Energize space heaters during storage as recommended by manufacturer.

3.02 INSTALLATION:

A. Erect, install, and start-up equipment.

B. The VFD's shall be installed in the control panel as shown on the Drawings and in accordance with the manufacturer's installation instructions.

C. Factory-trained service personnel, other than sales representatives, shall supervise field installation, inspect, make final adjustments and operational checks, make functional checks of spare parts, and prepare a final report for record purposes. Adjust control and instrument equipment until this equipment has been field tested.

3.03 FIELD TESTING:

A. Perform testing checkout, and start-up for variable frequency drive equipment under technical direction of manufacturer's service engineer. Under no circumstances energize any portion of the drive system without authorization from manufacturer's technical representative.

B. Field Tests:

1. Test each drive over the total speed range that it will be required to operate through for the load being driven for a minimum of two hours. Determine for each drive, motor, and load combination the following at minimum speed, maximum speed, and at 1/3 and 2/3 points between the minimum and maximum speeds:

   a. Input power (kW), voltage, current and RMS power factor on the line side of the drive isolation device.

b. Output to the driven load in kilowatts.

2. Test each drive by using the actual control signal for remote and local operation.

3. Test each driver's alarm functions.

4. Perform all tests in the presence of the Owner's representative.

5. Perform the above test in addition to the manufacturer's normal field tests.

END OF SECTION

SECTION 26 32 13

TRANSFER SWITCHES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Types of transfer switches required for the Project and include the following:

1. Automatic transfer.

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with Section 01 33 00, Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:

1. Product Data: Submit manufacturer's data and installation instructions for electrical power transfer switches.

2. Wiring Diagrams: Submit wiring diagrams for electrical transfer switches, and associated control diagrams showing connections to prime and alternate power sources, electrical load, and equipment components. Differentiate between portions of wiring that are manufacturer installed and portions that are field installed.

1.03 QUALITY ASSURANCE

A. Codes and Standards:

1. UL Compliance: Comply with applicable requirements of UL 1008, "Automatic Transfer Switches," and UL 486A, "Wire Connectors and Soldering Lugs for Use with Copper Conductors." Provide transfer switches and components which are UL listed and labeled.

2. NEMA Compliance: Comply with applicable requirements of NEMA Standards Pub/Nos. ICS 2, "Industrial Control Devices, Controllers and Assemblies," ICS 6 and 250, pertaining to transfer switches.

3. NFPA Compliance: Comply with applicable requirements of NFPA 99, "Standard for Health Care Facilities," and NFPA 101, "Code for Safety to Life from Fire in Buildings and Structures," pertaining to transfer switches.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Automatic Transfer Switches:
   a. Automatic Switch Co. (ASCO).
   b. Caterpillar, Inc.
   c. Cummins.
   d. Russelectric, Inc.
   e. Zenith Controls, Inc.

2.02 AUTOMATIC TRANSFER SWITCHES

A. Automatic Transfer Switch: UL listed and 600 volt-rated with amperage rating shown on Drawings and shall be the mechanically held, electrically operated type rated for continuous duty in an unventilated sheet metal enclosure.

B. Switch shall be double throw, with an off position, having electrical operated normal-emergency positions inherently interlocked mechanically, and with main contacts mechanically attached to a common shaft. Main contacts shall be silver alloy wiping-action type. They shall be protected by arcing contacts.

C. Switch and Relay Contacts, Coils, Springs, and Control Elements: Removable from front of transfer switch without removal of the switch panels from enclosure and without disconnection of drive linkages or power conductors. Sensing and control relays shall be continuous duty industrial control type with 600 volt, 10 amp rated contacts.

D. Upon drop in normal voltage of 83-85 percent of rated voltage, and after an override delay of 3 seconds nominal, switch shall start generator and transfer the load to emergency source, provided emergency source voltage and frequency are 90 percent of rated or higher.

E. Upon return of normal source voltage for 5 seconds nominal, to 92-95 percent of rated, switch shall retransfer load to normal source after a minimum transfer time or if emergency source fails. Provide a 5- to 60-second adjustable time delay to maintain transfer switch in the "Off" position during transfer to either source.

F. Sensing relays shall operate without contact chatter or false response when voltage is slowly varied to dropout and pickup levels.

G. Four auxiliary contacts shall be provided: Two for transfer switch position indicating use, and two auxiliary contacts, one N.O. and one N.C. to operate after completion of the 3-second override delay for starting generator. All auxiliary contacts shall be 600 volt, 10 amp continuous rating.

H. Accessory devices shall be provided as follows:

1. Time delay to override harmless power dips and outages. (Inverse time characteristic with voltage.)

2. Test switch.

3. Auxiliary contacts (as specified herein).

4. Selector relay (as specified herein).

5. Lockout relay (sensitive to voltage and frequency).

6. Full phase protection with nominal 75-80 percent dropout and 92-95 percent pickup on phase relay.

7. Adjustable time delay on retransfer to normal source. Minimum retransfer of 2 minutes and maximum of 25 minutes. Built-in circuitry to nullify the retransfer time delay if the emergency source fails and the normal source is available.

8. Adjustable (10-20 minutes) time delay for running generator unloaded after transfer for cool down.

9. Adjustable time delay or delays (5 to 60 seconds) for holding transfer switch in the "Off" position when switching from standby source to normal and normal source to standby.

10. Engine starting contact.

11. Exerciser to exercise generator for 15 minutes every 168 hours. A selector switch shall permit generator to be exercised with or without load.

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 31 23 33

EXCAVATION AND BACKFILL FOR PIPES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This work covers clearing and grubbing, site work, excavation, and backfill for sanitary sewers, force mains, potable water mains, reclaimed water mains and their appurtenances.

1.02 BURNING

A. Burning of debris will not be permitted.

1.03 CLEAN-UP

A. Clean-up is an essential part of the work. As the work progresses and is completed, the Contractor shall clean the various sites of all operations and completely restore all work areas to the satisfaction of the Engineer and the County. This clean-up shall be done as promptly as practical and shall not be left until the end of the construction period. No part of the work shall be considered complete, and no payment will be made, until clean-up is completed.

B. It is the Contractor's responsibility to assure that all construction sites and all other affected properties are restored to a condition equal to, or better than, the existing conditions prior to construction. All restoration is subject to the approval of the Engineer and/or Property Owners.

1.04 DRAINAGE

A. It is the responsibility of the Contractor to maintain the existing drainage systems during construction. Any damage done to an existing drainage structure or system is to be immediately repaired to a condition equal to or better than its original condition.

1.05 DUST CONTROL

A. It is the responsibility of the Contractor to control all dust problems that may occur during the construction with required watering. Dust control will be required seven days a week.

1.06 SPRINKLERS

A. The Contractor shall be responsible for sprinklers encountered within the area of excavation and shall make sure that if disturbed or damaged, they shall be rebuilt to the satisfaction of the Engineer or property Owner and with no additional cost to the County.

1.07 EROSION CONTROL

A. It is the Contractor's responsibility to erect suitable silt fences, hay bales or other erosion runoff control devices prior to commencement of earth moving or excavation activities. The Contractor shall be responsible for maintaining the silt fences, hay bales or other erosion runoff control devices in an effective manner, repairing or replacing damaged or ineffective section during the course of the work until a ground cover of grass is established and final environmental approval has been obtained.

1.08 PERMITS FOR DEWATERING OPERATIONS

A. The Contractor is responsible for obtaining all permits required for dewatering discharges, including a Florida Department of Environmental Protection Generic Permit for Produced Groundwater.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General

1. Materials for use as fill are described below. For each material, theContractor shall notify the testing lab of the source of the material at least ten (10) calendar days prior to the date of anticipated use of such material.

2. Materials shall be furnished as required from off-site sources and hauled to the site.

3. Disposal of unsuitable material is specified in this Section.

B. Common Fill

1. Common fill shall consist of mineral soil, free of organic material, loam, wood, trash and other objectionable materials, which may be compressible or which cannot be compacted properly. Common fillshall not contain stones larger than four

inches in any dimension, broken concrete, masonry, rubble, or other similar materials. It shall have physical properties such that it can be readily spread and compacted during filling.

2. Material falling within the above Specification, encountered during the excavation, may be stored in segregated stockpiles for reuse. All material, which in the opinion of the Engineer, is not suitable for reuse shall be spoiled as specified herein for disposal of unsuitable materials.

C. Crushed Stone

1. Crushed stone for pipe bedding shall be FDOT No. 57 in accordance with Section 901-2 of the FDOT Standard Specifications for Road and Bridge Construction.

D. Select Fill

1. Select fill shall be noncohesive, non-plastic material free of all debris, lumps or clods. Fill material shall be clean earth fillcomposed of sand or an approved mixture of clay and sand. Backfill material placed within one foot of piping and appurtenances shall not contain any stones or rocks larger than two inches in diameter, or three-quarter inch in diameter for PVC pipe.

PART 3 - EXECUTION

3.01 SAFETY PRECAUTIONS AND TEMPORARY WORKS

A. The Contractor shall provide and maintain adequate barricades, construction signs, torches, flashers and guards as required in pedestrian and vehicular traffic areas. All safety rules and regulations of local authorities shall be observed. Local fire officials shall be kept advised of roads closed and roads re-opened.

B. Where required, the Contractor shall provide suitable crossings at street intersections and driveways, and supply such aid, as may be required for pedestrians and motorists, including delivery vehicles, to safely negotiate the construction area. "Street Closed to Through Traffic" signs and "Detour" routes shall be indicated and maintained by the Contractor when the job is located in a public or private street or way. In the case of dead end streets, the Contractor shall advise all concerned residents and make all arrangements to maintain reasonable ingress and egress for the residents.

Particular attention shall be given to residents in bad health, emergencies and emergency vehicles. The Contractor shall be responsible for building and maintaining all by-pass roadway areas and restoring those areas to their original condition.

C. The Contractor shall furnish temporary or permanent support, adequate protection and maintenance of all underground facilities and utilities encountered. Support, protection, maintenance and restoration are the Contractor's responsibility at no additional cost to the County.

3.02 CLEARING AND GRUBBING

A. The Contractor shall remove only vegetation such as trees, shrubs, and grass which interferes with the construction, as may be determined by the Engineer, and he shall preserve and protect all other existing vegetation.

3.03 EXCAVATION

A. General

1. The Contractor shall perform all excavation of every description, and of whatever substances encountered, to the depth indicated on the Drawings, or as otherwise specified.

2. Trench excavation shall be such that the pipe can be laid to the alignment and grade required. Trenches shall be shored and drained in such a manner that work may proceed safely and efficiently.

3. Trench dewatering pumps shall discharge to natural drainage channels, drains or sewers and shall be adequate to remove accumulated storm and/or subsurface water. The Contractor shall take necessary action to prevent surface water from flowing into the trenches. It is the responsibility of the Contractor to assure that all trench walls and trench bottoms are dry and remain dry during pipeline construction.

4. The Contractor shall separate, remove and dispose of excavated material not suitable for backfill, as directed by the Engineer.

5. All excavated material retained for backfill shall be piled in such a manner as not to endanger the work or obstruct the sidewalks driveways or drainage. Fire hydrants, valve pit covers and hoses, curb stop boxes, fire and police call boxes

and other utility controls shall be unobstructed and accessible at all times during construction.

B. Unclassified Excavation

1. Unclassified excavation shall include soil, clay, silt, sand, muck, gravel, hardpan, loose shale, loose stones in masses and boulders measuring less than on-half cubic yard in volume.

C. Classified Excavation

1. Classified excavation shall be rock further defined as follows: boulders, measuring one-half cubic yard or more in volume, rock material in ledges, bedded deposits and unstratified masses, conglomerate deposits firmly cemented and concrete or masonrystructures, except sidewalks and paving, that in the opinion of the Engineer required for its removal drilling and blasting, wedging, sledging, barring or breaking up with a power operated hand tool.

2. No soft or disintegrated rock that can be removed with a hand pick or power operated excavator or shovel, no loose, shaken, or previouslyblasted rock or broken stone in rock fillings or elsewhere, and no rockexterior to the minimum limits of measurement allowed, which may fall into the excavation, will be considered as rock.

3.04 TRENCH PREPARATION

A. Unsupported trench width shall be limited to the minimum practicable width allowing working space to place and compact the haunching material. The maximum width shall be the pipe diameter plus one foot on each side of the pipe at springline for pipe in unsupported trenches. In sheeted trenches the width of trench between faces of the sheeting shall be adequate to allow the pipe bedding and haunching to be placed and completed, and the sheeting removed without disturbing the bedding and haunching material within two)pipe diameters on each side of the pipe. Trench boxes and moveablesheeting shall be wide enough to allow moving without disturbing thebedding and haunching within two pipe diameters on each side of the pipeTrench boxes and moveable sheeting shall be constructed and used in the trench to avoid disturbing the piping, bedding and haunching when being moved forward in the trench.

B. Dewatering of the trench bottom shall be accomplished using adequatemeans to allow preparation of bedding, placement of haunching and pipe in a trench environment without standing water. Dewatering shall continue until sufficient backfill is placed above the pipe to prevent flotation.

C. The trench shall be dug so that the pipe can be laid to the alignment and depth required, and it shall be excavated only so far in advance of the pipe laying as allowed by the Engineer. The trench shall be so braced and drained that the workmen may work in it safely and efficiently. All trench preparation shall comply with all of the latest applicable Local, State (Florida Trench Safety Act) and Federal Regulations (OSHA: Safe Trench Act). It is essential that the discharge of the trench dewatering pumps be conducted to natural drainage channels, drains or storm sewers.

D. Bell holes shall be provided at each joint to permit the joint to be made properly. Ledge rock, boulders and large stones shall be removed to provide a clearance of six inches on all pipe twenty-four (24) inches and smaller and nine inches on pipe larger than twenty-four (24) inches. If such removal is required, backfilling will be done with selected material approved by the Engineer and tamped to establish the proper grade.

E. Trench Bottom

Where the bottom of the trench at subgrade is found to be unstable or to include ashes, cinders, refuse, vegetable or other organic matter, or large pieces or fragments of inorganic material that, in the judgment of the Engineer, should be removed, the Contractorshall excavate and remove such unsuitable material to the widthand depth as directed by the Engineer. Before the pipe is laid, the subgrade shall be made by backfilling with an approved material in three inch compacted layers. The layers shall be thoroughlytamped as specified by the Engineer to provide the uniform and continuous bearing support as heretofore described.

1. The trench shall be dry when the bottom is prepared. The trench bottom shall be excavated, or filled and compacted, as required to bring it to grade and shaped to receive and support the pipe barrel. In addition, bell holes shall be excavated so that after placement only the barrel of the pipe receives bearing pressure from and is uniformly supported by, the bottom of the trench. Preparation of the trench bottom and placement of the pipe shall be such that the final position of the pipe is true to line and grade, and uniformly supported throughout the barrel of each length. When pipe is placed in refill material, additional refill of the same material

shall be tamped on each side of the barrel to the springline, thus forming a trough of firm bedding.

F. All materials that, in the opinion of the Engineer, are suitable for reuse in restoring the disturbed surface shall be kept separated from the general excavation material and can only be used as directed by the Engineer.

G. All excavated material shall be piled in a manner that will not endanger the work and that will avoid obstructing sidewalks and driveways. Hydrants, valve pit covers, valve boxes, curb stop boxes, fire and police call boxes,or other utility controls shall be left unobstructed and accessible until thework is completed. Gutters, drainage inlets, natural water courses and miscellaneous drainage structures shall be kept clear or other satisfactory provisions made for their proper operation.

H. Hand methods for excavation shall be employed when damage to existing facilities is likely if heavy equipment is utilized or as directed by the Engineer.

3.05 DEPTH

A. Gravity Sewers

1. The depth of trenches for gravity sewers shall be such that the invert of the pipe will be at elevations shown on the plan. Gravity sewers shall be on straight alignment and constant grade between manholes.

B. Overdepth

1. When classified excavation is required, the rock shall be excavated to a minimum depth of six inches below the trench depths as indicated on the drawings or Specifications. Authorized overdepths in rock excavation shall be refilled to grade with loose granular moist earth or shell thoroughly tamped in place.

C. Trench shall be excavated to the depth required so as to provide a uniformand continuous bearing and support for the pipe on solid and undisturbed ground at every point between bell holes, except as necessary for removal of pipe slings or other lifting tackle. Any part of the bottom of the trench excavated to a point below the specified grade shall be corrected with approved material at the Contractor's expense and thoroughly tamped as directed by the Engineer.

D. Wherever unstable soil or muck that is determined by the Engineer to be incapable of properly supporting the pipe is encountered in the bottom of the trench, such material shall be removed to the required depth and the trench refilled as specified to proper grade. If, in the opinion of the Engineer, removal of the unstable material by this method is impractical, then the Contractor shall support the pipe as detailed on the plans, or as directed by the Engineer.

3.06 BACKFILL

A. General

1. The Contractor shall not perform any of the backfilling operations untilafter he has inspected the lines and found them to be acceptable to the County.

2. Backfill material shall consist of earth, loam, sandy clay, sand, gravel,soft shale or other materials, free from organic materials, large clodsof earth, or stones. Where excavated material is not suitable for backfill, it shall be replaced by excess excavated material from other areas.

3. In all areas, backfill material shall be deposited in six -inch layers and carefully tamped until the compacted backfill depth reaches one foot above the top of pipe.

4. No mechanical equipment, or machinery other than a hand operated mechanical vibrator, will be allowed within the trench area until the backfill has been properly tamped to one foot above the top of pipe. The remainder of the backfill shall be deposited in one foot layers and thoroughly tamped. Settling the backfill with water will be permitted, if approved by the Engineer.

5. Where trenches are improperly backfilled, or where settle mentoccurs, the trenches shall be reopened to the depth required for proper compaction, refilled and compacted, and the surface restored to the required grade and compaction, mounded over and smoothed off.

B. Gravity Sewers

1. Haunching of native material shall be placed to the springline and compacted. If ground water, or trench bottom conditions, is such as to require use of Class I material, either to aid in

dewatering, or to provide foundation and bedding for the pipe, the haunching shall also be of Class I material. Class I material contains angular, 1/4 inch to1 1/2 inch graded stone. Care shall be taken to place the haunching material, without voids, completely filling the trench from pipe wall to trench wall.

C. Compaction Requirements

1. Trenches located under pavement or inside the two feet horizontal tone foot vertical slope, downward from roadway shoulder or the back of curb and from spring line to bottom of sub-grade or the finished surface of the embankment, as appropriate, shall be compacted to a density of one hundred (100) percent as determined by AASHTO T- 99 Method C.

2. Trenches located outside of the two feet horizontal to one foot vertical slope downward from roadway shoulder or the back of curb and where no vehicular traffic will pass over the trenches, back fill shall be compacted to a density approximately equal to that soil adjacent to the trench but not less than ninety-five (95) percent of the maximum density as determined by AASHTO T-99, Method-C.

3. Backfill testing shall be performed in accordance with Pinellas County Minimum Testing Frequency Requirements, latest edition, unless called out differently by the Engineer on the plan documents.

D. Testing of Backfill

1. Trenching within, or across roadways, or other areas to be paved, or stabilized shall be backfilled and compacted to their full depth. Compaction shall be as specified in the Special Provisions or on the Plans.

2. Density tests for backfilled trenches within, or across roadways, shall be performed as specified or as directed by the Engineer, with at least one test taken at different locations for each vertical foot beginning from two feet over pipe to ground level.
3. Backfill testing shall be performed in accordance with Pinellas County Minimum Testing Frequency Requirements, latest edition, unless called out differently by the Engineer on the plan documents.

4. Where unsatisfactory compaction is revealed by the test, the Contractor shall re-excavate, backfill, re-compact and/or rework the backfill as required, to obtain the required degree of compaction over the entire depth of the trench.

5. Satisfactory backfill compaction is an integral part of pipe laying, paving, and stabilizing. Satisfactory density reports shall be on file before each Contractor's statement is submitted for payment.

E. Disturbance of Sewer Mains

1. Sewer mains shall be checked by the Contractor to determine whether any displacement of the pipe has occurred after the trench has been backfilled to two feet above the pipe. If such inspection shows poor alignment, displaced pipe or any defects, these defects shall be remedied to the satisfaction of the Engineer by the Contractor at his expense.

3.07 DISPOSAL OF SURPLUS MATERIAL

A. All excavated material not required or not suitable for fill, or backfill, shall be disposed of by the Contractor, as directed by the Engineer.

B. Material suitable for backfill is to be stockpiled on, or near site, until released by the Engineer for disposal.

3.08 SHEETING AND BRACING

A. The Contractor shall do all shoring and sheeting required to perform and protect the excavation and, as required, for the safety of the employees.

B. All trenches shall be sheeted and braced as required by the Contractor's Delegated Design Engineer and all applicable Federal, State, County and Municipal regulations. Sheeting and bracing shall be used to prevent shifting of adjacent soil and to prevent damage to existing or new structures or the work. The sole responsibility for the design, methods of installation, and adequacy of the sheeting and bracing, shall be and shall remain that of the Contractor.

C. Sheeting and bracing or approved laying box shall be used in all trenches unless the slopes are excavated until the natural angle of repose of the soil is encountered.

D. In general, sheeting and bracing shall be removed as the excavation is backfilled in such a manner as to avoid the caving in of the bank or

disturbance of adjacent areas or structures. The voids left by withdrawal of the sheeting and bracing shall be carefully filled by jetting, ramming or other means approved by the Contractor's Delegated Design Engineer. Permission shall be obtained from the Contractor's Delegated Design Engineer prior to removal of any sheeting or bracing. Permission shall not relieve the Contractor of any responsibility for damage due to failure to leave such sheeting and bracing in place.

E. The Engineer may order, in writing, any or all sheeting or bracing to be left in place for the purpose of preventing injury to adjacent structures, property, etc. If left in place, such sheeting shall be cut off at the elevation ordered, but in no case less than thirty-six (36) inches below the existing grade. Bracing remaining in place shall be driven in tight. The right of the Engineer to order sheeting and bracing to remain in place shall not be construed as creating any obligation on his part to issue such orders. Payment for sheeting and bracing, unless specifically called for on the Drawings shall not be paid under separate item, but shall be included in the payment for other items of Work.

3.09 DEWATERING BY WELLPOINT

A. Wellpoints shall be spaced and at sufficient depths as required to eliminate water during the excavation period until the work is completed. Ample means and equipment shall be provided with which to remove promptly, and dispose properly all water entering any excavation. This includes the use of sand or gravel as required to maintain adequate flow during the pipe laying or installation of other items of work within the excavation.

B. Water pumped or drained shall be disposed of in a suitable manner without damage to adjacent property to other work under construction or to street pavements or public parks. Water shall not be discharged onto streets without adequate protection of the surface at the point of discharge. All gutter, drains, culverts, sewers and inlets shall be kept clean and open for surface drainage. Water shall not be directed across or over pavements except through approved pipes or properly constructed troughs. Contractor shall obtain permission from the owner of any property involved before digging ditches or constructing water courses for removal of water, and provide for disposal of the water without ponding or creating a public nuisance. Water may be discharged into storm sewers. Payment for dewatering shall not be paid for under a separate item, but shall be included in the payment for other items of work, unless it is specifically included as a Pay Item in the Contract.

3.10 APPURTENANCES

A. Excavation for manholes and other appurtenances shall be made to size that will allow at least twelve (12) inches between their outer surfaces and the embankment or shoring. Overdepth excavation and backfill to required depth below such appurtenances that have not been directed by the Engineer shall be at the expense of the Contractor.

END OF SECTION

SECTION 31 23 34

EXCAVATION AND BACKFILL FOR STRUCTURES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This work involves clearing and grubbing, site work, excavation and backfill for sanitary sewer manholes, wet wells and other buried utility structures.

1.02 BURNING

A. Burning of debris will not be permitted.

1.03 CLEANUP

A. Cleanup is an essential part of the work. As the work progresses and is completed, the Contractor shall clean the site of all operations and completely restore the area to the satisfaction of the Engineer. This cleanup shall be done as promptly as practicable and shall not be left until the end of the construction period. No part of the work shall be considered complete and no payment will be made until cleanup is completed.

B. It is the Contractor's responsibility to assure that all construction sites and all other affected properties are restored to a condition equal to, or better than, the existing conditions prior to construction. All restoration is subject to the approval of the Engineer.

1.04 DRAINAGE

A. It is the responsibility of the Contractor to maintain the existing drainage systems during construction. Any damage done to an existing drainage structure or system is to be immediately repaired to a condition equal to or better than its original condition.

1.05 DUST CONTROL

A. It is the responsibility of the Contractor to control all dust problems that may occur during the construction with required watering. Dust control will be required seven days a week.

1.06 SPRINKLERS

A. The Contractor shall be responsible for sprinklers encountered within the area of excavation and shall make sure that if disturbed or damaged, they shall be rebuilt to the satisfaction of the Engineer and with no additional cost to the County.

1.07 EROSION CONTROL

A. It is the Contractor's responsibility to erect suitable silt fences, hay bales or other erosion runoff control devices prior to commencement of earth moving or excavation activities at the locations indicated on the plans. The Contractor shall be responsible for maintaining the silt fences, hay bales or other erosion runoff control devices in an effective manner, repairing or replacing damaged or ineffective section during the course of the work until a ground cover of grass is established.

1.08 PERMITS FOR DEWATERING OPERATIONS

A. The Contractor is responsible for obtaining all permits required for dewatering discharges, including a Florida Department of Environmental Protection Generic Permit for Produced Groundwater.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

A. Compacted granular fill which will provide support for building or structure foundations will be referred to as "structural fill." Backfill which is placed against the exterior side of the building walls or structures, or as fill over pipe lines, will be referred to as "common fill."

B. Materials for compacted structural granular fill shall be gravel, sandy gravel, or gravely sand free of organic material, loam, wood, trash, and other objectionable material and shall be well-graded within the following limits

Sieve Size	Percent Finer by Weight
6-in.	100
No. 4	20 - 95
No. 40	0 - 60
No. 200	0 - 8

C. Common Fill

1. Common fill shall consist of mineral soil, free of organic material, loam, wood, trash and other objectionable material which may be compressible or which cannot be compacted properly. Common fill1shall not contain stones larger than ten (10) inches in any dimension, broken concrete, masonry, rubble or other such materials. It shall have physical properties such that it can be readily spread and compacted during filling.

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. Crushed Stone

1. Crushed stone shall be used for a drainage layer below structureswith underdrains and at other locations indicated on the Drawings.

2. Crushed stone shall be size No. 57 with gradation as noted in Table1, Section 901 of Department of Transportation, Construction of Roads and Bridges.

2.02 UNSUITABLE MATERIAL

A. Highly organic soil ASTM D 2487 Group PT, topsoil, roots, vegetable matter, trash and debris.

PART 3 - EXECUTION

3.01 SAFETY PRECAUTIONS AND TEMPORARY WORKS

A. The Contractor shall provide and maintain adequate barricades, construction signs, torches, flashers and guards as required in pedestrian and vehicular traffic areas. All safety rules and regulations of local authorities shall be observed. Local fire officials shall be kept advised of roads closed and roads re-opened.

B. Where required, the Contractor shall provide suitable crossings at street intersections and driveways, and supply such aid, as may be required forpedestrians and motorists, including delivery vehicles, to safely negotiate theconstruction area. "Street Closed to Through Traffic" signs and "Detour"routes shall be indicated and maintained by the Contractor when the job islocated in a public or private street or way. In the case of dead end streets,the Contractor shall advise all concerned residents and make allarrangements to maintain reasonable ingress and egress for the residents. Particular attention shall be given to residents in bad health, emergenciesand emergency vehicles. The Contractor shall be responsible for buildingand maintaining all by-pass roadway areas and restoring those areas to their original condition.

C. The Contractor shall furnish temporary or permanent support, adequateprotection and maintenance of all underground facilities and utilitiesencountered. Support, protection, maintenance and restoration are theContractor's responsibility at no additional cost to the County.

3.02 CLEARING AND GRUBBING

A. The Contractor shall remove only vegetation such as trees, shrubs, andgrass which interfere with the construction, as may be determined by the Engineer, and he shall preserve and protect all other existing vegetation.

3.03 JOB CONDITIONS

A. Lateral Support of Excavation for Structures

1. Furnish, put in place, and maintain sheeting and bracing required to support the sides of the excavations, to prevent any movementwhich could in any way diminish the width of the excavation belowthat necessary for proper construction, and to protect structures,pipe and utilities from damage due to lateral movement or settlement of ground. If the Engineer is of the opinion that at any point sufficient or proper supports have not been provided, he mayorder additional supports

put in at the expense of the Contractor,and compliance with such order shall not relieve or release the Contractor from his responsibility for the sufficiency of such supports.

B. Dewatering for Structures

1. Furnish, install, maintain, operate, and remove a temporary dewatering system, as required to lower and control the ground water level, so that the structures may be constructed in the dry. The Contractor shall, at his own expense, correct all damageresulting from inadequacy of the dewatering system or from flooding or the construction site from other causes.

2. The dewatering system shall be adequate to drain any excavatedarea, to maintain the water at such a level as to permit constructionin the dry, and to maintain the lowered water table until the structure has been completed to the required stages.

3. Continuously maintain excavation in a dry condition to prevent damage to the subsoil or fill during interruptions due to weather, labor strikes, power failures or other delays. Provide and have ready for immediate use at all times diesel or gasoline powered standby pumping units to serve the system in case of failure of the normal pumping units.

4. Piping and boiling, or any form of uncontrolled seepage, in the bottom or sides of the excavation shall be prevented at all times. If for any reason the dewatering system is found to be inadequate to meet the requirements set forth herein, the Contractor shall, at his own expense, make such additions, changes and/or replacements as necessary to provide a satisfactory dewatering system.

C. Control of Groundwater Level

1. Maintain the groundwater level at or below subgrade of the structure until the concrete structures are up high enough to: (1) prevent flooding the structure, (2) support both bottom and top levels of walls, and (3) prevent flotation.

2. After the structure has been completed in its entirety, backfill as described hereinafter.

3. Flotation shall be prevented by maintaining a positive and continuous operation of the dewatering system. The Contractor shall be fully responsible and liable for all damages which may result from failure of this system.

4. Disposal of drainage water shall be in an area approved by the Engineer. Precautions shall be taken to prevent the flow or see page of drainage back into the drainage area. Particular care shall be taken to prevent the discharge of unsuitable drainage to a water supply or surface water body.

5. Removal of the dewatering system shall be accomplished after the dewatering system is no longer required.

3.04 EXCAVATION

A. General

1. The Contractor shall perform all excavation of every description, and of whatever substances encountered, to the depth indicated on the Drawings, or as otherwise specified.

2. Excavation shall be such that the structures can be installed at the grades required. Excavations shall be shored and drained in such a manner that work may proceed safely and efficiently.

3. Dewatering pumps shall discharge to natural drainage channels, drains or sewers and shall be adequate to remove accumulated storm and/or subsurface water. The Contractor shall take necessary action to prevent surface water from flowing into the excavations. It is the responsibility of the Contractor to assure that all excavation walls and bottoms are dry and remain dry during construction.

4. The Contractor shall separate, remove and dispose of excavated material not suitable for backfill, as directed by the Engineer.

5. All excavated material retained for backfill shall be piled in such a manner as not to endanger the work or obstruct the sidewalks, driveways or drainage. Fire hydrants, valve pit covers and hoses, curb stop boxes, fire and police call boxes

and other utility controls shall be unobstructed and accessible at all times during construction.

B. Unclassified Excavation

1. Unclassified excavation shall include soil, clay, silt, sand, muck, gravel, hardpan, loose shale, loose stones in masses and boulders measuring less than one-half cubic yard in volume.

C. Classified Excavation

1. Classified excavation shall be rock further defined as follows: boulders, measuring one-half cubic yard or more in volume, rock material in ledges, bedded deposits and unstratified masses, conglomerate deposits firmly cemented and concrete or masonry structures, except sidewalks and paving, that in the opinion of the Engineer required for its removal drilling and blasting, wedging, sledging, barring or breaking up with a power operated hand tool.

2. No soft or disintegrated rock that can be removed with a hand pick or power operated excavator or shovel, no loose, shaken, or previously blasted rock or broken stone in rock fillings or elsewhere, and no rock exterior to the minimum limits of measurement allowed, which may fall into the excavation, will be considered as rock.

3.05 STRUCTURE EXCAVATION AND COMPACTION PROCEDURES – GENERAL

A. Excavation shall be made to such widths as will give suitable room for construction of the structures, for bracing and supporting, pumping and drainage; and the bottom of the excavations shall be rendered firm and dry and in all respects acceptable to the Engineer.

B. Excavation and dewatering shall be accomplished by methods which preserve the undisturbed state of subgrade soils. Subgrade soil which becomes soft, loose, "quick," or otherwise unsatisfactory for support of structures as a result of inadequate excavation, dewatering or other construction methods shall be removed and replaced by structural fill as required by the Engineer at the Contractor's expense.

C. Dewatering shall be such as to prevent boiling or detrimental Under see page at the base of the excavation as specified herein. The Contractor shall install such means as required to preserve the stability of the base of the operation.

D. Excavating equipment shall be satisfactory for carrying out the work in accordance with the Specifications. In no case shall the earth be ploughed, scraped or dug with machinery so near to the finished subgrade as to result in excavation of, or disturbance of material below grade, the last of the excavated material being removed with pick and shovel just before placing of concrete or working mat thereon.

E. During final excavation to subgrade level, take whatever precautions are required to prevent disturbance and remolding of the subgrade. Material which has become softened and mixed with water shall be removed. Hand excavation of the final three to six inches will be required as necessary to obtain a satisfactory undisturbed bottom. The Engineer will be the sole judge as to whether the work has been accomplished satisfactorily.

F. All structure areas shall be stripped, cleared and grubbed of all surface vegetation and root laden top soils.

G. After stripping, the structure areas should be leveled sufficiently to permit equipment traffic and then proof-rolled with a vibratory roller with at least a twenty (20) ton static weight. Careful observations should be made during proof-rolling of the stripped subgrade area to identify any areas of soft yielding soils that may require over excavation and replacement.

H. Compaction should continue until the minimum density specified in the Special Provisions or on the Plans is achieved.

I. The Contractor shall do all shoring and sheeting required to perform and protect the excavation and, as required, for the safety of the employees.

J. All excavated areas shall be sheeted and braced as required by the Contractor's Delegated Design Engineer and all applicable Federal, State, County and Municipal regulations. Sheeting and bracing shall be used to prevent shifting of adjacent soil and to prevent damage to existing or new structures or the work. The sole responsibility for the design, methods of installation, and adequacy

of the sheeting and bracing, shall be and shall remain that of the Contractor.

K. Sheeting and bracing or approved laying box shall be used in all excavated areas unless the slopes are excavated until the natural angle of repose of the soil is encountered.

L. In general, sheeting and bracing shall be removed as the excavation is backfilled in such a manner as to avoid the caving in of the bank or disturbance of adjacent areas or structures. The voids left by withdrawal of the sheeting and bracing shall be carefully filled by jetting, ramming or other means approved by the Contractor's Delegated Design Engineer. Permission shall be obtained from the Contractor's Delegated Design Engineer prior to removal of any sheeting or bracing. Permission shall not relieve the Contractor of any responsibility for damage due to failure to leave such sheeting and bracing in place.

M. The Engineer may order, in writing, any or all sheeting or bracing to be left in place for the purpose of preventing injury to adjacent structures, property, etc. If left in place, such sheeting shall be cut off at the elevation ordered, but in no case less than thirty-six (36) inches below the existing grade. Bracing remaining in place shall be driven in tight. The right of the Engineer to order sheeting and bracing to remain in place shall not be construed as creating any obligation on his part to issue such orders Payment for sheeting and bracing, unless specifically called for on the Drawings shall not be paid under separate item, but shall be included in the payment for other items of Work.

3.06 BACKFILLING AND COMPACTION

A. Structural fill shall be placed in loose lifts not exceeding twelve (12) inches and should be compacted to the minimum density specified in the Special Provisions or on the plans.

B. Common fill may be used as backfill against the exterior walls of the structures, including manholes, wet wells and storm structures, or in other areas as designated by the Engineer. Common fill shall be placed in loose lifts not exceeding twelve (12) inches and should be compacted to the minimum density specified in the Special Provisions or on the plans.

C. Materials placed in fill areas shall be deposited to the lines and grades shown on the Drawings making due allowance for settlement of the material and for the placing of topsoil thereon.

D. The surfaces of filled areas shall be grades to smooth true lines, strictly conforming to grades indicated on the paving and grading Drawings, and no soft spots or uncompacted areas will be allowed in the work.

E. No compacting shall be done when the material is too wet either from rain or from excess application of water. At such times, work shall be suspended until the previously placed and new materials have dried sufficiently to permit proper compaction.

F. Density tests shall be performed by an engineering testing laboratory as specified or as directed by the Engineer.

G. When a density test is scheduled and a time agreed upon by the Engineer and Contractor, it shall be the Contractor's responsibility to properly prepare the area in advance.

H. Where unsatisfactory compaction is revealed by the test, the Contractor shall re-excavate, backfill, re-compact and/or rework the backfill as required, to obtain the required degree of compaction.

3.07 SHEETING LEFT IN PLACE

A. Where damage is likely to result from withdrawing sheeting, upon direction of the Engineer, the sheeting shall be left in place.

3.08 DISPOSAL OF SURPLUS MATERIAL

A. All excavated material not required or not suitable for fill, or backfill, shall be disposed of by the Contractor, as directed by the Engineer.

B. Material suitable for backfill is to be stockpiled on, or near site, until released by the Engineer for disposal.

3.09 GRADING

A. Grading in preparation for placing of topsoil, planting areas, paved walks and drives, and appurtenances shall be performed at all places that are indicated on the Drawings, to the lines, grades, and elevations shown and otherwise as directed by the Engineer. Such

work shall be performed in a manner that the requirements for formation of slopes, lines, and grades can be followed. All material encountered, of whatever nature, within the limits indicated, shall be removed and disposed of as directed. During the process of grading, the subgrade 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 progress or condition of the work.

B. If, at the time of grading, it is not possible to place any material in its proper section of the permanent structure, it shall be stockpiled for later use. No extra payment will be made for the stockpiling or double handling of excavated material.

C. The right is reserved to make minor adjustments or revisions in lines or grades, if found necessary as the work progresses, due to discrepancies on the Drawings or in order to obtain satisfactory construction.

D. Stones or rock fragments larger than four inches in their greatest dimensions will not be permitted in the top six inches of the finished subgrade of all fills or embankments.

E. In cuts, all loose or protruding rocks on the back slopes shall be barred loose or otherwise removed to line or finished grade of slope. All cut and fill slopes shall be uniformly dressed to the slope, cross section, and alignment shown on the Drawings or as directed by the Engineer.

F. No grading is to be done in areas where there are existing pipe lines that may be uncovered or damaged until such lines have been located and it has been determined if such lines must be maintained are relocated, or where lines are to be abandoned, all required valves are closed and remaining pipes are plugged.

END OF SECTION

SECTION 32 12 01

STABILIZED AND ASPHALT ROADWAY RESTORATION

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. Contractor shall furnish all labor and materials required to restore stabilized roadways and asphalt paving as specified herein.

B. Workmanship and materials shall be in accordance with Department of Transportation requirements for new pavement for roads under their jurisdiction. Any local or County Road shall be restored in accordance with permits or ordinances of the municipality having jurisdiction over such road or street. Restoration of flexible pavement shall conform to the approved permit or utility license for each road crossing.

C. Where applicable, all work shall conform to the Technical Specifications of Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", latest edition (Divisions II and III) and "Roadway and Traffic Design Standards", latest edition, including any amendments thereto. The Contractor shall acquire his own copies of the Department of Transportation Standards. In the event of conflict between the Department of Transportation Standards and the Specifications listed in these documents, the Engineer shall determine which shall govern.

1.02 SUBMITTALS

A. Shop drawings for the proposed materials of construction, including an asphalt job mix formula, shall be submitted to the Engineer for approval at least two weeks prior to the application of stabilized or paved surfaces.

PART 2 – PRODUCTS

2.01 SUBBASE

A. Materials used should be high bearing value soil, sand-clay, ground limestone, crushed limerock, coquina, or any other material suitable for stabilization. Muck shall not be used.

2.02 BASE

A. Limerock for use as base material shall meet the requirements of Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Section 911. The limerock producer shall address

each truck receipt to the Contractor and the job site. Each receipt will show the source of the material by D.O.T. pit number. One copy of each receipt will be submitted daily to the County for his records.

B. Coquina shell used in the base course shall have an organic material of not greater than 0.5 percent nor contain significant quantities of sand or other impurities, which would prevent bonding. At least ninety-seven (97) percent of the coquina used shall pass through a 3 1/ 2-inch ring.

C. Crushed concrete base material shall conform to the following gradation:

Sieve Size	Percent by Weight Passing
2"	100
1 1/2"	95-100
3/4"	65-90
3/8"	45-75
No. 4	35-60
No. 10	24-45
No. 50	5-25
No. 200	0-10

1. Material for Crushed Concrete Base shall consist only of crushed concrete and such additive materials as may be approved by the Engineer for the purpose of facilitating construction and achieving the desired characteristics of the finished in-place product. Material which shows a significant tendency toward adverse chemical or physical change on exposure to moisture will not be acceptable. The material shall be free of any ferrous metals.

2. The material shall not contain lumps, balls, or pockets of sand or clay material in size or quantity sufficient to be detrimental to the proper bonding, finishing or strength of the crushed concrete base.

3. The specific mechanical and physical properties of crushed concrete aggregate and any additive materials permitted in the construction of crushed concrete base shall be determined on the basis of test results as the work progresses.

D. Reclaimed Asphalt Pavement Base

1. Reclaimed asphalt base material may be used on paved shoulders, bike paths and other non-traffic applications. Materials shall be in accordance with Section 283 of the FDOT Standard Specifications for Road and Bridge Construction.

2.03 PRIME AND TACK COATS

A. Bituminous prime coats shall be applied to previously prepared bases. Bituminous tack coats shall be placed on existing paved surfaces and between successive lifts of asphalt material.

B. The prime coat shall be cut-back asphalt Grade RC-70 or RC-250, emulsified asphalt Grades SS-I or CSS-I, or other types and grades of bituminous material specified or approved by the Engineer.

C. The tack coat shall be emulsified asphalt, Grades RS-2, SSI-I, CSS-I, SS-IH, CSS-IH, AS-60, AE-90, AE-150, or asphalt emulsion prime.

D. A cover material must be placed on the prime coat to insure that the prime coat remains intact until the surface course is placed.

2.04 ASPHALT WEARING SURFACE

A. The bituminous wearing surface applied shall be that specified in the Plans or contract documents.

B. Asphalt mixes for FDOT roadways shall be as required by the FDOT permit or as specified.

C. If no asphalt mix is specified on Pinellas County roads, Type PC-III asphaltic concrete shall be used as the paving material, unless otherwise indicated. Design mix properties shall be in accordance with Pinellas County's Specifications.

PART 3 - EXECUTION

3.01 PAVEMENT AND BASE REMOVAL

A. Pavement removal shall be held to the minimum width consistent with good construction practice. The pavement material shall be carefully separated from other excavated materials and will not be permitted to be included in the backfill, but shall be satisfactorily disposed of by the Contractor. Base materials may be salvaged and stockpiled for reuse as stabilizer, subject to the approval of the Engineer. Reuse of salvaged base material as new base material is not permitted.

3.02 ASPHALT REMOVAL

A. All asphalt street pavement removed shall be replaced with base and surface materials which are of a quality and thickness equal to or more than the materials removed. The edges of the paving shall be cut to neat lines beyond any settled or broken areas. Pavement shall be replaced as soon as practicable after compaction of backfill.

3.03 SURFACE TREATED STREETS

A. All surface treated streets removed shall be replaced with at least six inches of compacted shell or limerock as directed by the Engineer. This base shall be primed and sanded and maintained until overlayed.

3.04 REPLACING STABILIZED ROADWAY

A. The Contractor shall restore cuts in all stabilized roadway surfaces using the same type and grade of material used on the existing street surface. After the pipelines and/or appurtenances have been installed and properly backfilled as herein specified, the Contractor shall bring the roadway surface to grade and ready the surface to receive the stabilization material. The stabilizing materials shall be of high-bearing value such as sand, clay, oyster shell, coquina shell, rock screening, crushed concrete or any other material which, as allowed by the agency with jurisdiction over such road and that, in the opinion of the Engineer, is suitable for stabilization.

B. The stabilizing material shall be applied in such quantities as may be necessary to bring the top six inches of the roadway surface to a bearing value as hereinafter specified and to the proper line and grade. The material shall be incorporated with the roadbed material by plowing, disking, harrowing, blading, and mixing with a rotary tiller, or any other equipment approved by the Engineer. The mixed materials shall be of uniform density throughout the width and depth of the layer being

processed. After thoroughly mixing to a uniform texture, the surface shall be compacted by rolling with any type of equipment that will produce the density required. Compaction shall continue until the entire depth to be stabilized has a value determined from tests made on the 6-inch compacted thickness, of not less than the requirements set forth by the agency having jurisdiction over the road.

3.05 RESURFACING

A. When pavement replacement is complete, certain streets as directed by the County, shall be resurfaced for the full width of the existing paved section. Resurfacing shall be consistent with the requirements set forth by the governmental agency that has jurisdiction over the road.

B. Materials for resurfacing shall be as specified on the Drawings.

3.06 SUBBASE PREPARATION

A. Prior to installation of base material, the area shall be graded to within 0.2± feet, and soft, spongy or mucky material removed. Sufficient stabilizing material shall be cut in to achieve a Florida Bearing Value (FBV) in excess of 75 psi or limerock bearing ratio (LBR) greater than forty (40) pounds at a minimum density of ninety-eight (98) percent of a maximum density as defined and measured in ASSTHO T-180 (Modified Proctor), to a six inch minimum depth.

B. Density tests for subbase materials shall be taken at three hundred (300) foot intervals in a staggered pattern and around structures as required. If compaction procedures allow, testing requirements may be reduced or increased at the Engineer's discretion.

3.07 BASE COURSE CONSTRUCTION

A. General

1. The base course shall be constructed on the prepared subgrade, in accordance with the Specifications and Plans. All base material shall be placed in accordance with the lines, grades, notes, and typical cross sections shown on the Plans. Any deviation from the Plans is subject to the approval of the Engineer. Any deviations not approved by the Engineer shall be repaired to the satisfaction of the Engineer at no expense to the County.

B. Limerock, Reclaimed Asphalt or Crushed Concrete Base Course

1. Base shall be spread by mechanical spreaders, equipped to produce an even distribution with a uniform thickness. When the specified compacted thickness of the base is greater than six inches, the base shall be constructed in two courses. The thickness of the first course shall be one-half the total thickness of the finished base. After spreading is completed, the entire surface shall be scarified and shaped so as to produce the required grade and cross section after compaction. If two courses are required, each lift shall be prepared as previously described. Prior to spreading of the upper course, density tests will have been taken for the lower and determined to be satisfactory.

2. When the material does not have the proper moisture content to ensure the required density, it shall be wet or dried as required. When adding water, it shall be uniformly mixed in by disking to the full depth of the course that is being compacted.

3. All materials shall be compacted to a density of not less than ninety-eight (98) percent of maximum density as determined by AASHTO T 180. Density tests shall be taken at three hundred (300) foot intervals in a staggered pattern and around structures as required. Density determinations shall be made at more frequent intervals, at no extra cost, if deemed necessary by the Engineer.

4. The finished surface of the base course shall be checked with a template cut to the required crown and a fifteen foot straight edge laid parallel to the center line of the road. All irregularities greater than one-quarter inch shall be corrected to the satisfaction of the Engineer.

5. The base material shall extend at least twelve (12) inches outside the edge of the finished paved surface, unless otherwise indicated. Thickness of the base shall be measured at two hundred (200) foot intervals at various points in the cross section. Measurements shall be taken at various points on the cross section through holes not less than three inches in diameter and at locations, as specified by the Engineer. Where the compacted thickness is deficient by one-half inches or more, the Contractor shall correct the deficiency by scarifying and adding material for a distance of one hundred (100) feet in each direction from the edge of the deficient area. The required thickness, compaction and cross section will then be achieved.

6. Prime coat shall be applied only when the base meets the specified density and the moisture content in the top half of the base does not exceed ninety (90) percent of the optimum moisture of the base material.

C. Asphalt Base Course.

1. Asphalt base courses shall be applied in accordance with DOT Standards and Specifications, Section 234. The job mix formula approved for the Project shall be used. Any deviation from the approved mix must be submitted to the Engineer and approved before being implemented.

2. The base course material shall be placed with an approved paving machine. A motor grader may be required if a leveling course is needed. The base mix may be placed when the air temperature is at least forty (40) degrees F and rising, provided that the sub-grade is not frozen or affected by frost.

3. A paver, equipped with automatic screed control, shall be used for all machine-laid courses. The automatic joint matcher shall be used on the top course of the base after the first pass with a paving machine. All mixtures shall be laid by the stringline method, with the exception of areas adjacent to curb and gutter or other true edges. The temperature of the mix shall be between three hundred (300) degrees F and three hundred fifty (350) degrees F. Any mixture caught by rain in transit may be laid at the Contractor's own risk; if removal and replacement is required, it shall be at the expense of the Contractor. In no case shall the mixture be spread when rain is falling or when there is water on the surface to be covered. The layer thickness for asphalt concrete structure courses shall be as shown on the Drawings.

4. Compaction

a. After the asphalt mixture has been spread to the proper lines, grades, and cross sections, compaction operations may begin. The Contractor shall establish rolling procedures and submit his sequence of compaction operations to the Engineer for approval. The equipment used may include, but is not committed to steel-wheeled rollers, pneumatic tired rollers, and vibratory rollers. Areas which are inaccessible to a roller shall be compacted by the use of hand tamps or other satisfactory means. An entire sequence of compaction operations shall be performed for each layer of applied material, density determinations shall also be made.

b. The in-place density of each course shall be determined through core samples and the nuclear backscatter method. A core sample of a representative paving section shall be taken every two hundred fifty (250) feet. Additional testing around manholes or other structures may be required. In addition to density tests via core samples, Marshall stability tests are also required. Marshall stability tests will be taken for every day of asphalt pavement production.

E. Shell Base Course

1. Shell base material shall be constructed on the prepared subgrade in accordance with these Specifications and in conformity with the lines, grades and cross sections shown on the Plans. The shell base shall be spread uniformly and evenly; during spreading operations the shell shall be thoroughly saturated with water.

2. After spreading the shell shall be compacted, with water being added as required, until the required density is obtained. Compaction and density shall be as required for limerock base, except that the testing methods shall be modified in the laboratory and in the field. At least three density determinations shall be made on each day's final compaction operations.

3. Upon completion of initial compaction, the entire surface shall be scarified and shaped to exact crown and cross section. The base shall then be rewatered and compacted to the required density. The finished surface shall be tested with a template and fifteen (15) foot straight edge. All irregularities greater than one-quarter inch shall be corrected to the satisfaction of the Engineer. The prime coat shall be applied after the base meets all density and finish requirements.

3.08 ASPHALT WEARING SURFACE

A. The asphalt wearing surface shall be constructed on the prepared base in accordance with the Plans and Specifications and in conformity with the indicated lines, grades, and cross sections.

B. The mixture shall be spread only when the base is clean, dry, properly cured, and approved by the Engineer. The temperature shall be at least forty (40) degrees F and rising. No paving operations will be permitted if it is raining or rain is imminent. The mix shall be between three hundred (300) F and three hundred fifty (350) degrees F.

C. The asphalt mixture shall be spread with an approved paving machine to the required width and depth. All mixes, except those adjacent to curb and gutter, shall be laid according to the stringline method. The depth of each layer shall be checked every fifty (50) feet.

D. The mixture shall be compacted to its final depth, no less than one and one half inch and thicker for new roads and one inch for overlays. Compaction and layering procedures specified for asphalt base courses shall apply to surface courses. All testing and density requirements will also apply.

E. When laying operations are interrupted, a transverse joint shall be constructed by cutting back on the previous run to expose the full depth of material. Longitudinal joints are to be sloped or rolled over and sealed. When the adjacent strip is constructed, the edge shall be trimmed back to expose the unsealed face. All longitudinal construction joints shall be offset six inches to twelve (12) inches laterally between layers.

F. When fresh mixture is laid against transverse or longitudinal joints, it shall be placed in contact to produce an even, well compacted joint after rolling.

G. The finished surface shall be tested with a template and fifteen (15) foot straight edge. Any irregularities shall be repaired to the satisfaction of the Engineer. The surface shall be of uniform texture and compaction. No sand spots, ripples, or loosened portions shall be evident. No traffic shall be allowed onto the finished surface until it is deemed acceptable by the Engineer.

Pinellas County
Public Works Roadway Pavement Guidelines

In accordance with County Ordinance 92-62, Article III, Section 154 (Ordinance Needs to be updated to show Superpave Surface Course)

	Arterial	Collector (Major/Minor) Commercial / Industrial	Residential Medium Traffic	Residential Light Traffic
Structural Coefficient	**4.17**	**3.28**	**3.06**	**2.46**
Asphalt Superpave Surface	Type SP-12.5 Fine, Traffic Level "C" 3" min. thick (2 lifts) (0.44) (1.32 Total)	Type SP-12.5 Fine, Traffic Level "C" 2" min. thick (0.44) (0.88 Total)	Type SP-9.5 Fine, Traffic Level "C" 1-1/2" min. thick (0.44) (0.66 Total)	Type SP-9.5 Fine, Traffic Level "C" 1-1/2" min. thick (0.44) (0.66 Total)
Base (Compacted 98% of AASHTO T-180)	Limerock 10 ½" Min. Thickness (Min. 100 LBR) (0.18) (1.89 Total)	Limerock 8" Min. Thickness (Min. 100 LBR) (0.18) (1.44 Total)	Limerock 8" Min. Thickness (Min. 100 LBR) (0.18) (1.44 Total)	Limerock 6" Min. Thickness (Min. 100 LBR) (0.18) (1.08 Total)
Sub-Base (Compacted 98% of AASHTO T-180)	12" min. thickness (Stab. w/min. 40 LBR) (0.08) (0.96 Total)	12" min. thickness (Stab. w/min. 40 LBR) (0.08) (0.96 Total)	12" min. thickness (Stab. w/min. 40 LBR) (0.08) (0.96 Total)	9" min. thickness (Stab. w/min. 40 LBR) (0.08) (0.72 Total)
Two Lane Roadway Pavement Width	28' Total (with or without curbs)	28' Total (with or without curbs)	24' Total (with or without curbs) (28' for type F curb)	24' Total (with or without curbs) (28' for type F curb)
				4-10-08

Structural Layer Coefficients for Optional Base: Superpave Type B-12.5 Base= 0.30, Crushed Concrete Base= 0.15

END OF SECTION

SECTION 32 13 01

CONCRETE SIDEWALKS, DRIVEWAYS AND GUTTERS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Contractor shall furnish all labor and materials required to restore and construct concrete sidewalks, driveways and gutters as specified herein.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Sidewalk shall be 3000 psi concrete, at least four feet wide, five feet wide on arterial and collector streets, and four inches thick, except at driveways. Driveway sidewalks shall be six inches thick with six inches by six inches #10 wire mesh reinforcing.

B. Replacement of concrete driveways shall be in accordance with County Standards (six inches, 3000 psi/28 day with 6 x 6 # 10 mesh from back of curb to property line).

C. Curb and curb and gutter shall consist of 3000 psi/28 day concrete.

D. Expansion joints shall be installed between the back-of-curb and concrete driveways, and between concrete driveways and sidewalks, where new concrete abuts old concrete.

PART 3 – EXECUTION

3.01 CURB AND GUTTER

A. Curb or curb and gutter removal, where required in the construction of this work, shall be held to a minimum. Curb and gutter material to be removed shall be carefully separated from the trench excavation material and shall be disposed of as directed. The Contractor shall replace all curb or curb and gutter which has been removed. Curb and gutter shall be removed up to the nearest regular joint on each side of the trench.

B. Curb or curb and gutter shall be replaced as soon as possible after the backfill is placed and compacted and shall duplicate in all respects the original construction. Workmanship shall be in accordance with the best standard practices for this type of work. Curb and curb and gutter shall

consist of 3,000 psi/28 day concrete reinforced with bars or mesh of the same size, spacing and number as the section of curb or curb and gutter it replaces.

3.02 SIDEWALKS

A. Sidewalk removal, where required in the construction of this work, shall be held to a minimum. Sidewalk material removed shall be carefully separated from the trench excavation material and shall be disposed of as directed. Sidewalk shall be cut at the nearest regular joint on each side of the trench.

B. The Contractor shall replace all sidewalks which are removed. Sidewalks shall be replaced as soon as practicable after the backfill is placed and compacted and shall duplicate, in all respects, the original sidewalk.

C. The Contractor shall replace all sidewalks which are damaged by the construction operation or by the heavy equipment traveling over them and shall replace them at their own expense.

D. The top surface of all sidewalks shall be given a light broom finish.

3.03 DRIVEWAYS

A. Concrete driveways that are crossed or traversed by the trenches shall be restored to the conditions existing prior to the excavation.

B. Removal shall be held to a minimum, but when necessary removal shall be made in neat sawcut lines or to the nearest joint if approved by the Engineer.

3.04 TESTS

A. The quality of the concrete as to conformance to the specifications is the entire responsibility of the Contractor until it is accepted in place. When required by the County or the Engineer, the Contractor shall arrange for field testing. Field testing shall include, but may not be limited to, the following:

1. Compressive Strength Test: Compressive strength tests shall be made by breaking standard six inch diameter by twelve (12) inch high test specimens prepared, cured and broken in accordance with the American Society for Testing Materials Standard Methods C 31 and C 39, Latest Revision. Four specimen test cylinders shall be taken from each concrete pour of five cubic yards or more. One additional test shall be taken from each fifty (50) cubic yards or

fraction thereof in each pour in excess of thirty (30) cubic yards. One cylinder from each pour shall be broken at seven days, the remainder at twenty-eight (28) days. Additional test cylinders may be ordered for determining the characteristics of a new design mix or changes in equipment or methods, and under adverse weather or curing conditions.

2. Slump Test: Slump test shall be made in accordance with ASTM C 143, and shall be made on each load of concrete unless directed differently by the County or Engineer.

3. Reports: Proper reports of all tests performed by the laboratory shall be prepared by the laboratory and submitted promptly to the County and Engineer. Such reports shall be properly labeled so as to identify the portions of the Project into which the materials are being placed, and the results of the test indicating whether or not the test met the requirements of these specifications.

3.05 CAUSE FOR REJECTION

A. Should the concrete fail to conform to all the requirements of this Section, the Engineer may require the Contractor to remove the defective concrete and reconstruct the work as directed.

END OF SECTION

SECTION 32 83 00

CHAIN-LINK FENCES AND GATES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: The work included in this Section consists of furnishing and installing a vinyl clad chain-link fence, complete with gates and barbed wire, to be constructed to the height and limits indicated on the Drawings.

1.02 QUALITY ASSURANCE

A. Chain link fences and gates shall be constructed in accordance with specified standards, as well as all pertinent codes and regulations. Where provisions of pertinent codes conflict with the specifications, the more stringent provisions shall govern.

B. Chain link fences and gates shall be manufactured by established, reputable manufacturers that have been engaged in the manufacture of chain link fencing for at least 10-years.

1.03 SUBMITTALS

A. Shop Drawings

1. Shop drawings for chain-link fence and gate systems including plan layout and details illustrating fence and gate height, location and sizes of posts, rails, braces, gates, footings, hardware list and erection procedures.

2. Descriptive literature of materials to be provided to determine compliance with the Specifications.

3. Certifications: Manufacturers material certifications in compliance with the current ASTM specifications

4. For fences containing windscreens or privacy slats and fences greater than 8 feet (2.4 m) in height using, 1 in. (25 mm) mesh or smaller require a wind load force analysis for post selection and post spacing provided by manufacturer.

B. Operation, Maintenance and Instruction Manuals for the equipment and systems shall be furnished.

1.04 WARRANTY

A. Fence and gates shall have one year warranty.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery of materials shall be in manufacturer's original packaging with all tags and labels intact and legible.

B. Handle and store materials in such a manner as to avoid damage.

1.06 REFERENCES

A. ASTM A491 Specification for Aluminum-Coated Steel Chain-Link Fabric

B. ASTM F552 Standard Terminology Relating to Chain Link Fencing

C. ASTM F567 Standard Practice for Installation of Chain Link Fence

D. ASTM F626 Specification for Fence Fittings

E. ASTM F668 Specification for Polymer Coated Chain Link Fence Fabric

F. ASTM F900 Specification for Industrial and Commercial Swing Gates

G. ASTM F934 Specification for Standard Colors for Polymer-Coated Chain Link

H. ASTM F1043 Specification for Strength and Protective Coatings of Steel Industrial Chain Link Fence Framework

I. ASTM F1184 Specification for Industrial and Commercial Horizontal Slide Gates

J. ASTM F1345 Specification for Zinc-5% Aluminum-Mischmetal Alloy-Coated Steel Chain-Link Fence Fabric

K. ASTM F1664 Specification for Poly (Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used with Chain-Link Fence

L. ASTM F1665 Specification for Poly (Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Barbed Wire Used with Chain-Link Fence

PART 2 - PRODUCTS

2.01 This Section includes industrial/commercial chain link fence and gates specifications:

A. Aluminum coated steel chain link fabric

B. Galvanized steel framework and fittings

C. Polymer coated galvanized steel framework and fittings

D. Gates: swing and cantilever slide

E. Barbed wire

2.02 MATERIALS

A. Black (solid core & UV resitsant) vinyl privacy slats shall be woven into all fencing.

B. Posts and Other Appurtenances: Polymer Coated Round steel pipe and rail shall be Schedule 40 standard weight pipe, in accordance with ASTM F1083, 1.8 oz/ ft^2 (550 g/m^2) hot dip galvanized zinc exterior and 1.8 oz/ft^2 (550 g/m^2) hot dip galvanized zinc interior coating. Intermediate Strength Grade: Minimum yield strength 50,000 psi (344 MPa) Polymer coated pipe shall have a PVC coating fused and adhered to the exterior zinc coating of the galvanized pipe in accordance with ASTM F1043. The minimum thickness of the PVC coating shall be 10-mils (0.254 mm). Color to match black fabric per ASTM F934

C. Top Rail: The top rail shall be provided with couplings approximately every 20 feet. Couplings shall be the outside sleeve type, at least 6 inches long.

D. Sizes of posts and rails are identified in Table 32 83 00-A.

E. Tension Wire: Polymer Coated Steel Class 1 (extruded) Tension Wire: 7 gauge (0.177 in.) wire complying with ASTM F1664, color to match black fabric

F. Polymer Coated Barbed Wire: Comply with ASTM F1665, Class 1 (extruded), 14 gauge (0.80 in) double twisted PVC coated Aluminum-

Coated (Aluminized): Strand wire coating Type A - 0.30 oz/ft² with aluminum alloy barbs, 4-point 14 gauge (0.080 in.) barbs spaced 5 inches on center.

G. Fittings: All fittings listed below shall be Polymer Coated In compliance with ASTM F626, PVC coating minimum thickness 0.006 in. fused and adhered to the zinc coated fittings, black color to match fabric**.**

1. Tension and Brace Bands: Galvanized pressed steel complying with ASTM F626, minimum steel thickness of 12 gauge (0.105 in.) (2.67 mm), minimum width of 3/4 in. (19 mm) and minimum zinc coating of 1.20 oz/ft² (366 g/m²). Secure bands with 5/16 in. (7.94 mm) galvanized steel carriage bolts.

2. Terminal Post Caps, Line Post Loop Tops, Rail and Brace Ends, Boulevard Clamps, Rail Sleeves: In compliance to ASTM F626, pressed steel galvanized after fabrication having a minimum zinc coating of 1.20 oz/ft² (366 g/m²).

3. Truss Rod Assembly: In compliance with ASTM F626, 3/8 in. (9.53 mm) diameter steel truss rod with a pressed steel tightener, minimum zinc coating of 1.2 oz/ft² (366 g/m²), assembly capable of withstanding a tension of 2,000 lbs. (970 kg).

4. Tension Bars: In compliance with ASTM F626. Galvanized steel one-piece length 2 in. less than the fabric height. Minimum zinc coating 1.2 oz. /ft². Bars for 2 in. and 1 ¾ in. mesh shall have a minimum cross section of 3/16 in. by 3/4 in.

5. Barbed Wire Arms: As indicated fence and gates shall have three (3) rows of barbed wire at the top. The wire shall be supported by arms attached to fence posts and vertical gates members. The arms may be attached to the fence post or be integral with the post weather cap. All arms shall be in compliance with ASTM F626, pressed steel galvanized after fabrication, minimum zinc coating of 1.20 oz. /ft², capable of supporting a vertical 250 lb load. Arms shall be Type I – three strand 45 degree arm.

6. Tie Wire and Hog Rings: Galvanized minimum zinc coating 1.20 oz/ft², 9 gauge (0.148 in.) steel wire in compliance with ASTM F626,.

7. Hardware: Miscellaneous hardware shall be of PVC coated steel, to match the coating, class and color to that of the chain link fabric, of standard design and conform to the requirements of the Chain-

Link Fence Manufacturer's Institute. All parts shall be galvanized except ties and clips may be of aluminum.

H. Concrete: Concrete shall have a minimum compressive strength of 3,000 psi at 28 days.

I. Swing Gates: Swing gates shall be as indicted on the Drawings and hinged to swing through 180 degrees from closed to open and shall be complete with latches, locking devices, stop keeper, hinges, fabric, and braces. Gates shall be the same height as the fence and the gate fabric shall be the same as the fence fabric. Gates shall be constructed of polymer coated round steel pipe, color to match fabric, and rail shall be Schedule 40 standard weight pipe, in accordance with ASTM F1083 and galvanized steel pipe welded fabrication in compliance with ASTM F900.

1. Frame members shall be spaced no greater than 8 ft. apart vertically and horizontally. Gate leaves more than 8 feet wide shall have either intermediate members or shall have tubular members as necessary to provide rigid construction, free from sag or twist. Gate leaves less than 8 feet wide shall have truss rods. Provide upright and diagonal bracing rails as required for gates as follows:

a. Horizontal top and bottom frame members:

2.375 in. OD Schedule 40 pipe weighing 3.65 lbs. per lin. ft., or 2 in. square tubing weighing 4.32 lbs. per lin. ft. (Painted black)

b. For gates over 6 ft. high, or leaf width exceeding 8 ft., interior upright bracing: (Painted black)

1.90 in. OD Schedule 40 pipe weighing 2.72 lbs. per lin. ft., or 1.50 in. square tubing weighing 2.60 lbs. per lin. ft. (Painted black)

c. Interior diagonal bracing:

1.66 in. OD Schedule 40 pipe weighing 2.27 lbs. per lin. ft., or 1.50 in. square tubing weighing 1.90 lbs. per lin. ft. (Painted black)

d. Gateposts per ASTM F1083 schedule 40 galvanized steel pipe as specified in Table 32 83 00-B.

2. Assemble gate frames by welding or with special malleable or pressed steel fittings and rivets for rigid connections. Use same fabric as for fence, unless otherwise indicated. Install fabric with stretcher bars at vertical edges. Bars may also be used at top and bottom edges. Attach stretchers to gate frame on all sides at not more than 15 inches on center. Attach hardware with rivets or by other means which will provide security against removal or breakage.

3. Install diagonal cross-bracing consisting of 3/8-inch diameter adjustable length truss rods on gates where necessary to ensure frame rigidity without sag or twist.

4. Gate Hardware: Provide manufacturer's standard, heavy duty framing and supports, bracing and accessories as required. Positive locking gate latch, pressed steel galvanized after fabrication. Galvanized malleable iron or heavy gauge pressed steel post and frame hinges. Provide lockable drop bar and gate holdbacks with double gates.

5. All parts associated with the gate including but not limited too, barbed wire arms, posts, members, hinges, latches and drop rods shall be polymer coated any damage shall be repaired using a liquid polymer touch up.

J. Cantilevered Slide Gate: Fabricate chain link cantilever slide gates in accordance with ASTM F-1184, Type II, Class 2, using aluminum members conforming to ASTM B 221, alloy and temper 6061-T6. Vertical members shall be 2 inch (50mm) square aluminum, weighing 1.13 lb./ft., 2 inch x 4 inch aluminum bottom frame member weighing 1.73 lb./ft., and a one-piece aluminum track/frame member weighing a minimum of 4.621 lb./ft. for single track and 7.95 lb./ft. for double track. The 2 inch square frame member of said track/frame shall have a wall thickness of not less than .250 inches on all four sides. Aluminum alloy used shall be 6061-T6 only. Internal uprights shall be 2-inch square aluminum spaced equally at no more than 6 feet on center subdividing the gate frame into panels. Weld all members together forming a rigid one-piece frame integral with

top track. Provide 2 truck assemblies for each gate leaf, except as indicated for gates larger than 30'. Frame sizes over 27' in length shall be shipped in 2 parts and field spliced with special attachments provided by the manufacturer.

1. Gate Opening, Overhang and Overall Width as specified in Table 32 83 00-B

2. Gate Frame Finish: Polymer Coated Aluminum

3. Chain Link Filler Finish: To match specification of existing fence

    a. All Operated Chain-Link Cantilever slide gates will be filled across the entire length of the panel (including the back frame counterbalance) to satisfy UL325 and ASTM F-220 safe gate design guidelines.

    b. Chain Link mesh size, and wire gauge to match that of existing fence. Fabric shall be attached between each internal upright with hook bolts spaced no more than 15 inches on center as recommended by the manufacturer.

4. Trussing: Each bay shall be cross-trussed by means of 3/16" minimum diameter stainless steel aircraft cable with adjustable turnbuckles. Trusses will maintain thestructural integrity of the gate while allowing for expansion and contraction of aluminum in varying weather conditions.

5. Top track/rail: Enclosed combination one-piece track and rail, aluminum extrusion with weight of: Openings up to 30'; 4.62 lbs./ft. Top track/rail to be a single formed profile with integrated center stabilizing web without welding. All wall thicknesses to be 0.25".

6. Truck assembly: Swivel type, zinc die coated steel, with 6 sealed lubricant ball bearing rollers, 2 inches in diameter by 9/16" (14 mm) in width, and 2 side rolling wheels to ensure truck alignment in track. Mount trucks on post brackets using 7/8" (22 mm) diameter ball bolts with 5/8" (16 mm) shank. Truck assembly shall withstand same reaction load as track 2,000 lb.

7. Gate hangers, brackets, guide assemblies, receivers, and latches: Malleable iron or steel, galvanized after fabrication. Operated cantilever gates are shipped without standard latching/locking hardware per ASTM F-2200. If positive locking is required, a suitable electronic locking device should be employed.

8. Bottom guide wheel assemblies: Each assembly shall consist of two UHMW, 3” minimum diameter wheels, straddling bottom horizontal gate rail, allowing adjustment to maintain gate frame plumb and in proper alignment. Attach one assembly to each support post.

9. End Plug: After gate has been installed, both ends of the combination track/frame member shall be closed off with a shock absorbing plastic block that shall also serve as a stop bracket.

10. Gate posts: galvanized steel 4” OD schedule 40 pipe, ASTM F 1083, weighing 9.1 lb./ft. Provide 1 latch post and 2 support posts for single slide gates. Latch post shall be 4”OD.

11. All parts associated with the gate including but not limited too, barbed wire arms, posts, members, hinges, latches and drop rods shall be polymer coated any damage shall be repaired using a liquid polymer touch up.

K. Nuts and Bolts: All hardware including carriage bolts and nuts shall be 316 SST. Carraige bolts used for fittings shall be installed with the head on the secure side of the fence. All bolts shall be peened over to prevent removal of the nut.

PART 3 - EXECUTION

3.01 ARRANGEMENT

A. Posts: All posts shall be uniformly spaced. Post spacing shall not exceed 10 feet. Intermediate posts shall have waterproof tops which have integrally cast openings through which the top rails shall pass. Terminal posts shall consist of end, corner and pull posts.

B. Braces: Braces shall be provided at each gate, corner, pull and end post.

C. Top Rails: The top rails shall pass through the line post tops and form a continuous brace from end to end of each stretch of fence. The top rail shall be securely fastened to the terminal posts by heavy pressed steel brace bands and malleable end connections. Top rail: Install 21 ft. lengths of rail continuous thru the line post or barb arm loop top. Splice rail using top rail sleeves minimum 6 in. long. Rail shall be secured to the terminal post by a brace band and rail end. Bottom rail or intermediate rail shall be field cut and secured to the line posts using boulevard clamps or brace band with rail end.

D. Bottom Tension Wire: The tension wire shall be stretched taut between terminal posts and securely fastened to each intermediate post 6 inches above the finish grade line. Tension wire shall be attached to the fence fabric with aluminum hog rings every 24 inches.

E. Stretcher Bars: Each stretcher bar shall be no less than 3/16 inch by 3/4 inch in cross section and shall have a minimum length 2 inches shorter than the fabric height. Stretcher bars shall be used for attaching the fabric to all terminal posts by threading through the fabric and being attached to the posts with 11 gauge tension bands, or other positive mechanical means, spaced at 12 inch centers. One (1) stretcher bar shall be provided for each gate and end post and two (2) for each corner and pull post.

F. Ties and Clips: Fabric shall be fastened to all intermediate posts with 9 gauge tie wires, with spacing not to exceed 12 inches apart. Fabric shall be tied to top rail with 9 gauge tie wires, with spacing not to exceed 14 inches on centers.

3.02 INSTALLATION

A. Post Setting: Posts shall be set plumb in concrete footings in accordance with ASTM F567. Line posts shall be set in holes 12 inches in diameter, 38 inches deep with 36 inch post embedment. Terminal posts shall be set in holes 24 inches diameter, 38 inches deep with 36 inch post embedment. After the post has been set and plumbed, the hole shall be filled with concrete. Top of concrete footing to be 9 inches below grade crowned to shed water away from the post.

B. Terminal and Gate Posts: Terminal and gate posts shall be set as specified above and shall be braced to the nearest post with a galvanized horizontal brace used as a compression member and a galvanized 3/8 inch steel truss rod used as a tension member. The horizontal brace rail and diagonal truss rod shall be installed in accordance with ASTM F567.

C. Fabric: Fence fabric shall not be stretched until concrete footings have cured a minimum of three (3) days. Chain-link fabric shall be placed on the side designated by the Engineer and shall be stretched taut approximately 2 inches above finish grade and securely fastened to all posts. Rolls of wire fabric shall be joined by weaving a single strand into the ends of the rolls to form a continuous mesh. Attach fabric to the terminal post by threading the tension bar through the fabric; secure the tension bar to the terminal post with tension bands and 5/16 in. carriage bolts spaced no greater than 12 inches on center. Chain link fabric to be stretched taut free of sag. Fabric to be secured to the line post with tie wires spaced no greater than 12 inches on center and to horizontal rail

spaced no greater than18 inches on center. Secure fabric to the tension wire with hog rings spaced no greater than 18 inches on center. Excess wire shall be cut off and bent over to prevent injury. The installed fabric shall have a ground clearance on no more than 2 inches.

D. Barbed Wire: Stretched taut between terminal posts and secured in the slots provided on the line post barb arms. Attach each strand of barbed wire to the terminal post using a brace band.

E. Swing Gates: Installation of swing gates and gateposts in compliance with ASTM F 567. Direction of swing shall be as indicated on drawings. Gates shall be plumb in the closed position having a bottom clearance of 3 in. grade permitting. Hinge and latch offset opening space shall be no greater than 3 in. in the closed position. Double gate drop bar receivers shall be set in a concrete footing minimum 6 in. diameter 24 in. deep. Gate leaf holdbacks shall be installed for all double gates.

F. Horizontal Slide Gates: Installation varies by design and manufacturer, install according to manufacturers instructions and in accordance with ASTM F567. Gates shall be plum in the closed position, installed to slide with an initial pull force no greater than 40 lbs. Roller guards and guide posts must be installed on Type II external roller cantilever slide gate in compliance with ASTM F1184. Ground clearance shall be 3 in. (76 mm), grade permitting.

TABLE 32 83 00-A

DIMENSIONS OF POSTS & RAILS (6-8 ft FENCE)

Designation	Nominal Diameter (Inches)	Outside Diameter (Inches)	Thickness (Inches)	Pounds Per Foot Plain Ends
End, Corner and Pull Posts	2.50	2.875	0.203	5.79
Line Posts	2.00	2.375	0.154	3.65
Braces	1.25	1.660	0.140	2.27
Top Rails	1.25	1.660	0.140	2.27

TABLE 32 83 00-B

SWING GATE POST DIMENSIONS

Gate fabric height up to and including 6 ft.

Gate leaf width	Post Outside Diameter	Weight
up to 4 ft.	2.375 in.	3.65 lb/ft
over 4 ft. to 10 ft.	2.875 in.	5.79 lb/ft
over 10 ft. to 18 ft.	4.000 in.	9.11 lb/ft
Gate fabric height over 6 ft. to 12 ft.		
Gate leaf width		
up to 6 ft.	2.875 in.	5.79 lb/ft
over 6 ft. to 12 ft.	4.000 in.	9.11 lb/ft
over 12 ft. to 18 ft.	6.625 in.	18.97 lb/ft
over 18 ft. to 24 ft.	8.625 in.	28.58 lb/ft

TABLE 32 83 00-C

CANTILEVER SLIDE GATE DIMENSIONS

Gate Opening	Cantilever Support (Overhang)	Overall Panel Width
6 Foot	4 Foot	10 Foot
8 Foot	4 Foot	12 Foot
10 Foot	4 Foot	14 Foot
12 Foot	5 Foot	17 Foot
14 Foot	6 Foot	20 Foot
16 Foot	7 Foot	23 Foot
18 Foot	8 Foot	26 Foot
20 Foot	8 Foot	28 Foot
22 Foot	9 Foot	31 Foot
24 Foot	10 Foot	34 Foot
26 Foot	11 Foot	37 Foot
28 Foot	12 Foot	40 Foot
30 Foot	12 Foot	42 Foot

END OF SECTION

SECTION 32 92 01

SEEDING AND SODDING

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. Where required by the Engineer, areas along the work shall be grassed and mulched in accordance with Section 570, of the latest edition of the State of Florida Department of Transportation "Standard Specifications for Road and Bridge Construction".

B. The area to be grassed and mulched along the work shall include all damaged cover over the backfilled trench and area adjacent thereto irrespective of the cause of damage, whether it be from handling of pipe, trenching or driving equipment.

1.02 QUALITY ASSURANCE

A. Requirements

1. It is the intent of this Specification that the Contractor is obliged to deliver a satisfactory stand of grass as specified. If necessary, the Contractor shall repeat any or all of the work, including grading, fertilizing, watering, and seeding or sodding at no additional cost to the County until a satisfactory stand is obtained.

B. Satisfactory Stand

1. For purposes of grassing, a satisfactory stand of grass is herein defined as a full lawn cover over areas to be seeded or sodded, with grass free of weeds, alive and growing, leaving no bare spots larger than 3/4 square yard within a radius of ten (10) feet.

1.03 SUBMITTALS

A. Provide technical data as required for shop drawings on all materials or installation procedures required under this Section.

B. When required by the Engineer, submit representative topsoil samples for analysis by a private laboratory to determine nutrient deficiencies and outline a proper fertilization program.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Fertilizer

1. Fertilizer shall be a complete fertilizer, the elements of which are derived from organic sources. Fertilizer shall be a standard product complying with State and Federal fertilizer laws.

2. Percentages of nitrogen, phosphorus and potash shall be based on laboratory tests on the actual soils. For purpose of bidding, assume four percent nitrogen, eight percent phosphorus and four percent potash by weight. At least fifty (50) percent of the total nitrogen shall contain no less than three percent water-insoluble nitrogen.

3. Fertilizer shall be delivered to the site, mixed as specified, in the original unopened standard size bags showing weight, analysis and name of manufacturer. Containers shall bear the manufacturer's guaranteed statement of analysis, or a manufacturer's certificate of compliance covering analysis shall be furnished to the Engineer. Store fertilizer in a weatherproof place and in such a manner that it will be kept dry and its effectiveness will not be impaired.

4. Superphosphate shall be composed of finely ground phosphate rock as commonly used for agricultural purposes containing not less than twenty (20) percent available phosphoric acid.

B. Seed

1. Grass seed shall be the same as existed prior to construction or as approved by the Engineer and shall be ninety-nine (99) percent minimum purity, eighty (80) percent minimum germination and one percent maximum weed seed, labeled in accordance with U.S. Department of Agriculture Rules and Regulations under Federal Seed Act in effect. Seed which has become wet, moldy, or otherwise damaged in transit or storage shall not be acceptable.

2. Hydroseed may be utilized if approved for use by the Engineer.

C. Sod

1. Sod shall be St. Augustine or Argentine Bahia, or the same as existed prior to construction, of firm texture having a compacted growth and good root development as approved.

2. Sod shall be certified to meet Florida State Plant Board Specifications, absolutely true to varietal type, and free from weeds or other objectionable vegetation, fungus, insects and disease of any kind.

3. Before being cut and lifted the sod shall have been mowed three times with the final mowing not more than a week before cutting into uniform dimensions.

D. Mulch

1. Mulch for use with seeding shall be fresh hay. Rate of application specified herein shall correspond to depth not less than one inch or more than three inches according to texture and moisture content of mulch material.

E. Water

1. It is the Contractor's responsibility to water the site, as required during seeding and sodding operations and through the maintenance period and until the work is accepted. The Contractor shall make whatever arrangements may be necessary to ensure an adequate supply of water to meet the needs for his work. The Contractor shall also furnish all necessary hose, equipment, attachments and accessories for the adequate irrigation of lawns and planted areas as may be required.

PART 3 - EXECUTION

3.01 SHOULDER STABILIZATION, SEEDING, MULCHING AND SODDING

A. The Contractor shall protect and restore road shoulders, ditch banks and other natural or artificial slopes as directed by the Engineer. Except where soil-cement rip-rap is shown and/or directed, protection shall be provided by stabilizing to a minimum LBR as set forth by the agency with jurisdiction over such road, and/or seeding and mulching the shoulders of the road.

B. The Contractor shall apply 4-8-4 fertilizer at a rate of six hundred (600) pounds per acre on all seeded areas. All seed or seed mixture used is subject to the approval of the Engineer.

3.02 GRASS AND SHRUBBERY PLOTS

A. Grass plots and graded areas shall be restored to the condition existing prior to making the excavation. All shrubbery, ornamental trees and other planting shall be fully protected. If it is necessary to remove any shrubbery or planting to accomplish the work, it shall be satisfactorily replaced before the work will be accepted. A 4-8-4 fertilizer shall be applied to all replaced sod at

a rate of six hundred pounds per acre.

B. The areas in which the grass plots and shrubbery are to be replaced shall contain sufficient moisture, as determined by the Engineer, for optimum results after being placed. The areas shall be kept in a moist condition for no less than three weeks. The moistened condition shall extend at least to the full depth of the rooting zone.

3.03 NEW SOD PLACEMENT

A. Whenever a suitable area has been graded and requires sodding, the Contractor shall, when directed by the Engineer, proceed at once with the sodding of the available areas. Sodding shall be incorporated into the Project at the earliest practical time in the life of the contract. No sod which has been cut for more than seventy-two (72) hours shall be used unless specifically authorized by the Engineer after his careful inspection thereof. Any sod which is not placed within twenty-four (24) hours after cutting shall be stacked in an approved manner and properly maintained,.

B. The sod shall be placed on the prepared surface, with edges in close contact, and shall be firmly and smoothly embedded by light tamping or rolling with appropriate tools or equipment.

C. Where sodding is used in drainage ditches, the setting of the pieces shall be staggered, such as to avoid a continuous seam along the line of flow. Along the edges of such staggered areas the offsets of individual strips shall not exceed six inches. In order to prevent erosion caused by vertical edges at the outer limits, the outer pieces of sod shall be tamped so as to produce a feather-edge effect.

D. On areas where the sod may slide, due to height and slope, the Engineer may direct that the sod be pegged with pegs driven through the sod blocks into firm earth, at suitable intervals.

E. Any pieces of sod which, after placing, show an appearance of extreme dryness shall be removed and replaced with new sod.

F. Ditch banks disturbed during the construction of ditch and creek crossings shall be sodded when directed by the Engineer or when called for in the permit requirements.

G. Watering and fertilizing requirements shall conform in all respects to those specified above.

END OF SECTION

SECTION 33 01 31

SANITARY SEWER CURED IN PLACE PIPELINING

PART I – GENERAL

1.01 SCOPE OF WORK

A. The Work includes furnishing all plant, labor, tools, equipment, materials, and performing all operations in connection with rehabilitation of 8-inch through 42-inch gravity sanitary sewer lines with cured-in-place pipe (CIPP).

B. The CIPP shall be continuous and jointless from manhole to manhole and shall be free of all defects that will affect the long term life and operation of the pipe.

C. All lining material shall be suitable for use in domestic sewage.

D. Pipelines to be rehabilitated may be in backyard easements, light traffic subdivision roadways or highways requiring Maintenance of Traffic plans conforming to Florida Department of Transportation and Pinellas County requirements. . No additional compensation will be made for these locations unless specified within the Contract.

D. It shall be assumed that pipelines to be rehabilitated will only need light cleaning, removal of protruding services and sewage bypass pumping to successfully install the liner system. If the Contractor feels point repairs are necessary to complete lining of a particular main line segment, the County will make the individual necessary repair or cancel that section of Work at no cost to the County. The Contractor shall be responsible for all material removed from the sewer and shall properly dispose of materials in accordance with the appropriate regulatory agency requirements.

E. Any main line or service line damage occurring during the rehabilitation process shall be the responsibility of the Contractor including, but not limited to, point repairs, main line replacement, service line replacement, any and all required permits, traffic control, by pass pumping, including a back-up system pipe/structure ventilation systems, Personal Protection Systems, such personal fresh air respirators, and restoration of all disturbed areas.

F. The Contractor shall be responsible for any wastewater spills during any bypass operation and pay any and all fines, fees, property damage,

environmental damage and cleanup costs that are associated with wastewater spill.

1.02 QUALITY CONTROL

A. Products and Installers seeking approval must meet all of the following criteria to be deemed acceptable:

B. Acceptable products shall have a minimum of 500,000 linear feet (LF) of documented acceptable wastewater installations in the United States.

C. The Contractor must have a minimum of three years experience with the specific product and have installed a minimum of 150,000 L.F. of documented acceptable wastewater installations in the State of Florida.

D. A client/reference list shall be supplied with the Bid, which shall include the product utilized for the referenced installations along with the dates of installation and the lineal footage of the individual installations.

E. Liner materials shall be as specified in the Material Specification Manual.

1.03 SUBMITTALS

A. The Contractor shall submit the following information:

1. Manufacturer's certification that the materials to be used meet the referenced standards and these specifications.
2. License or certificate verifying Manufacture's/ Licensor's approval of the installer.
3. Proposed equipment and procedures for accomplishing the work.
4. Lining Manufacturer's product data and instructions for resin and catalyst system.
5. Design Calculations, in accordance with the Appendix of ASTM F-1216, for each length of liner to be installed including the thickness of each proposed CIPP. It will be acceptable for the Contractor to submit a design for the most severe line condition and apply that design to all of the line sections. To be completed and certified by a Professional Engineer proficient in the design of pipeline systems. All calculations shall include data that conforms to the requirements of these specifications.
6. A detailed installation plan describing all preparation work, cleaning operation, pre-closed circuit television (CCTV) inspections, bypass pumping, traffic control, installation procedure, method of curing, service reconnection, quality control, testing to be performed, final CCTV inspection, and all else necessary and appropriate for a complete CIPP liner installation.

7. Tube wet-out and cure method including: a complete description of the proposed wet-out procedure, manufacturer's recommended cure method- for each diameter and thickness of CIPP liner to be installed, and detailed curing procedure detailing the curing medium and the method of application.
8. A detailed installation schedule.
9. All MSDS sheets for all materials to be furnished for the project.
10. Weekly work schedules shall be submitted no later than close of business on proceeding Thursdays for the work on the following week. Scope of the schedule shall include the following: cleaning operations, CCTV pre & post operations, lining, and crew leader's information including phone number.

1.04 SUBSTITUTIONS

A. Only after execution of the contract will Engineer consider requests from Contractor for substitutions. Substitutions will be considered only when a product becomes unavailable due to no fault of Contractor.

B. Items identified as "equal" shall be accompanied by product literature and a written itemized comparison of the published specifications (feature by feature from the manufacturer's literature) for the item specified and for the item proposed. The burden of proof of "equality" shall be on the supplier.

C. Request constitutes a representation that Contractor:
1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
2. Will provide the same warranty for substitution as for specified product.
3. Will coordinate installation and make other changes which may be required for Work to be complete in all respects.
4. Waives claims for additional costs which may subsequently become apparent.

D. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals without separate written request, or when acceptance will require substantial revision of Contract Documents.

E. Engineer will determine acceptability of proposed substitution, and will notify Contractor of acceptance or rejection in writing within a reasonable time.

PART 2 – PRODUCTS

2.01 CURED-IN-PLACE PIPE (CIPP) LINING

A. The liner material shall be an epoxy vinyl ester or polyester fiber felt resin-impregnated tubing or Engineer approved equal, sized to tightly fit the internal circumference and length of the designated gravity sewer. The cured liner shall meet the minimum initial structural properties as listed in ASTM F-1216. The liner shall be designed in accordance with the Appendices in ASTM F-1216. It shall be assumed that a fully deteriorated gravity sewer pipeline having no structural strength will be rehabilitated with H-20 traffic loading, the water table's at the ground surface and the product installed will have a minimum expected lifetime of fifty (50) years. In no case shall the liner thickness be less than 0.236 inches (6 mm) for pipe sizes eight inches through twelve (12) inches in diameter. Minimum liner thickness for pipes greater than eight inches shall be as specified by the Engineer. Liner shall be sized by Contractor to provide a tight fit to the inside circumference of the host pipe and shall be a continuous joint – less lining from manhole to manhole.

B. Unless otherwise specified, the Contractor shall use an epoxy vinyl ester or polyester resin and catalyst system and a fiber felt tube compatible with the inversion or other approved alternate installation process and having the following minimum physical properties for the cured pipe:

PROPERTY	TEST METHOD	MINIMUM VALUE
Tensile Strength	ASTM D 638	3,000 psi
Flexural Strength	Modified ASTM D 790	4,500 psi
Flexural Modulus of Elasticity	Modified ASTM D 790	250,000 psi
Minimum Long-Term (50 year)	Modulus of Elasticity (ASTM D 7790)	125,000 psi

C. The epoxy vinyl ester or polyester resin and fiber felt tubing system shall be in accordance with the requirements of ASTM F-1216 and be fabricated to a size that, when installed, will neatly fit the interior of the host pipe. Allowance shall be made for circumferential stretching during a direct (non-inversion) pull in. The CIPP product shall fit tightly to the host sewer pipe (with minimal shrinkage) in such a way as to minimize water migration (tracking) between the liner and the host pipe. A vacuum impregnation process shall be used in conjunction with a roller system to achieve a uniform distribution of the resin throughout the tube under controlled conditions. The volume shall be adjusted by adding five to ten (10) percent excess resin for the change in resin volume due to polymerization and to allow for any migration of resin into cracks or joints in the host pipe.

D. The outside of the fabric tube shall be marked every 5 feet with the name of the manufacturer or CIPP system, manufacturing lot and production footage.

2.02 CHEMICAL JOINT, CRACK AND ANNULAR SPACE SEALING MATERIALS FOR ACTIVE LEAKS AND SERVICE LATERAL CONNECTIONS

A. Chemical joint and crack sealing materials used on this Project shall have the following properties:

1. React quickly to form a permanent watertight seal;
2. Resultant seal shall be flexible and immune to the effects of wet/dry cycles;
3. Non-biodegradable and immune to the effects of acids, alkalis, and organics in sewage;
4. Component packaging and mixing compatible with field conditions and worker safety;
5. Extraneous sealant left inside pipe shall be readily removable; and shall be compatible with the repair resin utilized.

B. Chemical joint sealing material shall be acrylic resin type and shall be furnished with activators, initiators, inhibitors and any other materials recommended by the manufacturer for a complete grout system.

C. Sealing grout shall be furnished in liquid form in standard manufacturer's containers. Sealing grout shall be as specified in the Pinellas County Material Specification Manual..

PART 3 - EXECUTION

3.01 PUBLIC NOTIFICATION

A. All residences and businesses that may be affected by work performed in the installation of CIPP liners shall be notified by delivery of a notification. Notifications are to be delivered at least 72 hours before any work commences at a site.

B. Notifications shall include the following: and explanation of the work to be performed; when the work is anticipated to commence; where the work is to be performed in reference to local streets; the name and office telephone numbers of Contractor representatives; the nature of the inconvenience(s) anticipated to be experienced by the resident/ business owner; the anticipated duration of the work; that the work is being performed on behalf of Pinellas County and a Pinellas County Pinellas County contact and telephone number as provided by the County.

C. Information included in the notifications regarding Contractor representatives shall include both the name and twenty-four (24) hour telephone number of the Contractor's supervisor at the work site(s) and the name and business telephone number of a Contractor representative who is responsible for the administration of the project from the location of the offices of the Contractor.

D. The proposed format of all correspondence from the Contractor, to the public, shall be reviewed, and approved, by the Engineer or a Designee.

E. Complete public notification is to be the exclusive responsibility of the Contractor.

F. Cost associated with public notifications shall be included in the contract price of CIPP installation.

3.02 WASTEWATER FLOW CONTROL

A. The Contractor shall bypass sewage around the section of pipe being lined by plugging the upstream manhole and discharging to a downstream manhole. Bypass shall be set up to cause minimum disruption to residents, commercial establishments and traffic. Pumps shall be of sufficient capacity to accommodate daily peak flows and wet weather flows.

B. Where lines to be rehabilitated are determined by the Engineer to be of a critical nature and cannot be bypassed during normal work hours, lining may have to be scheduled at low flow during nighttime hours.

C. If wastewater flow is minimal and lining can be installed in a timely manner, bypass may not be required.

D. The Contractor shall make every effort possible to notify each customer whose service is affected by the lining operation.

E. The Contractor shall be responsible for any back-up or any damage caused by the lining process.

3.03 PRE-CLEANING AND TELEVISION INSPECTION

A. The Contractor shall clean and televise the assigned gravity sewer to be rehabilitated prior to construction in accordance with specification 33 01 32 - Sanitary Sewer Cleaning and Televising. Only National Association of Sewer Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) certified personnel trained in locating

breaks, obstacles and service connections by closed circuit television using PACP certified software shall perform the inspection. The interior surface of the pipeline shall be cleaned with high pressure water jet equipment prior to receiving the new liner. All service locations and obstructions, such as dropped joints and protruding services, shall be noted on the inspection.

B. Pre-Cleaning and television inspection to occur a minimum of five working days prior to installation of the liner, or as otherwise directed by engineer.

C. The Contractor shall notify the Engineer if any severe problems are discovered during televising that would prohibit the installation of the liner. If conditions such as broken pipe or major blockages are found that will prevent proper cleaning, or where additional damage would occur if cleaning is attempted or continued, the Contractor shall advise the Engineer.

D. The Contractor shall notify the Engineer if pipe joint offsets greater than 20% of the interior diameter of the pipe are present. No liners shall be installed through joint offset greater than 20% of the interior diameter of the pipe unless otherwise directed by Engineer.

E. Any damage done by the Contractor to any existing sewer pipe or structure by the Contractor will be immediately repaired to a condition equal to or better than its original condition at the Contractor's expense.

F. Cost associated with pre-televising and cleaning shall be included in the contract price of CIPP installation.

3.04 PROTRUDING SERVICE CONNECTIONS

A. Existing service connections that protrude into the main line shall be removed to within one-quarter inch of the inside wall of the main line pipe by means of robotic equipment. The protrusion shall be ground using grinding tools specifically designed for that purpose. The finished product shall be uniform and smooth to accept main line lining product and provide a proper seal.

3.05 LINER INSERTION

A. Installation of CIPP shall proceed only after all necessary preparation has been completed, including the following: all affected residences and businesses have been notified in accordance with these specifications; pre-installation cleaning and television inspection; implementation of adequate flow control; and the placement of traffic control measures in accordance with these specifications.

B. The Contractor shall obtain all field measurements required to properly size the liner for installation. The proposed liner shall be sized to provide for a tight fit to the inside circumference of the host pipe and extend sufficiently from manhole to manhole. Liner shall be installed in strict accordance with methods and requirements of ASTM F-1216 and of the liner manufacturer. Liner shall be free of irregularities, pinholes, tears, cracks, excessive wrinkling and sealed so as to eliminate any possibility of infiltration at the manhole wall.

C. The Contractor shall notify the Engineer in a timely fashion if the lining process is delayed and would continue to cause continued service interruption to customers affected by the lining operation. In this situation, the Contractor shall be responsible for taking steps necessary to reconnect services or provide a bypass operation, satisfactory to the Engineer, for the affected services at no additional cost to the County.

D. Pressure requirements: Before the curing begins, the pressure required to hold the flexible tube tight against the existing conduit, and the maximum allowable pressure so as not to damage the tube, shall be specified by the tube manufacture and provided to the County for each line segment.

E. Once the cure has started and dimpling for laterals is completed, the required pressure shall be maintained until the cure has been completed. Should the pressure deviate more than 2.3 ft. of water (1psi.) from the required pressure, the installed tube shall be removed from the existing conduit. A continuous log of pressure during cure shall be maintained and submitted to the County for each lined segment.

F. Prior to installation and as recommended by the manufacturer remote temperature gauges or sensors shall be placed inside the host pipe to monitor the temperature during the cure cycle. Liner and/or host pipe interface temperature shall be monitored and logged during curing of the liner.

G. Curing shall be accomplished by utilizing the appropriate medium (water or steam) in accordance with the manufacturer's recommended cure schedule. The curing source or in and output temperatures shall be monitored and logged during the cure cycles. The manufacturer's recommended cure schedule shall be used for each line segment installed.

H. The Contractor shall cool the CIPP in accordance with the approved manufacturer's recommendations.

I. Temperatures and curing data shall be monitored and recorded, by the Contractor, throughout the installation process to ensure that each phase

in achieved as approved in accordance with the CIPP System manufacturer's recommendations.

J. The installed CIPP shall be continuous over the entire length of sewer line section and be free from visual defects such as foreign inclusions, dry spots, pinholes, major wrinkles and de-lamination.

K. Contractor shall submit an inversion and cure record report for each liner. This record shall include location, from & to manhole numbers, direction of inversion, date, time, pressure and temperature throughout the entire inversion and curing process for each liner.

3.06 MANHOLE CONNECTIONS

A. A seal, consisting of a resin mixture or hydrophilic seal compatible with the installed CIPP shall be applied at manhole walls in accordance with the CIPP System manufacturer's recommendation.

B. Cost associated with manhole seals shall be included in the contract price of CIPP installation.

3.07 SERVICE RECONNECTIONS

A. Service reconnections shall be completed as soon as possible upon completion of the main line rehabilitation and with the approval of the Engineer.

B. Re-connection shall be accomplished without excavation using a robotic cutter. Cuts shall be neat and smooth with the service line opened to ninety-five (95) percent of the inside diameter in order to prevent blockages, and the bottom of both openings must match. The edges of the opening shall not have pipe fragments or liner fragments, which may obstruct flow or snag debris. All over-cut service connections will be properly repaired to meet the requirements of these specifications.

C. In the event that service reinstatements result in openings that are greater than 100 percent of the service connection opening, the Contractor shall install a CIPP type repair, sufficiently in size to completely cover the over-cut service connection. No additional compensation will be paid for the repair of over-cut service connections.

D. All cuttings and coupons of pipe material resulting from service tap cutting shall be recovered at the downstream manhole of the pipe rehabilitation operation prior to leaving the site and putting the main line back in service. Coupons may not be allowed to pass through the system.

E. The Contractor shall stop all visible service line leaks and seal each service lateral connection to the new liner with a chemical sealant compatible with liner material. The chemical sealant shall be injected by the use of standard packer device and equipment to create a water tight seal at each connection.

F. In the event reconnection within the pipe cannot be accomplished or failure occurs during the reconnection process, the Contractor may be permitted to excavate, at the Contractor's expense, and reconnect to the existing main using an approved sewer saddle.

G. Due to the critical nature of service reconnection, the Contractor shall keep backup robotic equipment on site to eliminate any delay to the reactivation of service to customers. This specification shall also apply to the Pay Item to grinding and sealing existing service openings on previously lined pipe.

3.08 TRAFFIC CONTROL AND MAINTENANCE OF TRAFFIC

A. The Contractor shall implement a Maintenance of Traffic Plan in accordance with specification 01 55 26- Traffic Regulation.

3.09 CIPP REPAIR/ REPLACEMENT

A. Occasionally installation will result in the need to repair or replace a defective CIPP. The Contractor shall outline specific repair or replacement procedures for potential defects that may occur in the installed CIPP. Repair/replacement procedures shall be as recommended by the CIPP system manufacturer and shall be submitted to the County.

B. Defects in the installed CIPP that will not affect the operation and long term life of the product shall be identified and defined.

C. Repairable defects that may occur in the installed CIPP shall be specifically defined by the Contractor based on manufacturer's recommendations, including a detailed step-by-step repair procedure, resulting in a finished product meeting the requirements of these contract specifications.

D. Un-repairable defects that may occur to the CIPP shall be clearly defined by the Contractor based on manufacturer's recommendations, including a recommended procedure for the removal and replacement of the CIPP.

3.10 POST CLEANING AND TELEVISION INSPECTION/ FINAL ACCEPTANCE

A. Post cleaning and television inspection shall proceed only after all necessary work and preparation has been completed, including the following: installation on CIPP liner in accordance with specifications, all services re-instated including grout sealing in accordance with these specifications; pre-installation cleaning and television inspection; implementation of adequate flow control; and the placement of traffic control measures in accordance with these specifications.

B. The Contractor shall clean and televise the assigned gravity sewer after rehabilitation in accordance with specification 33 01 32- Sanitary Sewer Cleaning and Televising. Only NASSCO PACP certified personnel trained in locating breaks, obstacles and service connections by closed circuit television using PACP certified software shall perform the inspection. The interior surface of the pipeline shall be cleaned with high pressure water jet equipment immediately prior to conducting the post television inspection. All service locations, gouges, cracks, bumps, bulges and obstructions, such as dropped joints, shall be noted on the inspection.

C. In the case of bellies in the line, the pipe shall be cleared of any standing water to provide continuous visibility during the post inspection.

D. The Contractor shall provide all inspections in digital PACP format including printed inspection logs.

E. Cost associated with post-televising and cleaning shall be included in the contract price of CIPP installation.

F. The finished liner shall be free of significant visual defects, damage, deflection, holes, leaks and other defects.

G. Each individual location contained in a Work Order is to be considered an “individual project” such that all work, including all deliverables shall be reviewed and accepted prior to the County accepting and processing payment for that individual project. No partial payments will be made on individual projects.

3.11 CLEANUP

A. Cleanup is an essential part of the Work. As the work progresses and is completed, the Contractor shall clean the various sites of all operations and completely restore all work areas to the satisfaction of the Engineer and the County. This cleanup shall be done as promptly as practicable and shall not be left until the end of the construction period. No part of the Work shall be considered complete and no payment will be made until cleanup is completed.

END OF SECTION

SECTION 33 01 32

SANITARY SEWER CLEANING AND TELEVISING

PART 1 – GENERAL

1.01 SCOPE

A. The Contractor shall provide for routine maintenance cleaning and closed circuit television inspection (CCTV) of assigned pipes and inspection of manholes within the Pinellas County sanitary sewer collection system including removal and disposal of debris removed during the cleaning process, which is preventing the design flow of the pipe, prevent blockages and restore the sewer to near full capacity and self-scouring velocity. The contractor shall be aware that this specification requires work in active sewers.

B. The Work includes furnishing all plant, labor, tools, equipment and materials including various forms of specialized pipe cleaning, and televising of sanitary sewage mains and related manholes, and all operations to support the primary maintenance cleaning and inspection activities are also to be provided.

C. This specification section also applies to new installation, replacement and repair inspection for compliance documentation of construction specifications.

1.02 SAFETY CODE REQUIREMENTS

A. The Contractor shall conduct his operations in strict accordance with all applicable Federal, State, and Local safety codes and statutes and shall be fully responsible and obligated to maintain procedures for safety of the public as well as work, personnel and equipment involved in the project.

B. The Contractor shall at all times during the course of the cleaning and televising conform to Occupational Safety and Health Administration (OSHA) and all other applicable safety codes or standards. No additional compensation will be allowed for OSHA or other safety code standards or requirements.

C. The Contractors shall conform to traffic control requirements of the State of Florida Department of Transportation at all sites within roadway right-of-ways.

1.03 SUBMITTALS

A. The Contractor shall submit the following information:

1. Information on all types of processes that will be used for cleaning.
2. Copies of PACP/ MACP certifications for personnel performing television and manhole inspections.
3. Manufacturer's certification that the equipment to be used meets the referenced standards and these specifications.
4. Proposed equipment and procedures for accomplishing the work.
5. Proposed personnel assigned to the cleaning work.

PART 2 – EQUIPMENT

2.01 CLEANING EQUIPMENT

A. All sanitary sewer pipes shall be cleaned with truck-mounted high velocity hydraulic cleaning (hydra-cleaning) equipment and equipped vacuum debris removal system. Sufficient high pressure hose length should be available on the vehicle described to perform cleaning on manhole runs up to 900 linear feet in length. High pressure hose should be at least 1 inch in diameter with the ability to deliver at least 80 gallons per minute at 3,000 PSI. Water tanks on the vehicle should be at least 1,200 gallons in capacity. All controls for cleaning equipment shall be located so that the equipment can be operated above ground.

B. The nozzle and skids used for cleaning should be designed for use in a manner consistent with the diameter of the pipe being cleaned. Specialty heads and nozzles may be required for hardened debris, grease, and scale removal.

C. Cutting heads to remove intruding roots or projecting obstructions will also be required and shall be designed specifically for the diameter of the pipe in which they are used.

D. Vacuum debris removal system shall be used to remove sand, silt, grease, rocks, bricks, and all other debris from manholes during the cleaning process. It is essential that the debris be removed from the wastewater system and not allowed to move into adjacent pipes or manholes. Wastewater removed from the collection system during the vacuuming process can be decanted back into the system only after being allowed to settle sufficiently to prevent solid materials from also re-entering the system.

E. Contractor shall provide equipment capable of removing all sand, dirt, rocks and other debris from the sewer reach to allow unobstructed remote television internal inspection of all internal surfaces.

F. Cleaning system shall utilize a device capable of dislodging sediments found in sewer lines without damaging the structural integrity of the pipe. Cleaning devices shall have sufficient power to force and move the debris commonly found in large diameter sewers to a manhole for extraction. Cleaning method may maintain normal sewer flows during the cleaning process.

G. Contractor shall certify that backup cleaning equipment, including machines, devices, tools, etc, is available and can be delivered to the site with in 24 hours.

H. Contractor shall provide all equipment required for specialty cleaning including removing roots and de-scaling sewer pipes.

2.02 CLOSED CIRCUIT TELEVISION EQUIPMENT

A. Video inspection shall be performed using National Association of Sewer Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) certified software.

B. Closed Circuit Television Inspection Equipment shall produce a color video.

C. Pipe inspection camera shall be a pan-and-tilt and radial viewing pipe inspection camera that pans a minimum of ± 275 degrees and rotates 360 degrees.

D. A slope indicator shall be included on the camera and accurately calibrated per manufacture's instructions for measurement of pipe slope.

E. A camera with an accurate footage counter shall be used, which displays on the monitor the exact distance of the camera from the centerline of the starting manhole.

F. The camera will be capable of height adjustment so that the camera lens is always centered at one-half the inside diameter, or higher, in the pipe being televised.

G. Lighting for the camera shall be suitable to allow a clean picture of the entire periphery of the pipe. A reflector in front of the camera may be required to enhance lighting in dark or large diameter pipe.

H. The camera, television monitor and other components of the video system shall be capable of producing a minimum 500-line resolution colored video picture.

I. Video data shall be provided to the County in a digital format such as a external removable drive, or other device or media, as required by the County to be uploaded to the CCTV inspection database.

J. Video data shall be PACP database compliant and compatible with the County's existing Granite XP software database system.

PART 3 – EXECUTION

3.01 NEIGHBORHOOD NOTIFICATION

A. Not less than 48 hours prior to the commencement of work in a right-of-way, the Contractor shall notify all residents and businesses affected by the work with an approved printed door hanger notice indicating the schedule date of work, the type of work, and Contractor's and superintendent's name, address and telephone number. The notice shall contain wording indicating any disruption of sanitary service or access to property that may be required to perform the work. Disruption in sanitary sewer service shall not exceed four hours. Access to private property shall be maintained at all times.

3.02 DEWATERING

A. All gravity sanitary sewer pipes (lines) less than 48" in diameter shall be dewatered for cleaning and inspection purposes. Lines 48" and larger may be cleaned and inspected without dewatering only when the County agrees that dewatering in not feasible. Each exception to the dewatering requirement shall be considered on a case by case basis. Contractor will assume that dewatering is required for bidding purposes.

B. Dewatering may be accomplished by pumping water around the work area or by plugging off pipes to isolate the portion of the system being worked on while cleaning and performing inspection. If plugging the line is used for dewatering purposes, the system must be properly monitored so that no overflows occur. If a pipe that has been rehabilitated by the installation of a liner is plugged, the liner must be braced at the manhole to prevent movement of the liner pipe.

3.03 CLEANING

A. The sewers shall be cleaned by removing dirt, rock, sand, roots and other deleterious materials from the pipe and manholes. The cleaning

equipment shall remove grease or roots and restore ninety-five (95) percent of original pipe inside diameter.

B. All necessary precautions are to be taken to protect the sewer lines from damage resulting from the cleaning and inspection process. Reimbursement for damage to the sewer infrastructure or damage or flooding of private or public property, as a direct or indirect result of the cleaning and inspection operation shall be the responsibility of the Contractor.

C. Contractor shall be responsible for all permits required to perform assigned Work.

D. Contractor shall obtain permission from the property owner whenever access to manholes in easements and right-of-way is required for equipment.

E. Cleaning and inspection work required includes, but not limited to the following:

a. Field locating all manholes along the sewer pipes to be cleaned.
b. Maintaining and protecting both vehicular and pedestrian traffic, and meeting all requirements of the County and all other government agencies having jurisdiction.
c. Cleaning and inspecting existing sanitary sewer pipes and manholes, as herein specified, and to record the inspection information in the format identified by the County.
d. Disposal of waste, sediment and debris as specified herein.
e. Removal of roots, scale, and protrusions as specified herein.
f. Cleaning and restoring the work area as the work progresses and after the completion of all work activities.
g. All other work required for the complete and satisfactory cleaning and inspection of the pipeline and adjacent manholes.

3.04 CLEANING PROCEDURE

A. After determining and performing all preliminary requirements, Contractor shall thoroughly clean assigned pipelines sufficiently to permit an unrestricted inspection by closed circuit television. The Contractor shall remove accumulated grease, roots, sand, rock, bricks, sludge and all other debris that obstructs video inspection such that all portions of the pipe being inspected will be clearly visible.

B. Contractor shall remove all brick, rocks, debris, sludge, dirt, sand, grease, roots and other materials from the sewers shown in the work order, and collect and remove the resulting debris from the manholes of the sewer section being cleaned. Equipment shall decant or separate the water from the solids before it is transported to the designated disposal site. Liquid decanted from the solids shall be returned to the sewer. Debris remaining in the sewer after cleaning shall not exceed 5% of the pipe diameter. Passing waste material between manholes, causing line stoppages, accumulations of sand, or damage to the pumping equipment, shall not be permitted.

C. Contractor shall complete a NASSCO Manhole Assessment and Certification Program (MACP) manhole inspection form for both upstream and downstream terminal manholes during cleaning and inspection operation.

D. Normal cleaning consists of removing all debris and requires a minimum of two passes. The first pass shall be restricted to 800 psi at the nozzle head. The second and subsequent passes shall be at 1200 psi.

E. Specialty cleaning consists of removing all heavy grease, roots and tuberculation by use of special equipment such as a high pressure de-scaling head, root cutter, or other mechanical means approved by the County.

F. Contractor is responsible for damage to the sewer as a direct result of the cleaning method.

G. Contractor shall use all cleaning equipment in accordance with manufacturer's recommendations to prevent damage to sewer lines.

H. Contractor shall immediately notify the County if fresh soil, pieces of pipe, or other visible signs of potential problems occur during cleaning operations.

I. Contractor shall ensure that water pressure created does not cause damage due to flooding of property being served by sewer section(s) involved.

J. Contractor shall conform to the following requirements:

a. Cleaning of upstream reached of sewers shall be completed before the downstream reached are cleaned.

b. Hydraulic cleaning equipment shall be inserted in the downstream manhole of the reach and the work shall proceed upstream unless otherwise approved by the County.

K. Any blockages of lateral building connections resulting from the cleaning or other items of work shall be removed by cleaning of the building connection by Contractor, at its own expense. Any damage caused by flooding of lateral building connections shall be corrected by Contractor, at its own expense.

3.05 WASTE DISPOSAL

A. Waste materials and debris resulting from sanitary sewer cleaning operations shall be removed and conveyed by the Contractor to an approved waste site. The disposal site shall be accessible during the Contractor's working hours. All permits required shall be the responsibility of the Contractor. Waste material and debris resulting from the cleaning operation shall be drained in the collection system and disposed of at Pinellas County Solid Waste Operations, located at 3095 114th Avenue North. The material deposited at Solid Waste Operations, shall not exhibit any liquid when deposited at the location as specified by Pinellas County Solid Waste Operations. Disposal manifest records shall be supplied to Pinellas County Utilities. Under no circumstances shall sewage or solids removed from sewer lines be dumped onto the streets or into ditches, catch basins or storm drains. It shall not be necessary to stop the cleaning operation while the debris is transported to the disposal site.

3.06 CLOSE CURICUIT TELEVISION INSPECTION PROCEDURE

A. The Contractor shall provide Pinellas County with digital media that includes video and data base file that is compatible with Granite XP in NASSCO PACP format. Compatibility issues with software other than Granite XP latest version are the Contractor's responsibility.

B. CCTV inspection shall be performed by NASSCO PACP certified operators who use NASSCO certified software that is compatible with Granite XP latest version using PACP defect coding methodology.

C. Perform CCTV inspection immediately after line cleaning. Before insertion of the camera into the sewer, the camera shall record on video the upstream and downstream manhole, pipe size, specific location of the sewer, and the direction in which the camera will travel. The camera shall be moved through the line in either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer's condition in audio and documented on the television inspection log.

D. The camera height shall be adjustment so that the camera lens is always centered at one-half the inside diameter, or higher, in the pipe being televised.

E. The camera shall not travel at a speed greater than thirty (30) feet per minute. To better understand the flow from each individual lateral the camera shall be positioned at each lateral for a sufficient duration to determine the nature of flow and condition of the lateral (minimum of 30-seconds).

F. Videos shall pan beginning and ending manholes to demonstrate that all debris has been removed. A manhole inspection shall be performed for all manholes.

G. Manual winches, power winches, TV cable powered rewinds, or self-propelled cameras may be used to move the camera through the sewer line.

H. When manually operated winches are used to pull the television camera through the line, telephones or other suitable means of communication should be set up between the two manholes of the section being inspected to insure good communication between members of the crew.

I. If during CCTV inspection of a pipeline, the television camera is unable to pass through the entire manhole section, the Contractor shall set up his equipment so that the inspection can be performed from the opposite direction (reverse setup) in order to obtain a complete video of the line. If, again, the camera fails to pass through the manhole section, the inspection of the entire manhole section will be considered complete for purposes of payment. Whenever such a condition arises, notify the County to determine if an obstruction removal or point repair is necessary.

J. In the event that the TV camera encounters broken pipe and there is a possibility that continuation of the inspection could cause the TV Camera to become stuck or result in additional pipe damage or collapse, the Engineer may elect to discontinue the inspection.

K. Distance Measurements: The accuracy of the measurements for location of defects, service connections, changes in pipe materials, and all other PACP recognized conditions is paramount, particularly when it may require later corrective action or a dig-up. The accuracy of the footage meter shall be checked by taking a reading at the entrance to the away manhole and comparing with a surface measurement made with a steel tape or walking meter (Roll-A-Tape). These measurements shall be performed by the Contractor in the presents of the Pinellas County inspector. Measurement meters shall be accurate to one-tenth of a foot over the entire length of the sewer line section being inspected. Otherwise, the Contractor shall take corrective action.

L. The video inspection shall be clear and visible with adequate lighting to enable the viewer to discern even small defects in the pipe being inspected. Camera distortions, inadequate lighting, dirty lens, or blurred/hazy picture will be cause for rejection of a video and rejection of the associated line segment. Any pipeline reach television inspection video that does not meet this requirement or fails to meet PACP specifications shall be cause for Contractor to re-inspect the pipe at no additional cost to the County. Payment for television inspection and sewer rehabilitation will not be made until the County approves the quality of the video and logs.

M. CCTV inspection video shall be continuous for pipe segments between manholes. Do not leave gaps in the video of a segment between manholes and do not show a single segment on more than one video, unless specifically allowed by the County.

N. Documentation of television inspection by the Contractor shall be performed in accordance with the Specifications. TV reports can be assembled elsewhere, but documentation must be done in the field. A video inspection report shall be prepared by the Contractor for every segment and manhole that is CCTV-inspected. The Contractor shall provide written records that show the location in relation to an identified manhole of each infiltration point observed during inspection. In addition, other points of significance such as locations of building sewers, unusual conditions, roots, sewer connections, broken pipe, presence of scale and corrosion, and other discernible features shall be recorded on the PACP television inspection report. The video, PACP television inspection report and the NASSCO Manhole Inspection Form version 4.3 or higher, with all applicable fields accurately completed per PACP format, shall be supplied to the County with each Pay Request.

3.07 REMOVAL OF DEBRIS

A. Materials generated by the cleaning operation shall be removed by vacuuming at the upstream or downstream manhole of the section being cleaned. Suitable traps or weirs shall be used to prevent the movement of solids to adjacent sections of pipe.

3.08 WATER

A. The use of potable water from the municipal, private, or reclaimed water systems for filling the water tanks on cleaning vehicles shall be permitted however, Contractor shall be required to acquire and use a meter approved by the County to monitor the use of this water and will be charged for water use in accordance with the current rate as described in PCU Policy Manual and the schedule of rates and fees. Contractor shall be responsible for obtaining and hooking up the potable water meter at his own expense. A reduce pressure type backflow preventer approved by the County shall be used to prevent contamination of the potable water system. Contractor is responsible for any damage resulting from improper operation of hydrants. Contractor shall not use or obstruct a fire hydrant when there is a fire in the area.

B. Contractor shall not waste water from the public water supply because of improper connections or from hydrants left open.

3.09 FINAL ACCEPTANCE OF SEWER LINE CLEANING

A. Acceptance of sewer line cleaning work is contingent upon the completion of the CCTV inspection and successful review of the television inspection video by the County. If the inspection shows the cleaning to by unsatisfactory, Contractor shall be required to re-clean and re-inspect the sewer line until the cleaning is shown to be satisfactory. Such re-cleaning and re-inspection shall be made at Contractor's expense.

3.10 TRAFFIC CONTROL AND MAINTENANCE OF TRAFFIC

A. Refer to Section 01 55 26, Traffic Regulation

B. If required, the Contractor shall employ a uniformed off-duty police officer to maintain and regulate traffic through the work area.

END OF SECTION

SECTION 33 10 00

VALVES AND APPURTENANCES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Furnish all labor, materials, equipment, and incidentals required to install complete and ready for operation all valves and appurtenances as shown on the Drawings as specified herein.

2. The equipment shall include, but not be limited to the following:

   a. Swing Type Check Valves
   b. Resilient Wedge Gate Valves
   c. Cam-Lock Male Coupling Adapter

B. Related Work Described Elsewhere:

1. Piping is included in the respective Sections of Division 33.
2. Pipe Hangers and Supports for Process Piping: Section 22 05 29.

C. General Design:

1. All of the equipment and materials specified herein are intended to be in accordance with the most recent version of Pinellas County "Material Specification Manual". This supplemental specification, 33 10 00, outlines the applicable valves and appurtenances recommended by the Material Specification Manual and is not intended to override the Material Specification Manual.

1.02 QUALITY ASSURANCE

A. All of the types of valves and appurtenances shall be products of well-established reputable firms who are fully experienced, reputable, qualified in the manufacture of the particular equipment to be furnished, and as specified by the Material Specification Manual . The equipment shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these specifications as applicable.

1.03 SUBMITTALS

A. Submit to the Engineer within 30 days after execution of the contract a schedule of valves to be furnished. The valve schedule shall include valve tags organized by process with the valve manufacturer, supplier, and the date of delivery to the site.

B. Complete shop drawings of all valves and appurtenances shall be submitted to the Engineer for approval in accordance with the requirements of Section 01 33 00 and the General Requirements. In addition, valve manufacturer shall certify in writing that valve design and materials of construction are suitable for the intended service.

C. Quality Control Submittals:

1. Certificate of Compliance for:

a. Electric operators; full compliance with AWWA C540.

b. AWWA service butterfly valves; full compliance with AWWA C504.

2. Tests and inspection data.

3. Manufacturer's Certificate of Proper Installation.

4. Operation and Maintenance Manual.

1.04 WARRANTY AND GUARANTEES

A. Provide equipment warranty in accordance with Section 01 78 36: Warranties and Bonds. The manufacturer’s warranty period shall be concurrent with the Contractor’s correction period for 1 year after the time of completion and acceptance.

1.05 SPARE PARTS

A. Provide one (1) replacement set of valve stem packing or seals as applicable for every five valves supplied. No less than one (1) set shall be provided for each type and model of valve supplied.

B. Provide one (1) full set of gaskets as applicable for each valve supplied.

C. Special tools, if required for normal operation and maintenance shall be supplied with the equipment.

PART 2 - PRODUCTS

2.01 GENERAL

A. Valves shall include operator, actuator, handwheel, chain wheel, extension stem, floor stand, worm and gear operator, operating nut, chain, wrench, and accessories as required for a complete and operable installation.

B. All valves and appurtenances shall be of the size shown on the Drawings and all equipment of the same type shall be from one manufacturer.

C. All valves and appurtenances shall have the name of the manufacturer and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.

D. Unless specified otherwise, all hardware on the valve and actuator including bolts, washers, and nuts shall be at a minimum Type 316 stainless steel.

E. Factory Finishing:

1. All valves shall be coated in accordance with Section 09 91 00: Painting and Protective Coatings.

2.02 MATERIALS AND EQUIPMENT

A. Approved Materials:

1. All valves and valve materials shall conform to the Material Specification Manual.

B. Swing Type Check Valves:

1. General:

a. Sanitary Sewer check valves for ductile iron pipes 4" thru 12" shall conform to Material Specification Manual D 4.1.

b. Prior to shipment from the factory, the interior ferrous surfaces of the valve, except for finished or bearing surfaces, shall be coated with a two-part thermosetting epoxy coating in accordance with AWWA C550, latest revision. Surfaces shall be clean, dry and free from rust and grease before coating.

C. Resilient Wedge Gate Valves:

1. General:

a. Gate valves shall have a clear waterway equal to the nominal diameter of the pipe when fully open.

b. Resilient Wedge Gate Valves for ductile iron pipes 4" thru 12" shall conform to the following details within the Materials Specification Manual:

1. 4"-12" (MJ x MJ) : Detail D.2.1
2. 4"-12" (FLG x MJ) : Detail D.2.2
3. 4"-12" (FLG X FLG) : Detail D.2.4

D. Cam-Lock Male Coupling Adapter:

1. General:

a. Cam-lock male coupling adapters shall conform to Material Specification Manual K 6.

2.03 ACCESSORIES

A. Expansion Joints:

1. Expansion joints shall be manufactured of molded chlorobutyl and polyester with a filled single arch. Expansion joints shall be suitable for buried service or above ground service. Flanges shall be drilled to ANSI 125#. Working pressures are as follows:

Size	Pressure
2” – 12”	150#
14"	130#
16" - 20"	110#
24" - 30"	100#
36"	90#

2. Maximum temperature shall be 250 degrees F. Expansion joints shall be Model 100 HT/711 as manufactured by Metraflex or approved equal.

3. Expansion joints shall be furnished with 304 stainless steel split, beveled retaining rings and control rod assemblies to limit over expansion or compression. A minimum of two control units shall be furnished with each expansion joint and shall be suitable for working pressures as specified above.

4. Minimum performance for flexible expansion joints shall be as follows:

Size (In.)	Axial Compression (Inches)	Axial Elongation (Inches)	Lateral Deflection (Inches)	Angular Deflection Degrees
2	7/8	1/2	1	30
4	7/8	1/2	1	30
6	7/8	1/2	1	25
8	1-3/8	3/4	1	25
10	1-3/8	3/4	1	20
12	1-3/8	3/4	1	20
24	1-5/8	7/8	1	20

5. Flexible expansion joints shall be as manufactured by Mercer or an equal approved by the Engineer.

D. Diaphragm Seals:

1. Diaphragm seals shall be installed on pressure gauge connections to protect pressure gauges and switches used to monitor pressures from excessive pressures. The diaphragm shall be "thread attached" to both piping and pressure switches. The top housing, bottom housing and diaphragm shall be constructed of 316 stainless steel, except that the bottom housing of all diaphragm

seals connected to PVC or CPVC lines shall be constructed of matching material.

2. Diaphragm seals shall have a flushing connection and be Type RA by Mansfield and Green, equal product manufactured by Trerice or Marshalltown, Instruments, or approved equal.

E. T-Handled Operating Wrench:

1. One galvanized operating wrench, 4 feet long.

2. Manufacturers and Products:

a. Mueller; No. A-224610.

b. Clow No.; F-2520.

F. Extension Bonnet for Valve Operator: Complete with stem and accessories for valve and operator.

1. Manufacturers and Products:

a. Pratt.

b. DeZurik

G. Floor Box and Stem:

1. Plain type, for support of nonrising type stem.

2. Complete with stem, operating nut, and stem guide brackets.

3. Stem Guide: Space such that stem L/R ratio does not exceed 200.

4. Anchor Bolts: Type 304 SST.

5. Manufacturers and Products:

a. Neenah Foundry: R 7506.

b. Clow; No. F5690.

2.04 MONITORING AND CONTROL

A. The supplier of equipment under this section is responsible for coordinating with the I&C System Supplier to ensure that its equipment is compatible with and provides all necessary ancillary and accessory equipment to accept control signals provided by the SCADA system and provide monitoring and feedback signals to the SCADA system that are specified in Division 26. This shall include all equipment control switches, flow detection switches, motor winding temperature switches and position switches that are mounted on or adjacent to the equipment for monitoring the performance of that piece of equipment. This shall also include all relays, transmitters, dry contacts and termination switches that are required on, adjacent to or in control panels supplied by the equipment vendor that are necessary to interface with the PLC/SCADA control system.

2.05 QUALITY CONTROL

A. Contractor shall follow Manufacturer's and Supplier's recommended product quality control specifics as required for this project.

PART 3 - EXECUTION

3.01 PREPARATION

A. All exterior surfaces of iron body valves shall be clean, dry and free from rust and grease before coating.

B. For valves installed underground or in valve vaults, all exterior ferrous parts or valve and actuator shall be coated at the factory with a thermally bonded epoxy coating in accordance with AWWA C550, latest revision, or with coal tar epoxy. Coal tar epoxy shall be applied in two 8 mil dry film thickness coats for a minimum total finish dry film thickness of 16 mils. Prior to backfilling, all uncoated nuts, bolts, glands, rods and other part of joints shall be coated in the field with coal tar epoxy. The coal tar epoxy shall be Carboline Bitumastic No. 300-M, Americoat No. 78, or approved equal.

C. For above-ground service, the exterior ferrous parts of all valves shall be coated as follows:

1. Prior to shipment from the factory, valves shall be coated with a thermally bonded epoxy coating in accordance with AWWA C550, latest revision, or shall be shop painted with one coat, 1.5 mils dry film thickness, of a combination lead and chromate primer with rust-inhibitive pigments and synthetic resins.

2. Following installation in the field, valves shall be painted with one coat, 1.5 mils dry film thickness, of a combination lead and chromate primer with rust-inhibitive pigments and synthetic resins. Valves shall be finish painted with two coats, 1.5 mils dry film thickness each coat, of a medium to long oil alkyd resin coating. Field applied coatings shall be as manufactured by the Carboline or an equal approved by the Engineer. The color of the finish coats shall be in accordance with the piping color code in the painting schedule.

D. All exterior surfaces of stainless steel valves shall be clean, dry and free from rust and surface contaminants. Stainless steel castings shall be of a smooth, bright, pit-free appearance. Fabricated stainless steel valve bodies shall be pickled and passivated following the fabrication process to remove surface contaminants.

3.02 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 the Contractor shall be responsible for the proper location of these valves and appurtenances during the construction of the structures.

D. Pipe for use with flexible couplings shall have plain ends as specified in the respective pipe sections in Division 33.

E. Flanged joints shall be made with bolts, nuts and washers as specified in the respective pipe sections in Division 33. Mechanical joints shall be made with mild corrosion resistant alloy steel bolts and nuts. All exposed bolts shall be painted the same color as the pipe. All buried bolts and

nuts shall be heavily coated with two (2) coats of bituminous paint comparable to Inertol No. 66 Special Heavy.

F. Pressure gauges shall not be installed until after the substantial completion date unless otherwise requested by the Owner.

G. Valve boxes with concrete bases shall be installed for each buried valve as shown on the Drawings. The valve box shall be centered accurately over the operating nut and the entire assembly shall be plumb. The tops of valve boxes shall be adjusted to the proper elevation as specified below and as shown on the Drawings.

1. In paved areas, top of valve box covers shall be set flush with pavement. Following paving operations, a 30-inch square shall be neatly cut in the pavement around the box and the paving removed. The top of the box shall then be adjusted to the proper elevation and a 30-inch square by 6-inch thick concrete pad poured around the box cover. Concrete pads in traffic areas shall be reinforced with No. 4 reinforcement bars as shown on the drawings. Concrete for the pad shall be 3,000 psi compressive strength.

2. In unpaved areas, tops of valve box covers shall be at least 0.20 foot above finished grade. After the top of the box is set to the proper elevation, a 30-inch square by 6-inch thick concrete pad shall be poured around the box cover. Concrete for the pad shall be 3,000 psi compressive strength.

3. The concrete pad for the valve box cover shall have a 2-inch diameter, bronze disc embedded in the surface as shown on the Drawings. The bronze disc shall have the following information neatly stamped on it: the size of the valve; the number of turns to open; the direction to open; and the year of installation.

H. Valve Orientation:

1. Install operating stem vertical when valve is installed in horizontal runs of pipe having centerline elevations 4 feet inches or less above finished floor, unless otherwise shown.

2. Install operating stem horizontal in horizontal runs of pipe having centerline elevations between 4 feet 6 inches and 6 feet 9 inches above finish floor, unless otherwise shown.

3. If no plug valve seat position is shown, locate as follows:

a. Horizontal Flow: The flow shall produce an "unseating" pressure, and the plug shall open into the top half of valve.

b. Vertical Flow: Install seat in the highest portion of the valve.

I. Install a line size ball valve and union upstream of each solenoid valve, in-line flow switch, or the in-line electrical device, excluding magnetic flowmeters, for isolation during maintenance.

J. Locate valve to provide accessibility for control and maintenance. Install access doors in finished walls and plaster ceilings for valve access.

K. Floor Box and Stem: Steel extension stem length shall locate operating nut in floor box.

3.03 INSPECTION AND TESTING

A. Completed pipe shall be subjected to hydrostatic pressure as indicated in Section: 01 45 17. 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.

3.04 START-UP AND INSTRUCTION

A. Manufacturer's Representative: Present at site or classroom designated by Owner, for minimum person-days listed below, travel time excluded:

1. One (1) person-day per completion phase for installation assistance and inspection. No less than a total of three (3) person-days of installation assistance.

2. One (1) person-day per completion phase for functional and performance testing and completion of Manufacturer's Certificate or Proper Installation and pre-startup classroom or site training. No less than a total of three (3) person-days of functional and performance testing.

END OF SECTION

SECTION 33 32 00

SUBMERSIBLE WASTEWATER PUMPING STATIONS

PART 1 – GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all labor, materials and equipment to construct and install a complete, automatic, underground pumping station with all factory-built equipment installed in a reinforced concrete pump wet well and shall furnish and install a reinforced concrete valve chamber complete with all pipe, valves, and fittings.

B. The Contractor shall furnish all labor, materials and equipment to setup, maintain and operate a sewage bypass system as necessary during the proposed construction. It is required that the bypass system include a backup pump to prevent spills during a primary bypass pump failure. The contractor shall be responsible for any wastewater spills during the bypass operation and pay any and all fines, fees, property damage, environmental damage and cleanup costs that are associated with wastewater spills. The Contractor is responsible for providing by-pass pumps which shall not create a nuisance. The contractor will be required to use electric by-pass pumps when not in compliance with the local code noise requirement.

C. Principal items of equipment included in the pump station: one set of pumps, one spare pump (unless noted otherwise by Pinellas County Utilities), valves, piping, automatic pump level sensor controller, GreyLine or Engineer of Record approved equal sonic-type of level sensor controller) will be the primary choice for pump level sensor controller (with Digital Controls bubbler system as a secondary choice), level sensor float backup system (Flygt or Engineer of Record approved equal), central control panel with circuit breakers and motor starters, all wiring and wetwell level sensors connected to SCADA system and mounted in the SCADA panel.

D. Each pump station site shall have Metal Halide area lighting. Lighting to be controlled by a switch located as designated by the Engineer and Pinellas County. All area lighting shall be installed a minimum of ten (10) feet above ground on a concrete pole as designated by Pinellas County. Area aesthetics will be the primary consideration for area lighting detail.

E. Each pump station site shall be provided with an appropriate driveway (Concrete, asphalt or millings), appropriate vinyl fencing and site landscaping as requested by Pinellas County.

F. Each pump station shall be evaluated to determine if an odor control system is required.

G. Each pump station shall have a potable “safety and sanitation” water supply connection for wet well cleaning. A potable water connection, installed with appropriate back flow prevention device, shall be provided. Where potable water is unavailable, a reclaimed water connection shall be provided, if available.

1.02 WARRANTY

A. The Contractor shall guarantee the entire installation, labor and materials for eighteen (18) months. The Contractor shall repair or furnish without charge similar part or parts, which within eighteen (18) months after date of acceptance, prove to be defective.

PART 2 –PRODUCTS

2.01 STRUCTURES

A. Reinforced concrete pipe installed vertically for use as a pumping station, shall have steel reinforcement equal to or exceeding ASTM designation C478, latest revision, and shall conform or exceed the wall thickness of Table 2, Wall B, ASTM designation C-76, latest revision. Concrete shall be 4000 psi/28 day and shall be made using Type II Portland Cement. Valve vaults may be precast or poured in place concrete. Top slabs to be per the plan drawings for both structures.

B. Concrete ingredients shall conform to as follows:

1. Portland Cement: Type II per ASTM Specifications C-150
2. Aggregate: 1” to #4 per ASTM Specification C-33
3. Sand: 2.35 fineness modulus, free from organic matter
4. Water: Clean and suitable for domestic use
5. Air: Maximum 5 percent entrained

C. Ballast concrete shall be 2500 psi/28 day and emplaced as shown on plans.

D. Slab shall be 3500 psi/28 day concrete and shall be placed on two layers of waterproof membrane.

E. Fiberglass Liners shall be as specified in the Materials Specification Manual and shall be specifically manufactured for sewer use. These products shall meet all requirements of latest ASTM designation C-582 (plastic laminates) and ASTM designation C-581 (chemical resistance).

The properly installed liners shall not fail under H-20 dynamic wheel load applied vertically. Liner shall be installed in accordance with manufacturer's requirements. The liner shall be tested in accordance with ASTM-3753.

F. All exposed interior wet well top surfaces shall be covered with 1/8-inch minimum thickness continuous fiberglass sheet adequately anchored to the concrete.

2.02 EQUIPMENT

A. Pumps

1. The pumps shall be capable of handling raw, unscreened sewage. The design shall be such that the pumps will be automatically connected to the discharge piping when lowered into place. The pumps shall be easily removable for inspection or service, requiring no bolts, nuts or other fastenings to be removed for this purpose.

2. Each pump shall be fitted with a lifting lug, bracket, etc. of adequate strength and length to permit raising the pump for inspection and removal.

3. The starter casing, oil/air casing and impeller shall be of grey iron construction, with all parts coming into contact with sewage, protected by a coat of rubber-asphalt paint. All external bolts and nuts shall be of 304 stainless steel. The impeller shall be protected by a rotating stainless steel or bronze wear ring and stationary neoprene "O" ring at the inlet of the pump. The impeller shall be of a single vane, nonclog design, capable of passing solids, fibrous material, and heavy sludge, and constructed with long throughway with no acute turns.

4. Each pump shall be provided with a tandem double mechanical seal running in an oil reservoir, composed of two separate lapped face seals, each consisting of one stationary and one rotating tungsten-carbide ring with each pair held in contact by a separate spring, so that the outside pressure assists spring compression in preventing the seal faces from opening. The compression spring shall be protected against exposure to the pumped liquid. The pumped liquid shall be sealed from the oil reservoir by one face seal and the oil reservoir from the motor chamber by the other, as required. The seals shall require neither maintenance nor adjustment, and shall be easily replaced.

5. A sliding guide bracket shall be an integral part of the pumping unit and the pump casing shall have a machined angle connection with

yoke to connect with the cast iron discharge connection, which shall be bolted to the floor of the sump and so designed as to receive the pump angle connection without the need of any bolts or nuts. The anchoring of the pump to the wet well floor shall include any pad or pedestal to allow unimpeded flow to the impeller per the recommendation and detail of the pump manufacturer.

6. Sealing of the pumping unit to the discharge connection shall be accomplished by a simple linear downward motion of the pump with the entire weight of the pumping unit guided to and wedging tightly against the angled discharge connection; no portion of the pump shall bear directly on the floor of the sump and no rotary motion of the pump shall be required for sealing.

7. The pump motor shall be housed in watertight casing and shall have Class F insulated windings which shall be moisture resistant. Pump motors shall have cooling characteristics suitable to permit continuous operation in a totally, partially or non-submerged condition. The pump shall be capable of running dry in a totally dry condition for extended periods under full load without damage.

B. Sewage Pumps and Motors

1. All sewage pumps shall be Flygt N-Series, or Engineer of Record approved equal, with 230/460 volt, 3 phase, 60 cycle motors. Impellers shall be capable of passing a three inch sphere and delivering the GPM and TDH as shown on the plans.

C. Access Frame and Guide Bars

1. An aluminum access frame complete with checkered aluminum doors rated at three hundred (300) pounds per square foot, as manufactured by Bilco or Halliday, shall be furnished unless conditions, i.e. vehicle loading, etc, require a higher load rating door. Stainless steel door hinges will be recessed and vandal-proof; hasp will be fabricated of round bar stock mounted vertically and drilled to accept a padlock. A fall prevention system shall be incorporated into the access frame.

2. Doors over fifty (50) pounds in pull-weight shall be torsion bar loaded, all will have a locking safety handle to hold them in the open position. Valve pit and wet well doors, in the open position, shall provide a clear opening to allow for service and removal of equipment (including pumps with mix flush valves). The upper guide and cable holder shall be furnished and securely mounted to the opening using 3/8” x 2 1/4” long stainless steel wedge anchors. Two stainless steel pump guide bars (SAE 304, schedule 40) of a

size shown on the drawings, shall be furnished for each pump and shall be of adequate length to extend from the lower guide holders on the pump discharge connection to the upper guide holder mounted on the access frame using 3/8” X 2 1/4" long stainless steel wedge anchors. Intermediate guide bar brackets shall be installed where depth of station is greater than eighteen (18) feet.

D. Valves and Piping

1. Gate valves, four inch through sixteen (16) inch diameter, shall be AWWA standard for resilient seated gate valves, NRS open left and rated at 250 psi minimum. Valves in vaults shall have flanged connections with a hand wheel operator. Buried valves shall have mechanical joint connections with a two-inch operating nut, supplied with a valve box, bronze identification disk and concrete valve box collar as shown in the Standard Details.

2. Piping shall be flanged ductile iron (no flange adapters will be accepted). Duplex pump discharge lines shall be flanged ductile iron (no flange adapters will be accepted) jointed by a double branch ninety (90) degree ductile iron elbow to the common outlet. Triplex pump discharge lines shall be flanged ductile iron (no flange adapters will be accepted) jointed by a ductile iron cross to the common outlet. A flanged wall pipe shall connect the riser pipe. MJ wall sleeves shall be utilized to make the horizontal connection to the riser. Pipe sizing shall be in accordance to plans. A line valve shall be installed within five feet of the valve pit with an external bypass system.

3. Discharge piping shall have two 1/2-inch stainless steel ball valves installed to permit pump performance testing. The ball valves shall be installed upstream of the pump discharge check valves

4. A by-pass draw tube shall be installed on stations that have two hour retention time or less, and six inch draw tubes.. Bypass valves should be 6” or greater when head condition exceeds 40’.

5. All hardware (bolts/nuts) on flange by flange piping shall be 304 stainless steel.

E. Pump Station Control Panel Specifications

1. The control panel enclosure shall be stainless steel, NEMA 4X (sized per the Appendix Schedule 1). There shall be polished aluminum dead front inner door. The dead front shall be mounted on a stainless steel continuous hinge (piano) mounted with pop rivets, with a positive mechanical quarter-turn handle catch and shall open at least ninety (90) degrees F. A method of holding the

dead front door in the open position shall be provided. A method of securing a standard padlock, thereby locking the cabinet outer door, shall be provided. All panels shall be equipped with stainless steel wire terminals.

2. The dead front door shall contain the following labeling: Access to circuit breakers, HAND-OFF-AUTO-RTU pump selector switches with green light for auto, yellow level indicator pilot lights, red pump run pilot lights, red alarm pilot light, maintenance switch with yellow pilot light, phase monitor test switch, green watchdog activated pilot light, and a 20 amp GFI receptacle. All indicator lights shall be lamp trade number (1819).

3. A MELTRIC #37-27-043 generator receptacle shall be mounted on the side of the control cabinet in the down position. Main circuit breaker and Emergency generator circuit breaker shall be inter-locked to prevent back feed. All circuit breakers shall be Square D FAL series or larger as required, and sized for the available power company fault current. Where a “high” leg service exists, it shall be connected to the “B” phase of the main breaker. Most applications will be duplex pumps unless otherwise specified.

4. The motor starter sub panel shall contain Square D Model #8536 (Type P starters are not acceptable) across-the-line NEMA-rated magnetic starters with individual over-load on each leg and one hundred 120 volt coil control. Across the line motor starters with thermal overload protection shall be used when pump horsepower is less than 20 hp on a 240 volt or less voltage feed or 20 horsepower on 480 volt or less voltage feed. Additionally, a VFD shall be installed for all applications. All control wiring shall be surface mounted, void of splices, have appropriate color coded or numbered terminal ends, sized 14 minimum, type THHN or equivalent, rated for six hundred (600) volts, stranded tinned copper conductor colors are as follows:

   a. 120V-A/C
      Blue-Hot
      White – Neutral

   b. 24V-A/C
      Orange – Hot
      Grey – Neutral

   c. 12V D/C
      Red – Positive
      Black – Negative

d. Green – Ground

e. Diversified Electronics - Pump Alternator Only
Brown – 1 Input
Yellow – Common Input

f. RTU colors are per Pinellas County Utilities standard.

5. Control relays shall be 8 pin plug-in type and a LED pilot light to indicate when energized. Relay sockets shall be surface mounted. 120V to 24 volt step down transformers shall be minimum, .075KVA rated and primary and secondary fused. Alternators shall be Diversified Electronics solid state 8 pin plug-in type with indicator LED's, a switch to select automatic or lead pump operation, and a test switch. A battery alarm system (STA-CON B.O.A.C.) shall be provided in the panel. A red-flashing light and an audible alarm (wheel-lock model #EH-EL2) compatible with the Sta-con alarm system. Alarm horn and light shall be mounted on site for optimum placement. An outside horn cancel button, that shall work on power failure, shall be installed.

6. All three-phase panels shall have an electronic solid state phase monitor and use pin wiring configuration compatible with current stations as follows: 240 volt systems shall use the Diversified Electronics 8 pin plug-in type; 480 volt systems shall use hard-wired surface mounted unit. The loss of any phase shall actuate the battery alarm and open the 120 volt neutral. This phase loss shall disconnect the 120 volt neutral from the 120 volt control section.

7. Control circuitry shall be designed as per Pinellas County Utilities standards. A solid state lightning surge protector with a clamping time of ten (10) nanoseconds shall be Innovative Technologies XT40 (230v.,1ph), XT40 (230v, 3ph) or XT40 (480v, 3ph) or EQX80 and be weatherproof for external mounting. The surge protector shall be mounted on the outside of the disconnect control panel on the load side. A NEMA 4 stainless steel, fusible, horsepower rated disconnect switch shall be provided and drilled for padlock security in the "OFF" position. The disconnect shall isolate the non-fusable utility power from the control panel. A second similar disconnect is required before the meter in 480 volt applications by the power company. An 11" x 17" schematic and pump data sheet shall be permanently affixed to the interior of the enclosed door. Lamination shall be provided to protect the data sheet. A stainless steel NEMA 4x junction box (minimum 14" x 12" x 6" and a minimum 24" x 24" x

8" for 20 H.P. and larger) with bottom or side hinged cover shall be installed between the control panel and the wet well. It shall house the terminal strip, which shall be stainless steel, mounted on an aluminum din rail, for pump, float, RTU and sensor connections (24). There shall be twelve (12) inches minimum clearance between the bottom of the junction box and slab top elevation.

8. The control panel and the junction box shall be connected by means of a 1-1/2-inch (minimum size) conduit with appropriately sized in-line gas seal-off. Myers Hub or other similar, reusable, water-proof fitting shall be installed where any conduit enters the top or side of any box. The junction box shall have one 2-inch PVC (minimum size) conduit for each pump, and two 2-inch PVC (minimum size) conduits for the floats. All conduits between the junction box and the wet well shall be sealed with duct seal or approved equal. Re-usable butterfly clamps shall be used in the junction box to secure motor, float and level controller leads. The control panel and disconnect switch shall be mounted plumb on two 6" x 6" x 10' (minimum) pre-cast concrete posts buried three feet in the ground. The overall length of the post shall be determined by the size of the panel and the three feet minimum distance required between the bottom of the panel and slab top elevation. All mounting hardware shall be 304 stainless steel. If UNI-STRUT is used, it shall be of 304 stainless steel. Larger than 20 H.P. applications shall have conduit for pump cable sized so that the cable does not occupy more than twenty-five (25) percent of the conduit.

9. All stand alone (pedestal mounted) panels shall have 304 stainless steel Uni-strut welded to the rear of the panel to support meter can, fusible disconnect and junction box. In addition the pedestal mounted panel shall be securely anchored to a six inch thick, reinforced with #4 bars at eight inches o.c. both ways, 3500 psi concrete slab.

10. All grounding grids (delta) shall consist of a minimum of three each 5/8-inch, copper-clad steel sectional ground rods, which are compression-coupled. The depth of all ground rods will be determined by a using IEEE "Fall of Potential Method" and shall be so noted on a Certified Ground Test Document, which shall be provided by the installer. Ground resistance shall test at or below 10 OHMS, un-bonded. All conductors shall consist of copper rope-lay cable composed of a minimum of twenty-eight (28) strands of 14 gauge wire weighing not less than 375 pounds per 1,000 feet.

11. All ground grid system connections shall be made using the exothermic process, CADWELD, or other approved equal manufacturer. All underground connections shall be via exothermic

welding. All structures shall be bonded to the closest electric service ground via the main size conductor and/or a water service pipe. The bonding shall be accomplished to achieve equal potential of all grounds. Delta grids shall be tested without the service and water main connection, and documented as such, and then connection to service and water main can be made. The ground resistance of the completed system shall be measured, and listed on the Certified Ground Test Document.

12. All conductors, other than those supplied from the power company, shall be 600 volt rated stranded copper THHN insulation or equivalent and be run in PVC conduit or as per code requirements. The service conductors shall have ampacity ratings that meet or exceed the main breaker ampacity. All utility services, not supplied by the power company, shall be supplied by the contractor and shall be underground in conduit.

13. The Contractor shall be responsible to verify power company requirements prior to ordering equipment and beginning any work. All workmanship shall be done in a professional manner and will meet all NEC and NEMA codes. The enclosure and components shall be UL approved.

14. Twenty four (24) din rail mounted RTU terminals shall be supplied and mounted vertically as close to bottom center of cabinet as possible. Above the terminals shall be seven RTU relays mounted and wired as per the supplied prints.

15. SCADA and RTU requirements shall be as specified in Section 40 95 01, Wastewater Pump Station SCADA Remote Telemetry Unit (RTU).

F. Mixing/Flushing

1. All pump stations shall have a mixing and/or flushing capability so that at minimum the fluid in the wet well is mixed once per alternation cycle (i.e. one mixer/flusher per duplex setup, two per triplex setup). Location of mixing and/or flushing valve shall be determined in the field by the Engineer and Pinellas County Engineering.

G. Wiring

1. The pump station shall be factory wired for the electric service to the central control panel and either a 100 amp or 200 amp (sized as required) fusible disconnect switch in a stainless steel rain tight enclosure to be located between the electric meter and the control panel of all 230 volt electrical services and a stainless steel rain tight enclosure to be located on each side of the electric meter of all

460 volt electrical services. A stainless steel junction box with stainless steel terminal strip shall be furnished and installed between the control panel and wetwell. All wiring shall be copper. All conductors shall be color coded 4 AWG or larger 600 volt type THW and shall be run in PVC conduit.

H. Painting

1. Surfaces to be painted shall be free from grease, excess moisture and rust. All metal surfaces except stainless steel and all exposed interior concrete surfaces and exterior pump station concrete wall surfaces shall receive two coats (15 mils total) of a self-curing material consisting of two components. The material used shall meet all requirements of the US Army Corps of Engineers Formula C-200, and/or Steel Structures Painting Council Specification SSPC-Paint No. 16, Coal Tar Epoxy – polyamide black paint. Wet well and valve vault top slab surfaces shall have a broom finish.

I. Factory Tests

1. The completed pump station shall be given a two hour running test. A written report of the actual test shall be provided showing pump capacities, control settings, motor amperage and voltage, accessory operation and thorough visual inspection noted herein.

PART 3 – EXECUTION

3.01 CONSTRUCTION

A. Fiberglass manhole liners shall be constructed on the base slab as specified and shall be seamless vertically and horizontally and sized according to plans. The top slab underside and walls of the opening(s) of the wet well shall have one-eighth inch minimum thickness sheet of fiberglass adequately anchored into the concrete slab.

B. Any pipe entering through the wetwell walls will be sealed all around to the interior walls by use of fiberglass patching kit. There shall be no mortar exposed above bench level, except the stack.

C. Station and Wetwell Installation

1. The Contractor shall furnish all labor, materials and equipment necessary or incidental to the installation of the pump station and wet well, including:

a. Clearing, topsoil removal, disposal of excess excavation, supplying of any borrow replacement of topsoil and sod.

b. Shoring and bracing where necessary.

d. Keeping the excavation dry at all times.

e. Providing any ballast concrete that may be required.

f. Backfilling by compacting twelve inch layers of approved materials simultaneously on all sides of the structures.

g. Providing electrical service feeders with NEMA 4X fused main disconnect located per code requirements.

h. Grading, sodding and landscaping shall be required for the entire pump station easement. The contractor shall water and maintain the new sod and landscaping. All plants and bushes shall be submitted as a landscape plan to allow for proper clearance around the valve vault and wet well.

i. A driveway shall be installed in accordance with the plans.

j. Installation of all equipment and materials shall be in accordance with manufacturer's requirements.

k. All gravity inflow pipes shall be installed with a PVC Bowl Drop facing downward with a drop pipe to a depth specified during the plan review process.

3.02 INITIAL START-UP AND OPERATOR INSTRUCTION

A. The Contractor shall provide the services of a factory-trained service man for one day of initial start-up and operator instruction.

APPENDIX

SCHEDULE 1
PINELLAS COUNTY ENCLOSURE SIZES

VOLTAGE	HORSEPOWER	ENCLOSURE SIZE	DUPLEX	VFD'S
230V/3PH	3HP	48" X 36" X 10"	X	
230V/3PH	5HP	48" X 36" X 10"	X	
230V/3PH	7.5HP	48" X 36" X 10"	X	
230V/3PH	10HP	48" X 36" X 10"	X	
230V3PH	15HP	60" X 60" X 12"	X	
230V/3PH	20HP	60" X 48" X 14"	X	X
230V3PH	25HP	60" X 60" X 16"	X	X
230V/3PH	30HP	72" X 60" X 16"	X	X
230V/3PH	40HP	72" X 60" X 18"	X	X
230V/3PH	47HP	72" X 60" X 18"	X	X
480V/3PH	3HP	60" X 36" X 12"	X	
480V/3PH	5HP	60" X 36" X 12"	X	
480V/3PH	7.5HP	60" X 36" X 12"	X	
480V/3PH	10HP	60" X 36" X 12"	X	
480V/3PH	15HP	60" X 36" X 12"	X	
480V/3PH	20HP	60" X 48" X 12"	X	X
480V/3PH	30HP	60" X 60" X 16"	X	X
480V/3PH	47HP	72" X 60" X 16"	X	X
480V/3PH	60HP	72" X 60" X 16"	X	X
480V/3PH	77HP	72" X 84" X 18"	X	X
480V/3PH	88HP	72" X 84" X 18"	X	X
230V/1PH	2.4HP	60" X 36" X 12"	X	
230V/1PH	4.0HP	60" X 36" X 12"	X	

END OF SECTION

SECTION 33 33 01

GRAVITY SEWERS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The Work includes furnishing all plant, labor, tools, equipment, materials, and performing all operations in connection with construction of sanitary sewers and appurtenant structures, including excavation, trenching, backfilling and appurtenant work as required, or as directed.

1.02 Material Depth Limitations

A. Pipe materials used for gravity sewers shall be subject to the depth limitations indicated in accordance with the Standard Details.

PART 2 - PRODUCTS

2.01 MATERIALS

A. All gravity sewer pipe and appurtenant materials used in the Pinellas County Sewer System shall be as specified in the latest version of the Pinellas County Utilities Material Specification Manual at the time of plan approval.

PART 3 - EXECUTION

3.01 CONSTRUCTION

A. Order of Work

1. The Engineer reserves the right to specify which sewer lines will receive priority in construction. In general, however, the work will be from the lower end of the sewer towards the upper end of the sewer.

B. Maintenance of Existing Sewerage Facilities

1. It is the responsibility of the Contractor to maintain operation of the existing sewerage facilities during construction and repair work. The Contractor shall be responsible for providing any equipment required to maintain operation of service during construction. Any damage done to any existing sewer pipe or structure is to be immediately repaired to a condition equal to, or better than, its original condition.

C. Location and Grade of Sewers

1. The line and the grade of the sewer, as well as the location of manholes, and all other appurtenances, shall be as shown on the Plans or, as directed by the Engineer. The grade line as given on the Plans indicates the grade of the invert of the sewer pipe.

D. Cutting Gravity Sewer Pipe

1. Cutting ductile iron pipe shall be field cut with a power saw. No impact cutting is permitted. The spigot end of pipe thus cut shall be filed or ground to form a bevel.

2. Cutting PVC sewer pipe may be field cut using hand or power saws in accordance with the manufacturer's recommendations. The raw spigot end thus formed shall be filed to remove gasket damaging burrs and to form a standard bevel.

E. Laying Gravity Sewers

1. Cut sheets for complete sections of the gravity sewers, as designated by the Engineer, shall be submitted by the Contractor to the Engineer for approval at least two days prior to construction. Each run of gravity sewer shall be represented on a separated cut sheet.

2. Installation of ductile iron pipe shall conform to the procedures outlined in "A Guide for the Installation of Ductile Iron Pipe" which is available from the Ductile Iron Pipe Research Association. All ductile iron pipe is to be encased in green polyethylene material, conforming to the requirements of the County’s Materials Specification Manual. Polyethylene film shall be supplied in tube form suitable for use in Installation Method 'A' per AWWA C105.

3. Installation of PVC pipe shall be per ASTM D-2321 and UNI-B-5.

4. Trench excavation shall be as specified in Section 31 23 33, Excavation and Backfill for Pipes.

5. Each pipe shall be laid true to line and grade so as to form a close concentric joint with the adjoining pipe, preventing offsets in the flow line. The trench bottom shall form a solid base for the entire length of pipe and shall be capable of supporting the full weight of the pipe and backfill material. The pipe bells shall not bear against the solid bottom of the ditch. Sewers will be inspected with mirrors at intervals during construction and corrected, if necessary, before backfill.

6. All wye units, stubs, or other fittings placed in lines for future connections, or services, shall have the open bell tightly plugged using pipe manufacturer=s recommended watertight plug. All plugs shall be capable of withstanding 4 psi internal air test pressure, yet permit easy removal for future use.

7. The open ends of all pipelines shall be kept securely plugged at the end of each day's work and at any other time when any operation is being carried out which might permit foreign materials, rock, dirt, etc. to enter the pipe. Pipelines shall be thoroughly flushed out upon their completion and when directed by the Engineer.

F. Joining Gravity Sewer Pipe

1. Gravity sewer pipe having factory fabricated joints shall be joined together in strict accordance with the manufacturer's specifications. The surface shall be wiped free of dust, dirt, gravel, or other foreign materials before joining. The spigot end shall be centered on grade into the bell end of the last downstream length of pipe, and properly seated.

2. When seating pipe with a pry, lever, or other approved device, care shall be taken to protect the pipe end from damage. Ends damaged in any manner shall be cause for rejection of the pipe.

G. Repair and Replacement Construction

1. All repair and replacement work shall conform to standards specified for new construction wherever applicable, or as specified in the Repair Specifications.

H. Removal of Existing Pipe

1. Existing pipe no longer in service that is removed from the system shall be disposed of properly by the Contractor. Openings in manholes, sewer lines, or wye branches remaining in place shall be properly plugged and sealed so as to eliminate any possibility of infiltration at the point of separation. All pieces of broken pipe shall be removed from the trench before backfill operations commence. Backfill of the trench shall be as specified in Section 31 23 33 - Excavation and Backfill for Pipes. Inspection of structures remaining in place shall be made before backfill.

3.02 INSPECTIONS OF LINES AND MANHOLES

A. Inspection of completed lines and manholes shall be scheduled within a reasonable time after construction or when required by the Engineer. Before

scheduling an inspection, the Contractor shall prepare the lines by cleaning and flushing. Manholes shall be clean, finished and free of leaks.

B. Manholes shall be on a true and uniform grade. The inverts shall have a smooth steel troweled finish. All benches shall be uniformly sloping. The frames shall be tight and properly set in mortar on solid masonry. The invert, benches and adjacent pipe shall be free of splattered mortar. All required interior lining or paint shall be kept intact. Manhole frames shall be adjusted to grade with the covers and frames cleaned and free of mortar and asphaltic mixtures. All precast manhole seams shall be filled with an approved asphaltic compound.

C. Pipe between manholes shall be true to line and grade. Dips and sags with one inch or more of trapped water shall be cause for rejection. Inspection shall be by mirror and sunlight and shall be followed by television inspection at the Contractor's/Developer's expense. Air testing may be required also at the Contractor's/Developer's expense. Contractor shall provide personnel to assist with inspections.

D. The Contractor shall provide Pinellas County Utilities with a Television Inspection of the completed gravity sewers in accordance with the following:

1. Shall be performed by a NASSCO PACP Certified Operator who will use software that is compatible with Granite XP latest version software to NASSCO PACP Standards.

2. Shall be submitted as digital media that includes video and data base file in PACP format and include a printed copy of the PACP television inspection log.

3. Shall perform a manhole inspection and provide a completed NASSCO Manhole Inspection form latest version for each manhole that is connected to the sewer being inspected.

4. All pertinent data recorded in audio on the media to include:

    a. Subdividion name and phase number.
    b. Manhole numbers (these numbers must match manhole numbers on “as built” drawings).
    c. Date
    d. Size and material of pipe
    e. Service connection locations, right or left
    f. All distances between manholes
    g. Locations of suspected and obvious pipe deficiencies (i.e., bad joints, breaks or leaks etc)

5. PVC pipe shall have a deflection test using a seven and one-half percent (go-no-go) test mandrel of appropriate size, which shall be visible on video at all times.

6. The printed NASSCO PACP television report (indicating manhole numbers) which will accompany the media. This written report must include:

   a. Manhole numbers (these numbers must match manhole numbers on "as-built" drawings).
   b. Service connection locations, right or left.
   c. Reference to service connection locations out of manholes.
   d. Locations of suspected and obvious pipe deficiencies (i.e., bad joints, breaks or leaks, etc.).
   e. Depth of each manhole.
   f. Actual measured distance (on ground) between manholes.

7. All visual and television inspections shall be completed and approved by Pinellas County Utilities after the road base has been constructed but prior to the placing of any asphalt.

8. Television Inspection Media must clearly show details of structural defects, misalignments and infiltration.

9. For detailed requirements for Television Inspection see Section 33 01 32 Sanitary Sewer Cleaning and Televising.

E. All known or indicated breaks shall be repaired by the Contractor regardless of the test allowances. Faulty sections of sewer lines or manholes rejected by the Engineer shall be removed and re-laid by the Contractor. Sunken manholes will not be accepted.

3.03 SERVICE CONNECTIONS - WYE UNITS AND SERVICE PIPE

A. In new sewer construction, D.I.P. and PVC service connections shall be made by means of a wye or tee. All joints connected to the wye unit shall remain flexible. Service connections on existing mains shall be made using a sewer saddle approved in the County's Materials Specification Manual.

B. All new sewer service connections shall have a continuous looped trace wire consisting of one (1) 14-gauge minimum solid copper or one (1) 12- gauge copper clad steel tracer wires taped to the top center of the pipe from the cleanout to the main line and back to the cleanout in accordance with the Pinellas County Standard Details. Tracer wire shall be in accordance with the County's Materials Specifications Manual.

C. Service pipe for all properties shall be laid to the property line and plugged, as shown on the Standard Details. All ends of service lines shall be marked by a permanent stake and where sidewalks or curbs are located nearby, by a chiseled mark cut in the sidewalk or curb. Service pipe shall have a protective cover of not less forty-two (42) inches under all roads and thirty-six (36) inches at all property lines. Inspection of service pipe shall be made before backfill. Service pipe shall have a visibly good line and grade. Shallow service shall be laid by using a four foot hand level with proper shim attached to one end.

D. In cases of extra depth where service pipe cannot be laid on a continuous grade to the property line, the Contractor shall then furnish all materials and construct risers as shown on the Plans. When pipe cannot be adequately supported on undisturbed earth, it shall be supported on a concrete cradle. No payment will be made for concrete required to correct conditions resulting from faulty construction methods or negligence.

3.04 SERVICE RECONNECTIONS

A. Service reconnections require adapters for all joints that will not connect properly with ordinary factory joints. Approved pipe cutting methods shall be used to cut any pipe required for the connection. All cut pipe will be ground and smoothed to remove snags and sharp edges. No mortar or collars shall be used on reconnections unless specifically approved by the Engineer.

3.05 JOINING NEW PIPE TO OLD PIPE

A. Joining polyvinyl chloride pipe to existing vitrified clay pipe requires an adapter approved in the County's Materials Specification Manual for all joints that will not connect properly with ordinary factory joints. Approved pipe cutting methods must be used to cut any pipe required for the connection. All cut pipe shall be ground and smoothed to remove snags and sharp edges. No mortar or collars shall be used for such connections unless approved by the Engineer.

3.06 CLEAN-OUTS

A. Clean-outs shall be constructed in accordance with the Standard Details at locations as shown on the Plans.

3.07 JOINING PIPE TO MANHOLES OR OTHER STRUCTURES

A. All manhole connection holes shall be core drilled with a maximum hole diameter not to exceed one and a half times the pipe diameter.

B. Approved standard groutable PVC-to-manhole fitting approved in the County's Materials Specification Manual, or a flexible rubber boot may also be used at the manhole connection. The boot shall be manufactured of neoprene or isoprene compounds formulated and tested to resist deterioration due to sewage, hydrogen sulfide, oils, fats, greases, petroleum products and by-products. The connection at the manhole wall shall be flexible and water-tight. Any annular space inside the manhole at the connection shall be filled with approved caulking material or joint filler.

C. Stubouts for future mains shall be constructed at the locations and to the elevations shown on the Plans. The manhole benches shall be constructed to direct flows from all shown manhole inlets smoothly to the outlet. Stubouts shall be plugged with bricks and mortar per the detail shown on the Plans.

D. Pipe connections to existing manholes shall be made so that finished work will conform, as nearly as possible, to the essential requirements for new manhole construction, as specified above. Drop connections on existing manholes shall be strengthened by use of eight #6 pins, placed around the drop elbow and tee, or inside PVC drops may be used.

3.08 WATER MAIN STORM DRAIN CROSSINGS

A. In all cases where sanitary sewer mains cross water mains, or storm sewers with a minimum clear distance between the sanitary sewer and the water main or storm sewer of less than twelve (12) inches, the sanitary sewer shall be ductile iron pipe for a distance of ten feet on either side of the point of crossing. No pipe joint shall occur within ten (10) feet of the crossed water main.

END OF SECTION

SECTION 33 34 00

SANITARY SEWAGE FORCE MAINS AND APPURTENANCES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The Contractor shall furnish all plant, labor, materials, equipment and tools and perform all operations in connection with the construction of the sanitary sewage mains and appurtenances, including excavation, trenching, backfilling, testing, clearing and clean-up.

1.02 MAINTAINING SERVICE AND SHUT DOWNS

A. The Contractor's attention is called to the fact that the existing system must be kept in operation at all times. Where connections are made to existing mains or other shutdowns are necessary, permission must be obtained and arrangements must be made with the Utilities Department for removing from service those mains that will be affected. Shutdowns must be held to a minimum in both number and duration. Bypass pumping and hauling operations may be required to interrupt service.

B. No valve or other control device on the existing system shall be operated by the Contractor without first obtaining approval from the Utilities Department. The Contractor shall, at least forty-eight (48) hours in advance, notify citizens subject to interruption of service by means of door hangers or any other approved method of the starting time and duration of such interruption.

1.03 SUBMITTALS

A. Unless waived by the Engineer, cut sheets for the entire force main shall be submitted by the Contractor to the Engineer for approval at least two days prior to construction. This requirement will not relieve the Contractor of the responsibility to accurately record the "as-built" locations (horizontal and vertical) of piping, valving and appurtenances. Contractor shall submit to the County the Continuity Testing Results per Section 3.04 Item 6.g.

1.04 LAYING PIPE

A. All roads and curbs shall be installed prior to force main installation. On a road where there is no curb, the paving must be done prior to installing the force main. Any deviation from this must be approved in writing by the

Pinellas County Engineer or his designated representative. In any case, force mains will not be accepted or tested until curb and/or roads are compete, thus preventing possible relocation or adjusting and retesting of newly installed pipes.

B. All joints, fittings and other appurtenances shall not be covered until inspected by the Pinellas County Inspector. Non-compliance will require excavation of all joints and fittings.

C. The pipe and fittings shall be constructed as shown on the approved Plans. All pipe four inches and larger in diameter may be deflected, but not bent. PVC pipe two inches in diameter may be bent around cul-de-sacs that have a radius of thirty-seven (37) feet or larger if the trench is left open until the Pinellas County Inspector is onsite to document that this guideline is fully complied with. The use of fittings not shown on the "Contractor Copy" construction Plan must have the prior concurrence of the Pinellas County Inspector.

1.05 ABANDONMENT OF EXISTING MAINS BEING TAKEN OUT OF SERVICE

A. In general, pipe six inches and smaller abandoned within Pinellas County rights-of-way shall be capped at both ends and abandoned in place. Grouting is not required unless specifically required by the Engineer or the County.

B. Abandoned pipes eight inches and larger shall be filled with grout or flowable fill unless otherwise directed by the County or the Engineer.

C. Pipe abandoned in rights-of-way owned by municipalities other than Pinellas County shall be subject to the requirements of the agency having jurisdiction.

D. All pipes shall be abandoned in a manner which results in the abandoned pipeline not being pressurized.

PART 2 – PRODUCTS

2.01 GENERAL

A. Materials, equipment and supplies furnished and permanently incorporated into the Project shall be of first quality in every respect, shall be constructed and finished to high standards of workmanship, and shall be the product of an approved reputable manufacturer. Material shall be suitable for the service intended, shall reflect modern design and engineering and shall be fabricated in a first-class workmanlike manner. All materials, equipment and supplies shall be new and shall have not

been in service at any time previous to installation, except as required in tests or incident to installation.

B. Materials and construction pertaining to restoration and construction of roads and structures shall be in accordance with the latest edition of Florida Department of Transportation (DOT) Standard Specifications for Road and Bridge Construction or as called for on the Plans.

C. All ductile iron or cast iron pipe, fittings and valves are to be encased in green polyethylene material, conforming to ASTM specification D-1248, with a minimum 8 mil thickness, taped and free of dirt in accordance with the latest edition of AWWA C105. Polyethylene film shall be supplied in tube form suitable for use in Installation Method 'A' as defined in AWWA C105.

D. All piping and appurtenances shall be color coded green with the exception of ductile iron pipe. That shall be encased in green polyethylene wrap, or if not available, encased in clear polywrap and shall be marked by means of three four-inch wide painted green lines along the length of the pipe at opposite locations around the pipe.

E. All PVC piping and ductile iron mains partially constructed of PVC or HDPE between valves shall be installed with locator wires, as specified below.

F. Force mains shall be buried with green metallic locator tape. All locater tape shall be placed twelve (12) inches above buried pipe.

G. No glued joints will be allowed. Mechanical restrainers are the only acceptable method of restraint.

2.02 MATERIALS

A. All pipe and appurtenant materials used in the Pinellas County Sewer System shall be as specified in the latest version of the Pinellas County Utilities, Material Specification Manual at the time of plan approval.

PART 3 - EXECUTION

3.01 HANDLING

A. All materials, unless otherwise directed, shall be unloaded as nearby as possible to the location of installation by the Contractor. Materials shall be handled with care to avoid damage.

B. Materials shall be lifted by hoists or slid or rolled on skidways in such manner as to avoid shock. Under no circumstances shall materials be dropped. Pipe handled on skidways must not be allowed to roll against pipe already on the ground. The Contractor shall be responsible for the safe handling of all materials. Damaged materials shall not be installed.

C. All materials found during the progress of work to have flaws, cracks, or other defects will be rejected by the Engineer regardless of whether or not it has been installed and shall be replaced by and at the expense of the Contractor.

D. All PVC pressure pipe, upon delivery to the site and until such time as it is placed in the trench, shall be shielded from the weather and direct sunlight to prevent pipe deterioration.

E. Materials shall not be stacked or placed under materials in such a manner that damage could result.

F. Slings, hooks, or tongs used for lifting shall be padded in such a manner as to prevent damage to exterior surfaces, interior linings and components. If any part of the coating, lining or components is damaged, the repairs or replacement shall be made by the Contractor at his expense and in a manner satisfactory to the Engineer prior to attempting installation.

G. In the event that materials supplied by the County are defective, the Contractor shall notify the Engineer immediately so arrangements can be made for replacing such devices.

3.02 FIELD LAYOUT AND MODIFICATIONS

A. The Contractor, unless directed otherwise, shall be responsible for setting construction layout stakes and/or offsets required to complete the designated work. The Contractor shall insure that those stakes and/or offsets are protected and any re-staking due to work stoppage shall be included and no additional compensation to the Contractor will be made.

B. The Engineer has the right to make any modifications as he deems necessary due to field conditions, conflicts with other utilities or to protect other properties.

3.03 EXCAVATION, ALIGNMENT AND GRADE

A. Trench excavation and backfill shall be in accordance with Specification 31 23 33, Excavation and Backfill for Pipes.

B. All mains shall be laid and maintained at the required lines and grades with fittings, valves and appurtenances at the described locations. All pipe shall be laid to the depth as shown on the Plans, or when a depth is not indicated, with a minimum cover of thirty (30) inches outside of the roadway, and thirty-six (36) inches under the roadway. Grade lines shall be set by the Contractor. The tolerance of such grades shall not be more than that specified on the drawings. When no tolerance is indicated a tolerance of 0.5 foot shall be used. All other realignments must be approved by the Engineer. The Contractor shall have suitable survey equipment on the site at all times.

C. The Work shall at all times progress with caution so as to prevent damage to underground obstructions both known and unknown. Should an obstruction not shown on the Plans be encountered, the Engineer shall be immediately notified and he shall be responsible for alteration to the plan should realignment be necessary. The Contractor shall notify the Engineer far enough in advance to allow the realignment to be accomplished by deflection in the pipe joints.

3.04 LAYING AND JOINING BURIED FORCE MAINS

A. General

1. Prior to installation, all pipe shall be inspected for defects and all lump or excess coatings shall be removed. The inside of the bell and outside of the spigot shall be cleaned prior to joining of all pipe. Caution shall be taken to prevent damage to the pipe during lowering into the trench. Caution shall be taken to prevent foreign matter from entering the pipe during installation. The Engineer may require covering of the end of the pipe to prevent debris from entering. No debris, tools, clothing or other material shall be placed in the pipe.

2. After placement in the trench the spigot end of the pipe shall be centered in the bell and the pipe shall be driven home and then brought to the proper line and grade by tamping approved backfill material under it, except for the bell. Joint deflection shall not exceed manufacturer's limit.

3. During the time that the pipe is in the trench but no work is in progress, the end shall be closed by a water-tight plug. This shall include the noon hour, as well as overnight. If there is water in the trench upon beginning work, this plug shall remain in place until the trench has been pumped dry, unless otherwise approved by the Engineer.

4. Standard plugs shall be inserted into all dead end pipes, tees or crosses; spigot ends shall be capped; flanged ends shall have blind flanges, or sheet metal or plywood caps. Plugs installed for pressure testing shall be fully secured and restrained to withstand the test pressure.

5. Where plugging is required because of Contract division or phasing for later connection, the ends of such lines shall be equipped with a permanent type cast iron or ductile iron plug/cap or blind flange with or without a blowoff cock, as shown on the Drawings. Installation or removal of such plugging shall be considered incidental to the work and no payment shall be expected for this work by the Contractor.

6. Tracer Wire For PVC, HDPE and Non-Continuous Ductile Iron Force Mains.

   a. Tracer wire shall be installed on all mainline pipe. Mainline pipe installed by open cut method shall have two (2) 14-gauge minimum solid copper or two (2) 12-gauge copper-clad steel tracer wires taped to the top center of the pipe. Mainline pipe installed by horizontal directional drill shall have two (2) 12-gauge copper-clad steel tracer wires installed with the pipe. All tracer wire shall be as specified in the material specification manual.

   b. The locator wires shall have colored insulation matching the type of service provided in the main and be acceptable for direct burial.

   c. All splices of the wires shall be made with watertight connections per material specification manual.

   d. The wires shall each be continuous throughout the project.

   e. The wire is to be tied to all valves, tees and elbows

   f. The locator wires shall be brought up into all valve boxes with enough slack provided to extend 10 to 12-inches out of each box and installed as shown in the Standard Details.

   g. Contractor shall perform a 12-volt DC electrical continuity test on each of the wires. No more than one volt of loss per 1000 feet of mainline pipe will be acceptable. The locator wire system shall pass the 12-volt DC electrical continuity test for at least one wire prior to final acceptance of the

pipeline. Any cuts or breaks in the wire shall be repaired by the Contractor at his expense.

h. The locator wire shall be tested by the Contractor at the time of pressure testing. If this test fails, the Contractor is responsible for repairing the locator wire and the pressure test will be reschedule when the wire will pass.

B. Pigging, Flushing and Cleaning

1. All mains shall be pigged, cleaned and flushed to remove all sand and other foreign matter. The Contractor shall be responsible for developing a pigging and flushing plan to be submitted to the Project Representative for approval prior to pigging and flushing. The Contractor shall dispose of all water used pigging and for flushing without causing a nuisance or property damage, in accordance with state and local requirements. Any permits or fees required for the disposal of flushing water shall be the responsibility of the Contractor.

2. Flushing water used by the Contractor shall be taken from an approved metered source. The water utility will provide the meter and designate the source. Potable and reclaimed flushing water shall be at the Contractor's expense.

a. Reclaimed water should be used for sanitary force mains.

b. Potable water can be used for all service types.

3. The cleaning of the new piping system shall be accomplished by the controlled and pressurized passage of a series of hydraulic or pneumatic polyurethane plugs of varying dimensions coatings, and densities; which shall be selected by the pipe cleaning Contractor. The Contractor shall provide a means to enter the pig into the system, control and regulate flow, monitor flows and pressures, and to remove the pig from the system. The Contractor shall maintain a constant surveillance of the system and immediately report to the proper authority any in-line problems encountered or any malfunctions discovered in the piping system. A record of pig models, sizes, styles, and other pertinent information shall be kept by the Contractor and turned over to the County.

4. The Contractor shall furnish pig launching and retrieval equipment to minimize additional valving, fittings and auxiliary water supplies. Valves and blowoff assemblies, which are installed as part of the project, shall be used as much as possible to minimize the number of temporary ports required for proper flushing and cleaning.

5. All materials used shall be specifically manufactured for flushing and cleaning pressure pipes, bends and valves. The pigs shall be able to go through bends, open valves and fittings, and provide adequate cleaning of the pipe.

6. Cost of Pigging Services- The cost to complete the requirements under this section shall be included in the contract items provided in the proposal sheet. There is no separate pay item for this work.

C. Jointing HDPE Pipe and Fittings

1. HDPE pipe shall be jointed by the butt-fusion process in accordance with pipe manufacturer's directions. Contractor shall provide butt-fusion technicians who are trained and certified by the P.E. pipe manufacturer to complete the project. The date of technician certification shall not exceed 12 months before commencing construction.

2. Butt-fusion means the butt-joining of the pipe by softening the aligned faces of the pipe ends in a suitable apparatus and pressing them together under controlled pressure.

3. The internal and external beads resulting from the butt-fusion process shall be visible and examined for penetration 360 degrees around the pipe diameter.

4. All fittings for HDPE pipe (4" and larger), except for D.I/HDPE Mechanical Joint Adaptors, shall be ductile iron mechanical joint fittings per material specification manual and shall be joined to the pipe using a butt fused restrained mechanical joint adapter.

5. The D.I./HDPE mechanical joint adapter shall be connected to the HDPE pipe by a heat-fused joint on one end, and connected to a ductile iron pipe valve, or fitting with a mechanical joint on the other end.

6. Solvent epoxy cementing, electro-fusion couplings and mechanical joining with bolt on wrap around clamps or mechanical joints with out an adapter shall not be used for connections.

7. The D.I./HDPE mechanical joint adaptor shall be connected to the HDPE pipe by a heat-fused joint on one end, and connected to a ductile iron pipe valve, or fitting with a mechanical joint on the other end.

8. Short pieces of pipe between valves and fittings shall be DIP with all joints restrained for sizes 3-inches and larger. For 2-inch, the

short pieces shall be brass or Sch. 80 with IP threads and DI, HDPE or brass fittings and all joints restrained.

D. Jointing Push-On Ductile Iron and PVC Pipe and Fittings

1. The inside of the bell and the outside of the spigot end shall be thoroughly cleaned to remove dirt, grit, oil or excess coatings and other foreign matter. The rubber gasket shall be flexed inward and inserted in the gasket recess of the bell socket. A thin film of gasket lubricant shall be applied to either the inside surface of the gasket or the spigot ends, care will be taken to avoid contact with the ground. The joint shall be completed by forcing the plain end to the bottom of the socket with a forked tool or jacking device or other approved method. All pipe shall have depth mark prior to insertion. Pipe cut in the field shall be filed to resemble the spigot end of manufactured pipe.

2. When deflection is required the joint shall be completed prior to setting the deflection. The deflection shall conform to applicable AWWA Standards or manufacturer's recommendation with prior Engineer's approval.

E. Jointing Mechanical Joint Pipe and Fittings

1. The inside of the socket, the outside of the spigot end and the gland shall be thoroughly cleaned and or washed with an approved solution to remove dirt, grit, oil or excess coatings and foreign matter to improve gasket seating. The gland shall then be placed on the plain end of the pipe with the lip extension toward the plain end, followed by the gasket with the narrow edge of the gasket toward the plain end of the pipe. The pipe shall be inserted into the socket and the gasket pressed firmly and evenly into the gasket recess. The joint shall be kept straight during the assembly and any deflection required shall be done after the joint has been assembled but prior to tightening the bolts.

F. Jointing Special Joint Ductile Iron Pipe and Fittings

1. Other special joint pipe shall be assembled or installed, per manufacturer's recommendations, or directed by the Engineer. The Contractor shall insure that the joint is thoroughly cleaned by removing all dirt, oil, grit, excess coatings and foreign matter to insure a tight joint.

3.05 TEMPORARY AND PERMANENT PLUGGING

A. Temporary plugging of pipes shall be performed at the time of construction when the work is interrupted due to lunch breaks, end of shift or any other reason that require work to stop for more than half an hour.

B. Permanent plugs shall be inserted into the bells of all dead-ends of pipe, tees, or crosses and plain ends shall be capped. All plugs and caps shall be properly restrained as called for on the Plans or Standard Details.

3.06 REMOVAL OF OUT OF SERVICE PIPE

A. Due to certain permit requirements, pipe that is to be removed from service will have to be physically taken out of the ground. The limits of pipe to be removed shall be specifically called for in the Plans or shall be approved in writing by the Engineer. Any other removal not specifically called for, shall be considered incidental to construction of other items in the Contract and the Contractor will not receive compensation for such work.

B. When removing pipe, the Contractor shall excavate a trench wide enough to dislodge the pipe from the surrounding soil, and long enough to be able to handle the pipe without causing any damage to nearby utilities, structures or adjacent property.

C. The removed pipe, fitting and appurtenances will become the Contractor's property and he shall be responsible for proper disposal and any required permits thereof.

D. Refer to Specification 01 35 00, Special Project Procedures for removal of asbestos cement (AC) pipe.

3.07 INSTALLATION OF PIPE UNDER DRIVEWAYS

A. At the Engineer's discretion, the Contractor will be required to auger pipes under driveways, structures or trees to avoid removal or expensive restoration of those structures. The Contractor will be allowed to utilize an auger machine and to push or pull the carrier pipe into the bore without the need of a casing.

B. The Contractor shall install the sewer water pipe within the bore hole on a line and grade to allow connection to open cut piping adjacent to the bore hole within pipe jointing alignment limits defined for the pipe in question. The completed installation shall not result in settlement of soil under the driveway.

3.08 INSTALLATION OF PIPE UNDER HIGHWAYS AND RAILROADS

A. The Contractor shall furnish and install protective steel pipe casings and/or carrier pipe under highways/railroads in the pipe size, thickness, length, location and details as shown on the Drawings and specified herein. The Contractor's attention is particularly directed to the requirements of the particular municipal or private owner or Department of Public Works having jurisdiction over the highways/railroads whether through permit, verbal or other directions.

B. The construction shall not be started until the necessary permits have been obtained, a copy is at the job site, and proper notice and approval for construction has been obtained from the owner of the highway/railroad and the Engineer.

C. All necessary materials, equipment, labor and traffic protection devices shall be on the job site before requesting permission to start the Work.

D. Steel casings and the installation thereof required for highway/railroad crossings shall be in accordance with the standards and requirements of the Florida Department of Transportation (FDOT) or railroads or AASHTO Standards and the Specifications outlined herein. All work of this nature shall be performed by qualified Subcontractors regularly engaged in that type or work and shall be subject to approval by the Engineer.

E. All work shall be in accordance with Specification 33 05 20, Jacking and Boring.

3.09 FITTINGS

A. All fittings shall be restrained by means of restraining devices such as restrainer glands, restraining gaskets, etc.

B. Fittings shall be set and joined to the pipe and each type of joint as specified for pipe.

C. Trenching and backfilling for all fittings shall also be in accordance with Section 31 23 33, Excavation and Backfill for Pipes.

D. The use of thrust blocks in new lines is prohibited and shall only be limited to areas in which a new fitting has been installed in an existing line and is not feasible to restrain joints or when directed by the Engineer.

E. The use of "reverse dead-man" shall be as described under Standard Details for dead-end valves or in circumstances that the Engineer deems it necessary and shall be performed under his direction.

3.10 VALVES

A. Valves shall be set and joined to the pipe and each type of joint as specified for pipe.

B. Trenching and backfilling for all valves shall also be in accordance with 31 23 33, Excavation and Backfill for Pipes.

C. Cast iron valve boxes shall be firmly supported, maintained centered and plumb over the operating nut of the valve. Outside of paved areas, valve boxes shall be set in a 2' x 2' x 6" thick concrete collar, along with a brass ID tag, as shown on Standard Details. The box cover shall be flush with the surface of the finished pavement. All force main valve box lids shall be painted green and shall have the word “SEWER” cast in the lid.

D. All reasonable effort must be made to locate valves/valve boxes, back of curb, in grass areas and at street corners, whenever possible.

E. Valve boxes in areas that will require sod at a later date must be left one to two inches above existing grade (to allow for sod thickness).

F. All valves/boxes shall be located by means of a perpendicular 6" x 2' green stripe across the curb. The distance from the back of the curb to the valve will be stenciled on the curb with numbers four inches high, painted green, by the Contractor. This information will be referenced on the pavement, if no curbs are to be installed. All valve box tops shall be painted green. All valves must be centered over the operating nut/wheel and all valves, after being fully opened, will be backed off one-quarter turn to prevent them from being jammed open. This procedure should take place only after the main has passed pressure testing and has been accepted by the County.

G. All dead end valves shall be restrained with a reverse deadman, per the Standard Details.

H. Should the operating nut be more than three feet below the final grade, an extension shall be supplied and installed by the Contractor. The extension shall bring the nut to within twelve (12) inches of final grade.

I. Installation of Valves on Existing Force Mains

1. When installing valves in existing mains (cutting-in), the Contractor shall insure that the pipe is kept clean at all times and no debris, ground water, mud, oil, etc., will make their way into the pipe.

2. The lid shall fit flush in the top of the box without forcing and shall not rock, tip or rattle. Valve box lids shall be painted green and referenced to the closest curb by stenciling the distance, and by painting a six inches wide by two feet long stripe perpendicular to the curb of the roadway.

J. Removal and Disposal of Existing Valves

1. Any valve, unless otherwise specified, that is removed from the system shall become the property of the Contractor and he shall insure proper disposal.

3.11 TAPPING OF MAINS

A. The Contractor, after installing the sleeve and prior to making the tap, shall ensure that the sleeve is providing a watertight joint by means of pressure testing with pressures in accordance with 01 45 17, Pipeline Testing Requirements. If leaks are present, the Contractor will be required to repair them to the satisfaction of the Engineer.

3.12 INSTALLATION OF BOLTS ON MECHANICAL JOINTS

A. Align bolt holes and insert bolts, with bolt heads behind the bell flange, and tighten opposite nuts to keep the gland square with the socket. Tighten the nuts in accordance with following table:

Bolt Diameter (inches)	Torque (ft-lb)
5/8	45-60
3/4	75-90
1	85-100
1 1/4	105-120

3.13 PAINTING

A. All above ground installations shall be painted OSHA safety precaution green. Paint application shall be in accordance with the paint manufacturer's recommendation.

B. Paint shall be as specified in the County Materials Specification Manual.

C. Guard post shall be painted OSHA safety yellow.

D. All painting shall be in accordance with Section 09 91 00, Painting.

3.14 PRESSURE TESTING

A. All sewage force mains shall be tested in accordance with Specification 01 45 17, Pipeline Pressure and Leakage Testing Requirements.

END OF SECTION

SECTION 33 39 00

SANITARY SEWER STRUCTURES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The Work includes furnishing all plant, labor, tools, equipment, materials, end performing all operations in connection with construction of sanitary sewers and appurtenant structures, including excavation, trenching, backfilling and appurtenant work as required, or as directed.

1.02 RELATED DOCUMENTS

A. Specification 33 33 01, Gravity Sewers

B. Specification 31 23 34, Excavation and Backfill for Structures

PART 2 – PRODUCTS

2.01 MATERIALS

A. General

1. All manholes shall be precast concrete unless prior approval for an alterative material is given by the County.

B. Concrete

1. Concrete for cradles shall conform to Specification 03 10 01, Concrete and Concrete Materials of these Specifications and shall develop a minimum 2,500 psi compressive strength at twenty-eight (28) days.

C. Brick

1. Where brick manholes are specifically called for, brick shall be hard, solid common clay brick meeting the requirements for latest ASTM C-32 (sewer brick), Grade MA.

D. Mortar

1. Mortar for manholes shall consist of one part Portland Type II cement, two to three parts fine sand mixed with water for proper

consistency. Lime shall not be used in mortar for manholes. Commercially prepared mortar mixes, or expanding grout, shall not be used. Admixtures to mortar or commercial fast-setting cements shall not be used without approval of the Engineer.

2.02 MANHOLES

A. Slabs for Brick Manholes

1. Slabs shall be 3,750 psi/28 day concrete with a wood float finish. Reinforcement shall consist of #4 bars on eight inch centers, both ways, with one and one-half-inches of cover over the bar mat and three inches between earth and re-bar.

2. Brick manholes less than twelve (12) feet deep shall have a slab depth of eight inches. Manholes twelve (12) feet or deeper shall have a slab depth of twelve (12) inches. Slabs for standard manholes, shall be no less than six feet square. Slabs for Type A manholes, shall be a minimum of five feet square. Slabs for drop manholes shall be of sufficient size to support the manhole and the entire drop structure.

3. Slabs shall be located accurately so that manhole or manhole and drop assembly will be centered on slab. All slabs shall be installed at a grade that will allow clearance under the bells of the pipe. All slabs shall be solidly installed on 3/4-inch bedding stone which has been compacted against firm undisturbed ditch bottom. Depth of bedding stone shall be a minimum of six inches, or as directed by the Engineer.

4. The Contractor shall request an inspection of reinforcing steel for all slabs poured on the job.

5. The Contractor shall submit a copy of all concrete truck delivery receipts to the Engineer.

6. If slabs for manholes are to be supplied by a commercial precast firm, the Contractor shall advise the Engineer sufficiently in advance so that inspection may be initiated at the precast yard.

B. Precast Manholes

1. Precast, reinforced concrete manholes shall have tongue and groove interlocking joints. Inverts shall be formed as specified herein. Shop drawings shall be submitted and approved by the Engineer prior to placing order with supplier.

a. Precast reinforced concrete manhole risers, grade rings and tops shall conform as to materials, design, and fabrication with the requirements of ASTM, C-478. The concrete shall consist of 4,000 psi/28 day, Type II Portland Cement. The walls for standard manholes shall be no less than six inches thick. All precast manhole parts are to be free of fractures, honeycomb, and other defects of concrete. Cones shall be concentric.

b. Precast manholes shall consist of a base unit with openings for the sewer pipe, riser units of various lengths to build the manhole up to the required depth and concentric cones. The minimum height of the shortest riser shall be twelve (12) inches.

C. Fiberglass Manholes

1. Fiberglass manholes shall be as specified in the County's Materials Specification Manual.

D. Manhole Frames and Covers

1. All frames and covers are to be U.S. Foundry and Manufacturing Corporation #195W, with a one hundred sixty-five (165) pound cover, or approved equal. All mating surfaces shall be machined for proper fit. All covers are to be stamped "Pinellas County Sanitary Sewer" with the year of construction. All manhole covers shall have two watertight pick holes.

PART 3 - EXECUTION

3.01 EXCAVATION AND BACKFILL

A. Excavation and backfill for manholes shall be per Specification 31 23 34, Excavation and Backfilling for Structures.

3.02 MANHOLE CONSTRUCTION

A. Brick Manholes

1. Where required, manholes shall be constructed of brick masonry with cast iron frames and covers. Mortar shall be properly proportioned, thoroughly mixed, and used immediately. Any mortar entering the initial set, requiring additional water or heating, shall be discarded. Bricks will be laid radially and pressed into the mortar spread on the previous course. Each brick will be pressed against the adjoining brick so that inside vertical corners touch. The mortar shall totally fill

all space between bricks. The inside wall of the manhole shall be kept wiped clean of excess mortar. Excess mortar on the outside of the manhole wall shall be kept troweled smooth or cut off. Corbels are to be concentric, and built in twelve (12) courses, unless otherwise specified. The exterior of the manhole shall be plastered to a 5/8-inch thickness, and shrinkage cracks shall be sealed by brushing before the final set. Risers between corbels and cast iron frames shall be limited to twelve (12) inches. The exterior plastered surface of the manholes shall be coated with an approved asphaltic waterproofing material. When outside drops are constructed on manholes, the drop shall be entirely supported by the slab. The drop stack may be formed by brick and poured with concrete, or built up with brick and mortar. Memphis Tees shall be used in the drop structures. All drop manholes shall have the inside surfaces coated as specified for precast manholes.

B. Precast Manholes

1. Any modifications necessary to adapt the units to conform to the locations and grades shown, or required, shall be made without additional compensation. It shall be the responsibility of the Contractor to assure that all manhole inlets are provided at the proper locations and elevations to accommodate the actual field requirements without additional compensation.

2. All requirements for manhole and drop manhole construction as previously specified which are applicable to precast manhole construction shall be considered as being contained herein.

3. Slabs for precast manholes shall extend a minimum of six inches beyond the outside face of the manhole wall.

4. All slabs for precast drop manholes shall be of sufficient size to entirely support the drop structure. Slabs shall have the minimum thickness shown in the Standard Details.

5. Manhole Units

a. All exposed interior surfaces and the tongue and groove ends of each unit shall be sand blasted and brushed clean, and immediately thereafter, completely coated with a protective coating of not less than 15 mils of manhole coating per Material Specification Manual. The coating shall be applied in strict accordance with the manufacturer's recommendations.

b. All exterior surfaces shall be brushed clean and, immediately thereafter, completely coated with a protective coating of not less than 15 mils of approved coating. The coating shall be applied in strict accordance with manufacturer's recommendations.

c. The interior and exterior paint shall be intact and continuous. Any chips or holidays shall be patched using two coats of approved coatings and used according to manufacturer instructions.

d. Top and bottom ends of riser or sections shall be perfectly formed so that continuous and uniform contact is possible around the entire joint. Malformed joints shall be rejected.

6. Installation

a. All slabs or bottom sections shall be installed at a grade that will allow clearance under the bells of the pipe. All slabs or bottom sections shall be solidly installed on 3/4-inch bedding stone which has been compacted against firm undisturbed ditch bottom. Depth of bedding stone will be as directed by the Engineer.

b. The tongue and groove ends of each unit shall be primed with Ram-nek primer and allowed to dry. Immediately before placing the next unit, the joints shall receive a coating of Ram-nek. Enough plastic material shall be placed in the joint to squeeze a bead of excess material out of the joint insuring a completely sealed joint.

c. The top of the cone shall be set between two and one-half inches and fourteen and one-half (14 1/2) inches below the bottom of the manhole cover frame. It is the intent of the Specifications to provide a minimum of two and one-half inches to accommodate future grade changes without disturbing the manhole. Where the distance between the bottom of the manhole cover frame and the top of the cone is greater than fourteen and one-half (14 1/2) inches, 12-inch riser units shall be used to bring the top of the cone to within the limits specified.

d. The annular space between the sewer pipe and the opening in the manhole shall be grouted with Portland cement mortar and wiped or collared to insure a watertight joint. Invert channels shall be formed after the manhole is set by one of the following

methods: Build up with brick and mortar, or lay a full section of sewer pipe through manhole and cut out the top half. The manhole floor outside of the channels shall be made smooth and sloped toward the channels on a slope of two inches, per foot.

C. Inverts

1. Invert channels shall be constructed smooth and semicircular, conforming to the inside of adjacent sewer section. The mortared invert channel shall have a steel trowel finish. Changes in direction of flow shall be made in a smooth curve of as large a radius as possible. Changes in size and grade shall be made gradually and smoothly. Whenever possible, inverts shall be formed with a full section of pipe laid through the manhole with the top half of the pipe cut out. Benches shall be built up solidly with concrete or brick and mortar and shall be sloping to the invert. All inside drops shall have a flume constructed to channel flow into the invert. Standard drop manholes shall be built whenever the inside drop exceeds twenty-four (24) inches. All pipe entering the manhole must be trimmed flush with the walls. All exposed sharp edges of pipe shall be wiped smooth with mortar.

D. Type A Manholes

1. Manholes four feet or less in depth shall be constructed in accordance with the details shown on the Plans.

E. Standard Manholes

1. Standard manholes shall be constructed in accordance with the details shown on the Plans.

F. Drop Manholes

1. Drop manholes shall be constructed in accordance with details shown on the Plans.
2. Special drop manholes may be required at points where force mains connect to gravity sewers above the flow line of the manhole. The special bowl drop shall be constructed in accordance with the Standard Details.

G. Concrete Cradles

1. Concrete cradles shall be constructed at the location shown on the Plans or as directed. They shall conform to the details shown on the

Plans, or may, under special conditions, be modified as directed by the Engineer.

H. Fiberglass Lined Manholes

1. The properly installed liners shall not fail under H-20 dynamic wheel load applied vertically. All fiberglass products shall be subject to OCFC Visual Inspection Standards, prior to installation. Fiberglass manhole liners shall be constructed on the base slab, as specified, and shall be encased by brick masonry, or pre-cast as previously specified.

2. Any pipe entering through the manhole walls with an invert equal to, or higher than the benches will be sealed all around to the interior walls by use of fiberglass patching kit. There shall be no mortar exposed above bench level, except the stack.

I. Epoxy Impregnated Membrane Lined Manhole

1. Where specifically required by the Plans, manhole lining shall be installed using an epoxy impregnated membrane. Specific membrane thickness and epoxy density, and attributes, shall be as shown on the Plans or Standard Details, or as specified by the Engineer.

J. Removal of Existing Manholes

1. The Contractor shall remove, as indicated on the Plans, the entire manhole structure including all walls, base slab, frame and cover. The Contractor shall install a new manhole immediately after removal of the existing manhole or immediately backfill and compact the excavation with sand to a one hundred (100) percent maximum density, as determined by the methods contained in the State of Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.

2. Should the Contractor elect to backfill the excavation prior to the installation of the new manhole, the road surface shall be patched with asphalt in accordance with Section 32 12 01 – Stabilized Roadway and Asphalt Paving, and shall be maintained in satisfactory condition until such time as the new manhole is installed.

K. Adjustment of Manhole Frames and Covers

1. Manhole frames and covers shall be adjusted to pavement grade during road resurfacing by addition or removal of successive courses of brick

masonry. Where required by the Engineer, height adjustment inserts of continuous rings of a type, as directed by the Engineer, shall be installed in the frame/cover assembly.

2. Manhole frame and covers shall be adjusted to finished ground elevation in non-pavement areas by addition or removal of successive courses of brick masonry. Where required by the Engineer, height adjustment inserts of continuous rings of a type, as directed by Engineer, shall be installed in the frame/cover assembly.

3.03 INSPECTION OF MANHOLES

A. Inspection of completed lines and manholes shall be as specified in Section 33 33 01, Gravity Sewers.

END OF SECTION

SECTION 33 53 00

ODOR CONTROL SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. This section describes the furnishing of a complete biological odor control system consisting of an HDPE filter tower, two biologically active filter medias, stainless steel fan, irrigation system with permanent recirculation function, interconnecting duct work between the fans and the biotrickling filter vessels, nutrient addition system if required, instrumentation, fluid controls, and control panel as specified to properly operate and monitor the biofilter system.

1.02 DEFINITION

A. H_2S: Hydrogen Sulfide Gas
B. D/T: Detection to threshold as per the specifies air odor determination method.
C. OU: Odor Unit

1.03 SUBMITTALS

A. Furnish complete fabrication, assembly and installation drawings, together with electrical and instrumentation details and drawings shall be submitted for review. All dimensions, parts, construction details and materials of construction shall be shown.

B. Complete shop drawings of the biological odor control unit and appurtenances shall be submitted to the Engineer for approval in accordance with the requirements of Section 01 33 00 and the General Requirements.

1.04 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM).

B. American National Standard Institute (ANSI).

C. National Electrical Manufacturers Association (NEMA).

D. Air Movement Control Association International (AMCA).

E. American Composites Manufacturers Association (ACMA).

F. Underwriters Laboratories (UL).

G. Canadian Standards Association (CSA).

H. National Fire Protection Association (NFPA).

I. When reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Product delivery, storage, and handling shall comply with Manufacturer's instructions and as follows.

B. All packing slips and shipments must be inspected upon delivery to ensure shipments are complete and no damage has occurred during transportation.

1.06 WARRANTY AND GUARANTEES

A. The Manufacturer shall warrant the biofiltration medias not to compact, degrade or decompose for a period of 10 years from the date of Substantial Completion, provided that the system is operated in accordance with the Manufacturer's printed Operation and Maintenance Manuals.

B. All mechanical components shall be warranted free of manufacturing defects a period of 12 months from Substantial Completion, or 18 months from equipment delivery to site, whichever occurs first.

1.06 QUALIFICATIONS

A. The Odor Control System Manufacturer shall have at least 5 years experience in design and fabrication of odor control systems as demonstrated by a list of at least 5 successful multi stage installations of comparable size with references. All references shall include valid contact names and phone numbers that can be verified.

B. Consideration of alternate biological filter media shall be submitted to the Engineer at least 14 days prior to the bid date. No alternate biological filter media will be considered unless it has been pre-approved by the Engineer.

C. The Odor Control System Manufacturer shall provide the Owner with training and monitoring support service during the first year of operation.

The support service must be renewable at the end of the first year of operation.

D. The Biotrickling filter Manufacturer shall maintain regular laboratory facilities for the microbial and chemical support services required for normal operation of the biotrickling filter system. The facilities shall be open for inspection by a representative of the Owner or Engineer.

E. The following type of odor control systems will not be considered equal.

1. Odor control systems using masking agents.

2. Odor control systems using “counteractants”.

3. Odor control systems using granular activated carbon.

4. Odor control systems in which the media is not completely enclosed.

5. Systems that do not provide continuous and permanent recirculation of the media.

6. Systems that provided structured media that is not free-flowing.

1.08 ACCEPTABLE MANUFACTURERS

A. The odor control equipment shall be manufactured by BIOREM, or approved equal.

PART 2 - PRODUCTS

2.01 OPERATING PARAMETERS

A. The odor control system shall be designed to remove odorous constituents from the process air stream under the following operating conditions:

Parameter	**Value**	**Unit**
Airflow Capacity	Up to 450	CFM
H_2S Loading (ave./peak):	10/50	ppmv
Process Air Temperature:	50-100	Degree F
Ambient Air Temperature:	30-110	Degree F
Make-up water Source	Potable/Effluent	

B. The biotrickling filter system by designed in accordance with the following table:

Parameter	Value	Unit
Odor Control Unit	BIOREM SK 450 or approved equal	
Maximum Vessel Pressure Drop	6	Inches WC
System Footprint Dimensions	12’ x 6’ 4”	L:W, Feet
Recirculation Rate	4 – 8	GPM
Maximum Inlet Water Pressure	40	psi
Blower Motor Size	2	HP
Blower Pressure Rating	8	Inches WC
Recirculation Pump Motor Size	1	HP

2.02 SYSTEM PERFORMANCE REQUIREMENTS

A. When loaded under average and peak conditions the biotrickling filter system shall provide at least 99 percent removal of H_2S when operated at the design air flow rate.

2.03 SCOPE OF SUPPLY

A. Odor Control Vessels

1. The vessel shall be designed to handle a pH of 1-2 as sulphuric acid.

2. The vessel shall be manufactured so that all parts are proportioned to have liberal strength and stiffness and to be especially adapted for the intended working conditions.

3. Vessel shall be designed to operate under a positive pressure of at least 8” WC.

4. Materials:

   a. The vessel shall be constructed of FRP or high density polyethylene (HDPE).

b. All materials shall be suitable for exposure to hydrogen sulfide fumes at a concentration of up to 150 ppm and sulfuric acid at a pH of 1.0.

c. Ultraviolet inhibitors shall be added for improved weather resistance.

5. The vessel shall be equipped with the accessories as listed below:

a. The vessel shall be attached to the system skid assembly and come pre-loaded with biofilter media(s).

b. All necessary access hatches, nozzles and other attachments. Vessel connection flanges shall be compatible with connecting piping and ductwork.

c. All bolts and fasteners shall be minimum Type 304 stainless steel hardware and EPDM strapping.

d. All gaskets shall be EPDM.

e. The media support shall be vinyl ester FRP grid type. Packing support plates and mid-span supports shall be suitable to support the weight of the packing and entrained recirculation solution.

f. Integral sump to allow for continuous water recirculation.

B. Odor Control Skid Assembly

1. The odor control equipment shall be come pre-arranged on an equipment skid and be securely fastened for shipment and installation.

2. Skid material shall be extruded anodized aluminum or other approved material.

3. Skid will be constructed so as to allow it to be picked up, moved and placed by means of forklift truck or overhead crane.

C. Biotrickling Filter Media shall be synthetic, engineered type and shall have the following characteristics;

1. Media shall be random packed.

2. The biotrickling filter media shall consist of inorganic inert hydrophilic material, uniform in shape.

3. The media shall not shrink or swell under varying moisture conditions.

D. Biofilter Media shall in inorganic and shall have the following characteristics;

1. The biofilter media shall be XLD and shall consist of inorganic, inert hydrophilic cores uniform in shape.

2. The biofilter media shall not shrink or swell with varying moisture contents.

3. The biofilter media shall be formulated with nutrients, buffering agents and adsorbents.

4. The biofilter media pressure drop shall not exceed ½-inch water column per foot of depth upon system startup.

E. Recirculation and Spray Irrigation System

1. The recirculation system shall consist of a spray nozzle assembly above the top media layer, and centrifugal recirculation pump. Pipe shall be Schedule 80 PVC. Spray nozzles shall be PVC.

2. The centrifugal pump shall be CPVC or 316 stainless steel construction. Motors are 3 Phase/ 60Hz/460V, TEFC, Suitable for Class 1, Division 2 classification.

3. The recirculation system shall be operated continuously for entire life of odor control system.

4. An intermittent media irrigation system shall be utilized for the biofilter stage. Frequency and duration of irrigation shall be determined by the system supplier.

F. Biofilter Fans

1. Fan shall be designed for continuous service.

2. Fans shall be 316 SS, pressure blower type.

3. Fan shall be statically and dynamically balanced.

4. Fan shall be equipped with an ANSI flanged inlet connection, outlet flange, drain connection at bottom of fan scroll.

5. Fans shall have a 316 stainless steel shaft.

6. Fan shall have Viton shaft seals.

7. Fan shall have manual control damper integral to fan outlet.

8. Fan shall have a 3 phase/60Hz/460V, TEFC, 3600 RPM Motor, suitable for Class 1, Division 2 and a service factor of 1.15.

9. The fan shall be manufactured by New York Blower or approved equal.

G. Auxiliary Equipment

1. A nutrient feed system shall be provided if necessary to maintain optimal conditions for microbial growth. Nutrients shall be required if plant effluent of suitable quality is not available. A polypropylene tank, mixer and metering pump shall be included to deliver the adequate amount of nutrients to the system. The manufacturer shall supply one (1) year supply of nutrients.

2.04 INSTRUMENTATION AND CONTROLS

A. Provide a single control panel to service the biofilter system. Provide all items which are required to implement the specified functions and the functions required for proper system operation.

1. Panel shall contain the local control and monitoring for the odor control system components, including;

a. NEMA 4X FRP enclosure mounted on support connected to system skid.

b. Door-mounted disconnect

c. VFD and Hand/Off/Auto switch for fan

d. Motor starter and Hand/Off/Auto switch for recirculation pump

e. Status light (on when running) for fan and recirculation pump

f. Recirculation low flow alarm

g. Alarm reset push button

h. Control, contactors, HOA switches, and fusing for heater package, if required

i. Dry contacts for transmitting signals to remote location

2. UL certified.

3. Panel shall be mounted a minimum of 3 feet from any potential leak point to comply with NFPA 820.

B. Water panel

1. A water panel, which houses components necessary for water recirculation shall be provided.
2. Water panel to be a NEMA 4X enclosure of either FRP or 304 SST.
3. Water panel shall contain valves and plumbing required for media irrigation
4. Field connection to external water supply.
5. Prewired to vendor supplied control panel.
6. Water panel is mounted a minimum of 3 feet from any potential leak point to comply with NFPA 820.
7. Water panel shall contain the following instrumentation:

a. (1) Flow indicator/switch, to display recirculated water flow rate, signal alarm and shut off recirculation pump in case of reduced water flow.

b. (3) Local flow indicator to display irrigation, sump make-up and sump blow down water flow rates.

c. (1) Solenoid valve for irrigation control.

d. (1) Pressure indicator on water supply line.

C. Instrumentation External to Water panel:

1. (1) Differential pressure gauge to measure pressure drop across media.

2. (1) System air temperature indicator (local read).

3. (1) Pressure indicator (water) at outlet of recirculation pump.

D. Fluid Control Systems:

1. (1) Lot fluid control valves and strainers as required (pre-plumbed).

2. (1) Lot 0.25” tubing for differential pressure gauges (pre-installed).

3. (1) Lot drip legs for differential pressure gauges (pre-installed).

2.05 QUALITY CONTROL

A. Contractor shall follow Manufacturer's and Supplier's recommended product quality control specifics as required for this project.

PART 3 EXECUTION

3.01 GENERAL

A. Install in accordance with Manufacturer’s written instructions.

3.02 INSPECTION AND TESTING

A. The Manufacturer of the odor control system shall furnish the services of a factory representative who has complete knowledge of proper operating and maintenance to inspect the final installation and supervise a test run of the equipment. The Manufacturer shall furnish a minimum of 1 trip and a minimum of two (2) days total on-site service for mechanical checkout. On site service required for performance testing shall be in addition to the mechanical checkout service.

B. Install all systems in accordance with Manufacturer’s written instructions and recommendations.

C. Performance Testing of Odor Control System

Verify conformance to specified parameters, to be conducted using actual inlet conditions of the site. Testing to be completed no sooner than three weeks, but not later than 10 weeks, after system startup and shall include;

1. Verification of proper airflow

2. Measurement of inlet and outlet H_2S concentrations.

3. Test will be conducted for a period of not less than 8 continuous hours with H_2S readings being collected every 30 minutes.

4. Record pressure drop readings across media lift.

5. In addition, bag samples will be collected at two different times, on the inlet and outlet of the odor control system, for odor panel analysis.

6. A report of the test results shall be provided.

END OF SECTION

SECTION 40 05 00

COMMON WORK RESULTS FOR PROCESS INTEGRATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: General administrative and procedural requirements for instrumentation installations.

1.02 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings covering the items included under this Section. Shop Drawing submittals shall include:

1. Product data for each product specified.

2. Wiring diagrams, both elementary and schematic, differentiating between manufacturer installed and field-installed wiring.

3. Digital Systems: Provide the following:
   a. Digital equipment layouts of input and output racks showing complete module model number and addressing assignment. Layouts of port pin assignment, connection schematic indicating cable types and port addresses.

B. Operation and Maintenance Manuals: Submit operation and maintenance manuals for items included under this Section.

1. Instructions shall be short, easy-to-understand directions specifically written for this Project describing various possible methods of operating equipment. Instructions shall include procedures for tests required, adjustments to be made, and safety precautions to be taken with equipment. These documents are to be submitted to ENGINEER's office.

2. Provide 1 complete set of manufacturer's documentation covering programmable equipment supplied. Include hardware manuals and prints as manufacturer normally ships with programmable equipment.

C. Warranty: Submit warranties covering the items included under this Section.

1. Warranty time periods shall start from Start-up date and not ship dates.

1.03 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of equipment, of types and sizes required, and whose products have been in satisfactory use in similar service for not less than 5 years.

B. Codes and Standards:

1. National Electric Code.

2. Applicable State and local requirements.

3. UL listing and labeling shall be adhered to.

C. Items covered by this Section are designated as undelivered specifically manufactured equipment for which associated progress payments will be made in accordance with this Specification.

D. Equipment that does not have a UL, FM, CSA, or other listed testing laboratory label shall be furnished with a notarized letter signed by the supplier stating that equipment furnished has been manufactured in accordance with National Electric Code and OSHA requirements.

E. CONTRACTOR shall provide permits and licenses, observe and abide by applicable laws, regulations, ordinances, and rules of State, territory or political subdivision thereof, wherein the Work is done. CONTRACTOR shall pay fees for permits, inspections, licenses, and certifications when such fees are required.

F. To ensure timely performance and conformance with Specifications, Project meetings shall be held at OWNER's facility once every 3 months during course of Project. Cost of such meetings shall be included.

G. Component Requirements: For the purposes of uniformity and conformance to industry standards, signal transmission modes shall be electronic 4-20 mA DC. No other signal characteristics are acceptable,; 4-20 mA DC signals shall be such that devices may be wired in parallel for 1-5 volt DC as required. 1-5 volt DC mode shall be employed only within control panel enclosures.

H. Responsibility and Coordination: Drawings and Specifications are intended to include details of a complete equipment installation for purposes specified. CONTRACTOR shall be responsible for details which may be necessary to properly install, adjust, and place in operation complete installation. Any error on Drawings or in Specifications which prevents proper operation of supplied system shall be shown correct at time of Shop Drawing submittal for approval or brought to attention of ENGINEER with or prior to submittal.

I. CONTRACTOR shall be responsible for costs incurred to correct aforementioned errors brought to ENGINEER's attention. CONTRACTOR shall assume full responsibility for additional costs which may result from unauthorized deviations from Specifications.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Manufactured material shall be adequately packed to prevent damage during shipping, handling, storage, and erection. Material shipped to Site shall be packed in a container properly marked for identification. Blocks and padding shall be used to prevent movement.

B. CONTRACTOR shall inspect the material prior to removing it from carrier. If damage is observed, CONTRACTOR shall immediately notify carrier so that a claim can be made. If no such notice is given, material shall be assumed to be in undamaged condition; any subsequent damage that occurs to the equipment shall be the responsibility of CONTRACTOR. Repair and replacement of damaged parts will be done at no expense to OWNER.

C. CONTRACTOR shall be responsible for any damage charges resulting from handling of materials.

PART 2 - PRODUCTS

2.01 EQUIPMENT SUPPLIERS

A. References made in these Specifications to specific manufacturer’s products are intended to serve as a guide to type, construction, and materials. Listing of a manufacturer does not imply acceptance by ENGINEER of a manufacturer's particular product, product line, or latest product revision if it does not meet Specifications.

B. Equipment Supplier: Equipment specified under Division 40 and shown on Drawings shall be designed as a system, fabricated or purchased, shipped to Site, and started up by one of the qualified and approved equipment suppliers listed under this Section. Intent is for unit responsibility.

1. Equipment supplier shall not assign any of its rights or delegate any of its obligations under these Sections without prior written acceptance by ENGINEER.

2. Direct purchase of any items in these Sections by CONTRACTOR is not in compliance with this Specification and will not be permitted.

3. When a Service Contract is included, it shall be performed by factory-trained personnel employed by equipment supplier. Equipment supplier shall assign a qualified Engineer employed by the supplier as Project Engineer/Project Manager.
    a. Project Engineer/Project Manager's name shall be forwarded to CONTRACTOR and ENGINEER within 30 days after receipt of a purchase order by equipment supplier.
    b. Project Engineer/Project Manager shall be focal point for design, fabrication, Contract communications, and shall be responsible for start-up and acceptance. Project Engineer/Project Manager shall be at factory test at Site for start-up and at the Site during entire acceptance procedure. Only qualified and approved equipment suppliers shall be accepted as meeting this Specification.

2.02 EQUIPMENT

A. Transmitted electronic signals to equipment of other vendors and between control panels shall be a separate isolated-floating output for each item of equipment and shall conform to ISA Standard S50.1.

B. Enclosures shall be 316 SS NEMA 4X as indicated on Drawings. Intrinsically safe systems, as approved by Factory Mutual, shall be furnished when called for.

C. No external power connections shall be allowed unless specifically called for in Specification. Where an external power source is called for, unit shall accept 120 VAC, plus or minus 10 percent power.

D. Size and style of instruments are defined in Specifications.

E. Charts and scales are shown on Drawings. Standard scales shall not be accepted without ENGINEER's approval if it differs from those shown. Ratio station scales and other scales shall be graduated such that major graduations fall on whole numbers (i.e., 1, 2, 3, or 5, 10, 15, etc.) and minor graduations fall on 0.1 or 0.2 intervals (i.e., 1.1, 1.2 or 11, 12, etc.). If two scales are called for on ratio stations, each scale shall be indexed to meet Specification. Drawing of each scale for ratio stations shall be submitted with Shop Drawings for approval.

F. Solid-state output switches, where used, shall be overvoltage transient protected and not be damaged by dI/dT or dv/dt for their design application under this Contract.

G. Instruments shall be equipped with permanently attached identification tag. Tag shall be included on field- and panel-mounted devices. Tags shall include ENGINEER's tag identification and manufacturer's tag identification if different from ENGINEER's.

1. Tags shall be either stamped metal or laminated phenolic with white letters engraved on a black background. Field-mounted devices shall have tags fastened with screws. Devices mounted in panels will be tagged inside panel on subplates or on device itself where it can be easily read.

H. Finish on instruments and accessories shall provide protection against corrosion by elements in environment in which they are to be installed. Both the interior and exterior of enclosures shall be finished. Extra paint of each color used on material shall be provided by manufacturer for touch-up purposes.

I. Provide equipment identification nameplates complying with specification within Division 26. Nameplates shall contain ENGINEER's item designation and, for indicators and transmitters, design range and units of device shown.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Equipment provided under this Section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with detail drawings, specifications, engineering data, instructions, and recommendations of equipment manufacturer as approved by ENGINEER.

B. Install equipment as indicated, in accordance with manufacturer's written instruction, and in compliance with recognized industry practices to ensure that products fulfill requirements.

C. Drawings are not intended to show every detail of construction or location of piping, ductwork, or equipment. Where proper operation or construction makes it necessary or advisable to change location of piping, instrumentation equipment, air ducts, or other equipment, CONTRACTOR shall so inform ENGINEER for his approval and permission.

3.02 FIELD QUALITY CONTROL

A. Calibrate equipment in accordance with manufacturer's instructions to ranges or set points indicated on Drawings.

B. Installation and Start-up: Equipment supplier shall have an established service facility from which qualified technical service personnel and parts may be dispatched upon call. Such a service facility shall be no more than 6 hours travel time from Site.

1. Equipment supplier shall provide an experienced, factory-trained, competent, and authorized service representative during installation and start-up.

3.03 DEMONSTRATION

A. Upon completion of installation and calibration, demonstrate functioning of equipment in accordance with requirements. Where possible, correct malfunctioning units at Site, then retest to demonstrate compliance; otherwise, remove and replace with new or repaired units, and retest to demonstrate compliance.

END OF SECTION

SECTION 40 91 23.36

LEVEL PROCESS MEASUREMENT DEVICES

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes the following:

1. Sonic level transmitter.

2. Cord type float switch.

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with Sections 01 33 00 and 40 05 00, Shop Drawings covering the items included under this Section.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Cord Type Float Switch:
   a. Anchor Scientific, Inc.
   b. Consolidated Electric Co.
   c. Pulsar, Inc.

2. Sonic Level Transmitter:
   a. Delta Controls Corp.
   b. Environmental Monitoring.
   c. Pulsar, Inc.
   d. Milltronics.

2.02 SONIC LEVEL TRANSMITTER

A. Sonic level device shall be microprocessor-based and include sensing head, control cabinet, and cable between head and control cabinet.

B. Length of cable shall be sufficient for application shown.

C. Sensor shall automatically compensate for ambient temperature changes.

D. CONTRACTOR, equipment supplier, and manufacturer shall examine Drawings for each installation to determine equipment supplied will work in each application.

E. Drawings shall contain a typical installation detail and show location of sensors.

F. Equipment supplier must ensure beam angle of sensor shall not have interference from walls, pipes, or other objects at each location. Shop Drawings shall be specific about model numbers at each location, and detail sketches showing mounting height, zero dimensions, span dimensions, and beam angle data for each location.

G. Any device that will not function reliably to specifications in its application shall be replaced at CONTRACTOR's expense.

H. Sonic sensor head shall be intrinsically safe for NEMA 7 areas (explosion-proof). Sensor head shall be epoxy-coated metal, encapsulated or mylar for corrosion resistance. Sensor head and reflector shall contain a thermostatically controlled heater for outdoor application for manufacturers that require sensor head heater for operation down to -20 degrees F.

I. Sonic frequency shall be less than 45 kHz. Frequencies above this range will not be accepted.

J. Control cabinet shall be supplied rated NEMA 4 or as shown on Drawings. Control cabinet shall contain a receiver processor, a full-hinged front door, a control cabinet thermostat controlled heater for -20 degrees F operation, and local digital indicator configured in engineering units.

K. Connections to controller and sonic sensor shall be with well-marked terminal blocks.

L. Field adjustments shall be made through membrane keypads. Units requiring the use of an oscilloscope will not be accepted.

M. Operational Data:

1. Temperature: Sensor to operate within specifications over -20 degrees F to 150 degrees F. Controller shall operate from 32 degrees F to 120 degrees F without heater, and -20 degrees F with a heater.

2. Pulse Rate: 1.5 pps minimum sensing rate.

3. Operating Frequency: Less than 45 kHz.

4. Reflection Blocking: Adjustable receiver blanking to operate only on first pulse received.

5. Cable Length: Sensor and controller may be separated up to 500 feet.

6. AGC: Automatic gain control to maximize signal to noise ratio.

7. System Accuracy: Plus or minus 1.0 percent of full scale over the complete temperature range.

8. Power Supply: 120 volt AC plus or minus 10 percent at 60 hertz with power consumption of 100 watts maximum exclusive of controller heaters.

9. Output: 4-20 mA output linear with level into 0-700 ohms. Output shall be isolated, floating to prevent system ground loops when used with other control loops that have an established common at a remote location. Output time constant shall be adjustable through keypad from 1 to 10 seconds.

2.03 FLOAT SWITCH (CORD TYPE)

A. Direct acting float switch shall be furnished to automatically detect liquid level change. Liquid rise of 1 inch from rest position shall operate float switch and reset will occur when liquid level drops 1 inch. Mounting shall be to a 1-inch vertical pipe for multiple float applications or to a flange for a single float application as shown. Free cable hanging floats with weights shall not be acceptable.

B. Float switch shall consist of 316 type stainless steel housing, mounting clamp for 1-inch-diameter pipe, flexible 3-conductor cable with a synthetic rubber jacket, and mercury switch. Inside float housing will be a (normally open/closed) mercury switch potted in epoxy. Electrical load for switch contacts shall be rated 115 volt AC at 0.5 horsepower inductive load.

C. Three-conductor cable shall be 14 AWG with 105 strands per conductor made for heavy flexing service and underwater use. A green grounding wire shall connect internally to float housing.

PART 3 - EXECUTION

3.01 GENERAL

A. Examination, Installation, Field Quality Control, Demonstration: In accordance with Section 40 05 00.

END OF SECTION

SECTION 40 94 00

DIGITAL PROCESS CONTROLLERS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Programmable Logic Controller (PLC):
   a. Central processing unit.
   b. Process input/output.

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with Sections 01 33 00 and 40 05 00, Shop Drawings covering the items included under this Section.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall be regularly engaged in manufacturing equipment complying with requirements of these Specifications.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Programmable Logic Controller (PLC):
   a. Allen-Bradley.
   b. Modicon.
   c. Square D Co.

2.02 PROGRAMMABLE LOGIC CONTROLLER (PLC)

A. PLCs shall be general purpose process data acquisition and control devices. The PLC shall be microprocessor-based driven by a stored program, and shall be compatible with and work in harmony with remote devices specified herein.

B. Central Processing Unit:

1. Each central processing unit shall consist of a 16-bit parallel processor with scan not to exceed 150 milliseconds for all program steps and input/output time servicing. The processor(s) shall have memory capacity as shown on Drawings.

2. The system shall contain a general purpose set of instructions. Watchdog timer protection shall be provided. The processor shall have self-diagnostic capabilities. Each processor shall be supplied with adequate random access memory to support tasks covered in these Specifications. Memory shall be semiconductor with on-board lithium battery backup power for at least 4 months prime source outage.

3. PLCs shall have permanently installed system software for process input/output servicing, PLC intercommunications, LAN communication, diagnostics, and process control. The basic model for PLC operations shall be "ladder diagram."

4. Data elements shall be grouped according to type or function into registers or files. Provide a consistent addressing structure for PLC and external machines to reference data elements. The following basic data types shall be provided:
   a. Input.
   b. Output.
   c. Bit.
   d. Integer (16-bit).
   e. Timer.
   f. Counter.
   g. Character (ASCII).

5. Process Control: Program elements shall be provided to execute the following kinds of actions:
   a. Basic Relay Logic.
   b. Timers: On-delay, Off-delay, Retentive.
   c. Counters: Count-up, Count-down.
   d. Arithmetic: Add, Subtract, Multiply, Divide, Square Root.
   e. Logic: Negate, And, Or, Exclusive Or.
   f. Conditionals.
   g. Data transition.
   h. One-shot.
   i. Stepper Switches (sequencers).
   j. Branching Instructions.
   k. Subroutines.
   l. File Instructions.
   m. Analog PID Control:
      1) ISA Algorithm.
      2) Independent Gain Algorithm.
      3) Ratio Control.

6. Analog Input: Analog inputs to system shall be in form of differential (non-grounded) direct current voltages. Input circuitry shall be high-impedance such that external sensing circuits will not be adulterated by presence of this equipment. In all cases this equipment shall be passive with respect to analog sensing circuits. External power supplies shall be provided as necessary.
   a. Milliampere loops shall be sensed in concert with precision resistors appropriately sized. Such resistors shall be applied at termination point in a way that input card removal does not affect loop continuity. Each analog signal shall be connected to system via a barrier-type terminal strip.
   b. Input impedance shall be a minimum of 10 megohms and common mode rejection shall be 120 dB or better. Accuracy shall by plus 0.1 percent full scale and resolution shall be 25 percent. Analog to digital conversion shall yield a signed 12-bit integer. Provide 8 inputs per card.

7. Analog Outputs: Control signals in form of 4-20 mA analog signals into 500 ohms shall be provided. Each analog output shall be provided on a barrier-type terminal strip.
   a. Analog output modules shall be provided to interface each output to appropriate terminal strip. Each output shall be continually maintained by a sample and hold circuit with a drift rate no greater than 1 percent in 12 hours. Digital to analog conversion shall accept signed 12-bit integers. Provide 4 outputs per card.

8. Discrete Inputs: Discrete inputs to be monitored shall consist of isolated dry contract closures and 120 VAC inputs as shown. Barrier-type terminal strips capable of terminating inputs shall be provided.
   a. A discrete input circuit board shall be equipped with a photo isolation for each discrete input. Noise and contact bounce less than 20 milliseconds shall be rejected. Provide 16 inputs per card.

9. Discrete Outputs: Control signals in form of discrete outputs shall be provided. Each discrete control signal shall be provided on a barrier-type terminal strip. They shall make use of relays or zero-angle fired triacs having a capability of at least 2 amps. They shall include any necessary arc suppression or other conditioning circuitry to ensure their proper operation in conjunction with field elements specified.
   a. Each output shall be fused and shall be equipped with a status indicator. A blown fuse indicator shall also be provided.
   b. Outputs used to control devices external to enclosure in which module is located shall be isolated type, allowing use of a different external 120 VAC power source for each output. Outputs used to control devices within enclosure in which module is located need not be isolated. Provide 16 outputs per card.
   c. Outputs used to control devices external to enclosure in which module is located shall be relay type. Outputs used to control devices within

enclosure in which module is located may be zero-angle fired triacs where compatible with devices.

NOTE TO SPECIFIER: EDIT OR DELETE IF I/O ASSIGNMENT IS SHOWN ON DRAWINGS

10. Rack Configuration: Provide I/O to meet requirements shown on Drawings, plus 20 percent spare I/O of each type used. I/O assignments must not put more than 50 percent of similar equipment on same card to prevent catastrophic failures based on loss of 1 card. Equipment rack layout must allow for addition of 20 percent more cards per rack; minimum space 2 slots. This requirement is totaled for each rack; it in not based on overall network.

PART 3 - EXECUTION

3.01 Examination, Installation, Field Quality Control, Demonstration: In accordance with Section 40 05 00.

END OF SECTION

SECTION 40 95 01

WASTEWATER PUMP STATION SCADA
REMOTE TELEMETRY UNIT (RTU)

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Contractor shall provide, program, and install SCADA Remote Terminal Units (RTU's) as described within this Specification.

B. The RTU unit shall be interfaced with the pump station Pump Control Panel and be configured to monitor the pump station status, and provide control as noted within this Specification.

C. The RTU shall be programmed and configured by an authorized agent of Motorola.

D. The RTU shall be configured to interface with the County's existing SCADA system in place, via Field Interface Units (FIU's).

E. The Contractor shall provide programming, required by the WonderWare HMI software, to interface with the RTU/FIU at the central SCADA system.

F. The County will provide existing sample screens for each SCADA panel type.

1.02 QUALITY CONTROL

A. It is essential that only qualified personnel be allowed to work on the RTU/SCADA system. To maintain system warranties and system security it is imperative that only qualified SCADA contractors provide new equipment and integration services. At a minimum, the RTU/SCADA contractor must have the following qualifications:

1. State of Florida Electrical Contractor license to insure proper electrical installation of the RTU.

2. Motorola Certified MOSCAD Solutions Provider indicating that the contractor was Motorola trained on MOSCAD to insure proper software configuration, application, and functionality of the RTU.

1.03 WARRANTY

A. The manufacturer shall furnish a minimum eighteen (18) month warranty against defects in materials and workmanship covering parts and labor on all electrical control components to include breakers, starters, selector switches, pilot lights (excluding lamps), and transformers. The RTU/PC will have a two-year warranty to include lightning damage. The manufacturer will supply all material and labor to repair or replace failed components at no cost to the County.

1.04 OPERATION AND MAINTENANCE MATERIALS

A. The Contractor shall deliver to the County the following documentation with the Final Pay Request:

1. A complete RTU schematic and wiring diagram, with bill of materials, on CD, AutoCAD, latest version.

2. Four maintenance manuals with the above drawings and manufacturer's maintenance literature bound in three ring binders.

3. A laminated copy of the schematic and wiring diagram will be permanently affixed to the interior side of the exterior enclosure door using RTV silicone.

PART 2 - PRODUCTS

2.01 REMOTE TERMINAL UNIT (RTU)

A. The County's SCADA consists of remote terminal units, Field Interface Units/Front End Processors (FIUs/FEP's) and multiple redundant SCADA computers operating with WonderWare Human Machine Interface (HMI) software. Lift station remote monitoring and control communications are provided through the County's 800MHZ trunked radio system.

B. A complete RTU shall be installed and integrated with the station Pump Control Panel, and HMIs. All RTU components will be provided in a single enclosure. The RTU shall be compatible with and provide all the functionality and features of the County's existing wireless SCADA System. The RTU will be Motorola MOSCAD Ace with Motorola SCADA RTU software. It is the responsibility of the RTU/SCADA supplier to provide all of the specified RTU hardware, software, functionality, installation, and startup services as detailed below.

C. The pump control panel shall also operate independently of the SCADA/telemetry system in the event of failure of the remote communications link.

2.02 FUNCTIONALITY

A. The RTU shall provide local automatic monitoring from float switches, bubbler systems, transducers, ultrasonic level sensor inputs, and dry contacts. Inputs shall be provided for both digital inputs and analog (4-20ma DC) transducers. Simultaneous monitoring of analog and digital level sensing devices shall be supported where the analog level sensing device shall be primary. The RTU shall contain routines for detecting sensor failures and utilize the alternate level sensing device(s). Analog sensors and specific float alarms shall be reported to the Central HMIs if floats operate out of sequence. In all cases, the RTU shall be supplied with an input for an emergency “High Level Float”. Battery backup power shall be provided so that monitoring is maintained during Utility power failures. Specific functions may vary based upon the Pump Station Type as noted within this specification.

B. Local manual pump control is provided by “Hand-Off-Auto-Remote” (HOAR) switches located in the Pump Control Panel. In the absence of RTU power or in the case of RTU failure, the pump motor starters shall remain operational in the HAND position. In no case shall the RTU have the capability to operate or override the pumps in the HAND, OFF or AUTO positions. HOAR switches shall be reported back to the Central HMIs when a switch has been set in the HAND, OFF, or AUTO positions.

C. The capability to control a local alarm system consisting of an alarm horn and light shall be provided. Inputs and outputs shall be provided for this functionality. Under a “High Level”, or other specified alarm condition, the alarm shall be reported to the Central HMIs. The alarm horn and light may be silenced either locally from the pump control panel or remotely from Central HMIs via the RTU. If the alarm condition clears, the alarm silence control shall be restored.

D. The RTU shall be configured to control two to four pumps.

E. The RTU shall report elapsed runtime and number of starts for each pump to the Central HMIs. These values shall be stored in the RTU. In the case of failure of the RTU, these values shall be restored without user intervention. The Central HMIs shall have the ability to individually reset each pump’s starts and/or runtimes without loss of data. On demand reports shall be made available for detailed and average starts and runtimes of each pump and station.

F. The RTU shall be provided with routines to detect individual pump fault alarms and shall report these alarms to the Central HMIs. Alarms shall report when a pump is called to run but fails to start, or when a pump is called to turn off but continues to run, and when a pump is running and shuts off before it is called to turn off. An additional spare input point shall be provided for each pump for use with an external pump fault indicator such as seal fail or thermal. These alarms shall be individually reported back to the redundant Central HMIs.

G. RTU configuration parameters shall be adjustable locally and remotely from the Central HMIs. These functions shall be logged with a time stamp at the Central HMIs.

H. The capability to interface with a phase monitor and associated inputs and outputs shall be provided with the RTU. The phase monitor shall detect loss of phase, phase reversal, and phase-to-phase voltages. Utility line voltages shall not be wired directly to the RTU. Upon loss of phase, phase reversal, low or high line voltages; the RTU shall send an alarm to the Central HMIs. Phase voltages from phase A to phase B, from phase C to phase B and from Phase A to phase C on three-phase systems and voltages from L1 to neutral, from L2 to neutral and from L1 to L2 on single-phase 240VAC systems shall be reported to the Central HMIs.

I. A 4-20ma DC analog input for each pump shall be provided with the RTU for monitoring motor amps or VFD output speed. The RTU shall average individual motor amperage and report both instantaneous and average amperage to the Central HMIs.

J. A fail-safe input shall be provided indicating intrusion. Upon loss of this signal, or a series of devices providing this signal, the RTU shall report an alarm to the Central HMIs. Battery backup power shall be provided for this input.

K. If the lift station has generator power backup, two inputs, one indicating generator power is online and the second indicating a commercial power phase loss detection thru a user installed phase monitor on the line side of the power feed from the utility, shall be provided and reported to the Central HMIs. Battery backup power shall be provided for these inputs.

L. The RTU shall have the capability of locally verifying communication status with a FIU/FEP. Pressing the SILENCE button five times in succession shall blink the alarm light five times in succession if communications is successful, in both directions, with a FIU/FEP.

2.03 CONSTRUCTION

A. The RTU shall be housed in a dust-proof and waterproof NEMA 4X, Type 304, 14 Gauge stainless steel enclosure powder coated white, with a 304 stainless steel, lockable three-point handle-type latching mechanism. All exterior hardware and hinges shall be stainless steel.

B. A 14 gauge aluminum back-panel will be provided to mount all electrical control devices. All interior electrical control components mounted on the back-panel will be secured using stainless steel machine screws 8-32 minimum size. Heavier items including the RTU, control power transformer and items in excess of ten (10) pounds will be secured with 1/4”-20 stainless steel machine screws. Screw anchor nuts will be permanently installed in the sub-panel using cadmium plated steel knurled threaded inserts AKV Model AKS7 or equal. No self-tapping or sub-panel tapped screws will be used.

C. All wiring to the control devices within the RTU panel will be harnessed and permanently attached to the panel using welded 8-32 studs and stud mounted cable ties. Stick on tie wrap fasteners are not acceptable. Wiring will be supported every eight inches minimum. This panel will be grounded via a 10-32 stud located in the bottom hinged side and bonded to the enclosure and ground buss.

D. There shall be a permanently affixed document pocket the interior side of the exterior enclosure door to include a laminated wiring diagram, and bill of materials.

E. No devices or equipment shall be mounted to the top of the RTU panel enclosure, exclusive of radio antenna.

2.04 PAINT

A. The enclosure, sub-panel, and dead front operator panel will all be painted with heat fused polyester powder, electro statically applied paint on a phosphatized base. The enclosure will be white, inside and outside. The interior panels will be silver-tek bronze.

2.05 ENVIRONMENTAL RATINGS

A. All components will be able to operate at -22 F or lower to 140 F and higher at ninety-five (95) percent humidity.

2.06 RTU

A. To match the County's existing hardware configuration, all RTUs will be Motorola MOSCAD Ace 3600, with 4-watt 800MHZ trunked radio, three mixed I/O (as required), battery backup, and 120V AC eight-amp power supply. The unit will have a 120V AC surge suppressor installed directly on the AC-main terminals. All relay outputs will have interposing 120V, 10A relays installed for output protection. Two-120V AC, 5 amp circuit breakers will be installed, one for the RTU, the second for auxiliary power. All internal wiring will be point-to-point labeled using permanent wire markers.

2.07 RTU SOFTWARE APPLICATION

A. Each RTU will have the latest RTU SCADA application license compatible with the existing central configuration. Software functionality and algorithms will perform all of the functions listed in the Functionality portion of the specification. Proven debugged software will be provided to perform the below listed functions

1. Inputs and Discrete Alarm Capabilities will be:

Wet Well High Level	Pump 2 Interlock(s)
Wet Well Lag-Lag Level	Pump 2 Start Fault
Wet Well Lag Level	Pump 2 Run Fault
Wet Well Lead Level	Pump 2 Stop Fault
Wet Well Off Level	Pump 3 SS in Hand Position
Wet Well Low Level	Pump 3 SS in Auto Position
Generator Running	Pump 3 Running
Alarm Horn Silenced	Pump 3 Interlock(s)
Alarm Light On	Pump 3 Start Fault
Alarm Horn On	Pump 3 Run Fault
Float Voltage Low Alarm	Pump 3 Stop Fault
Odor Detector Alarm	Pump 4 SS in Hand Position
Memory/Init Alarm (RTU Fail)	Pump 4 SS in Auto Position
AC Power Alarm	Pump 4 Running
Battery Fail	Pump 4 Interlock(s)
Module 1 Fail	Pump 4 Start Fault
Module 2 Fail	Pump 4 Run Fault
Module 3 Fail	Pump 4 Stop Fault
Primary OK	Pump 1 Max Runtime Alarm
Secondary OK	Pump 2 Max Runtime Alarm
Phase A Loss	Pump 3 Max Runtime Alarm
Phase B Loss	Pump 4 Max Runtime Alarm
Phase C Loss	Wet Well Level

Phase Sequence
Pump 1 SS in Hand Position
Pump 1 SS in Auto Position
Pump 1 Running
Pump 1 Interlock(s)
Pump 1 Start Fault
Pump 1 Run Fault
Pump 1 Stop Fault
Pump 2 SS in Hand Position
Pump 2 SS in Auto Position
Pump 2 Running
Phase Monitor
Pump 1 Amps
Pump 2 Amps
Pump 3 Amps
Pump 4 Amps
Station Intrusion
Pump Control Panel Intrusion
RTU Panel Intrusion
Wet Well Vault Intrusion
Valve Vault Intrusion

2. Analog Input and/or Alarm Capabilities will be:

Wet Well Level Sensor
Phase AB Voltage
Phase BC Voltage
Phase CA Voltage
Pump 1 Amps
Pump 2 Amps
Pump 3 Amps
Pump 4 Amps
Float Voltage
Station Flow
Float Sequence
Pump 1 Starts
Pump 1 Runtime
Pump 1 Avg Amps
Pump 2 Starts
Pump 2 Runtime
Pump 2 Avg Amps
Pump 3 Starts
Pump 3 Runtime
Pump 3 Avg Amps
Pump 4 Starts
Pump 4 Runtime
Pump 4 Avg Amps
Reuse Total Flow
Force Main Pressure

3. Controlled Discrete Output Capabilities will be:

Disable Station
Disable Alarm Light
Disable Alarm Horn
Silence Horn
Pump 1 Override
Pump 1 Disable
Pump 2 Override
Pump 2 Disable
Pump 3 Override
Pump 3 Disable
Pump 4 Override
Pump 4 Disable
Reset Pump 1 Starts
Reset Pump 1 Runtime
Reset Pump 2 Starts
Reset Pump 2 Runtime
Reset Pump 3 Starts
Reset Pump 3 Runtime
Reset Pump 4 Starts
Reset Pump 4 Runtime
Reset Pump 1 Average Amps
Reset Pump 2 Average Amps
Reset Pump 3 Average Amps
Reset Pump 4 Average Amps
Reset Pump 1 Max Runtime Alarm
Reset Pump 2 Max Runtime Alarm

Reset Pump 3 Max Runtime Alarm
Reset Pump 4 Max Runtime Alarm
Reset Total Flow

4. Additional Controllable Internal Points capabilities will be:

Low Level Alarm Set point	2nd Lag Pump Stop Set point
Lead Pump Start Set point	3rd Lag Pump Stop Set point
Lag Pump Start Set point	Lead/Lag/2nd/3rd Start Order
2nd Lag Pump Start Set point	Max Run Set point P1
3rd Lag Pump Start Set point	Max Run Set point P2
Lead Pump Select	Max Run Set point P3
Lag Pump Select	Max Run Set point P4
High Level Alarm Set point	2nd Lag Pump Select
Lead Pump Stop Set point	3rd Lag Pump Select
Lag Pump Stop Set point	

2.08 RADIO

A. The radio shall be a Motorola model XTL 2500 4 watt 800MHZ trunked radio or the latest model from Motorola that is designed for this purpose. No RTU or radio shall be integrated into the County's SCADA System without County authorization. Before the RTU or radio is placed into service, GPS coordinates of the lift station control panel must be provided to the County.

2.09 UNINTERRUPTIBLE POWER SUPPLY/BATTERY BACK-UP

A. The RTU shall be supplied with an integrated power supply/uninterruptible power supply (UPS) with battery back-up capability for operating the RTU for minimum of four hours in the event of a commercial power failure. The power supply shall keep batteries at a float charge. The RTU shall contain a low battery cutout circuit and the batteries shall not be damaged by deep discharges. The power supply shall supply power to the processor/PLC and I/O and/or function modules. The power supply shall also provide a 24-volt DC voltage source for field devices.

2.10 INSTRUMENT SURGE PROTECTION

A. All instrumentation will be protected by plug-in surge suppression with bases mounted in the RTU. Surge Suppression shall be as manufactured by Phoenix, or County approved equal.

2.11 SHOP TESTING

A. After fabrication in the RTU panel manufacturer's plant, an operational test shall be performed to check out the entire panel before delivery.

B. The RTU will have all software loaded and all I/O will be proven to the RTU with inputs simulated. A signed dated detailed test report will be shipped with the unit.

PART 3 -EXECUTION

3.01 INSTALLATION OF RTU PANEL

A. The Contractor shall provide and install all required hardware and software components necessary for a complete functional RTU. A Florida Certified Electrical Contractor will perform installation in accordance with the current edition of the NFPA, NEC, UL and local County electrical codes.

1. Electrical Power

   The Contractor will be responsible to run 20 amp, 120V AC circuits to the RTUs. All enclosures, ground busses, antenna masts, surge arrestors will be grounded and bonded to the existing service main ground.

2. All trunked radios will be programmed and 'code plugged' by the County's Radio Administrator. It will be the supplier's responsibility to provide the proper 'code plug' to the Radio Administrator, deliver the radios for programming, reinstall the radios, and verify operation. The County will not be responsible for invalid or improper 'code plugs'.

3. All hardware and brackets used to mount the RTU panel shall be stainless steel.

4. All interface wiring shall be tagged with heat shrink pre-printed wire labels. Hand written labels are not acceptable.

5. All RTUs will be quality accepted by having the supplier demonstrate to the County representative that all features and functions of the RTU perform.

3.02 STARTUP AND ACCEPTANCE

A. The County has established specific procedures for integration and acceptance of a RTU into the County's SCADA system. This procedure shall be followed. Before acceptance, a complete documented checkout of the RTU, Central HMIs interface, and RF communications, shall be completed and witnessed by the County and the system supplier.

END OF SECTION

SECTION 40 95 13

PROCESS CONTROL PANELS AND HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Control panels and consoles.

2. Switches, push-buttons, lights.

3. Relays.

4. Timing devices.

5. Terminal blocks.

6. Control power transformers.

7. Phase monitor

1.02 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings covering the items included under this Section.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Codes, Ordinances, and Industrial Standards: Design, testing, assembly, and methods of installation for materials, electrical equipment, and accessories proposed under this Section shall conform to National Electric Code and to applicable State and local requirements.

2. UL listing and labeling of custom-built panels (UL 508) shall be adhered to under this Contract.

PART 2 - PRODUCTS

2.01 PANEL SHOP MANUFACTURERS

A. Control panel manufacturer shall be one from the following list with out exception:

1. Flygt

2. Sta-Con

2.02 CONTROL PANELS AND CONSOLES

A. Sheet Metal Construction:

1. Panels and consoles shall be fabricated from sheet stainless steel welded and bolted into a rigid self-supporting structure a maximum of 90 inches high and a minimum of 20 inches deep. Overall length shall be coordinated with space requirements as indicated by Drawings. Changes in length from that shown on Drawings must be brought to attention of ENGINEER within 90 days of Contract Award. Cost to modify floor plan or wall opening shall be at CONTRACTOR's expense after this 90-day period. Panel face layouts shown on Drawings are intended to indicate relative position of all components. Supplier shall fix exact locations and overall dimensions to meet requirements of its equipment.

2. Panel and console bodies shall be 12 gauge minimum stainless steel for panels up to 42 inches in width, and 10 gauge minimum stainless steel for panels exceeding 42 inches in width. Panel subplates shall be same gauge as enclosure. Stiffening members shall be provided for strength and stiffness as required.

3. A minimum of 3 inches shall be provided between edge of panel subplate and outside walls of panel body to ensure adequate wire-way space for external wires entering panel. Panel subplate shall be mounted on collar studs for easy removal. Print pockets shall be provided on each panel. Brackets welded to inside of panel, complete with lights, shall be provided on panels where indicated by Drawings.

4. Identification plates shall be laminated phenolic with white letters engraved on a black background and mounted with screws or double-back adhesive foam tape.

5. All components inside panel shall have identification plates. This includes instruments, relays, switches, circuit boards in plug-in racks, etc. Identification plates shall include engineering symbols (FBQ-1, SW-3, FIC-4, CR-1, etc.). Switches and circuit breakers inside panel shall have names (Horn, Audio Tone, Panel Power, etc.) on identification plates as well as engineering symbol.

6. Identification plates shall be located on or adjacent to device they are identifying and shall be readable without looking around, under, or on top of device to find identification plate.

7. Panels shall be constructed with a deadfront. The switches, lights, and pushbuttons shall be mounted to an internally hinged lexan door.

B. Access:

1. Wall- and/or floor-mounted control panels shall have continuous piano-hinged doors for ease of access. Door openings shall expose a minimum of 80 percent of panel interior. Door openings shall be sealed with a 0.125-inch thick minimum cellular neoprene gasket cemented with oil-resistant adhesive and held in place with a retaining strip. Print pockets shall be provided on each door. Two door enclosures shall have a removable center post. Panel doors less than 40 inches high shall be equipped with a 2-point latching mechanism. Panel doors 40 inches high or more shall be equipped with a 3-point latching mechanism.

2. Components and terminals shall be accessible without removing another component except covers. Swing out sections shall be used if mounting space is required that is not normally accessible.

C. Finish:

1. Panel face openings for mounting equipment shall be smoothly finished cut with counterboring and trim strips provided as required to give a neat finished appearance. Bezels shall be used on all front panel-mounted devices to cover panel cutouts. A chrome-plated or stainless steel bezel shall be used at parting line of panels that have shipping splits or at parting line of panels placed end to end.

D. Electrical:

1. Internal panel wiring shall be 19 strand No. 16 AWG, 90^{O}C MTW, Class C stranded, or THHN/THWN approved as 90^{O}C MTW. All panel wiring not run in wire ducts shall be bundled and tied. Each wire shall be identified at both ends with same exclusive number. Number shall be same number shown on control schematic. Number shall not be used again for any other purpose. Wires marked differently on each end will not be accepted. Wire markers shall be provided on end of each wire at termination point.

2. Control wiring associated with control circuits de-energized when main disconnect is opened shall be color-coded red. Control wiring associated with control circuits which remains "hot" when main disconnect is opened shall be color-coded yellow. DC control wiring shall be color-coded blue. Ground wires

shall be color-coded green. Terminal blocks shall be numbered in numerical order. Yellow wiring leaving panel shall be brought to an isolated set of terminal blocks.

3. Provide an instrument common bus 0.1 by 0.5 by 6-inch minimum in enclosure and isolated from enclosure. A separate instrument common wire shall be run from each common terminal on an instrument to instrument common bus. Instrument common wires looped from one terminal to another and then to instrument common bus will not be accepted.

4. Instrument common bus shall be connected to power supply common with a wire or wire braid strap as short as practical and of sufficient capacity to prevent troublesome voltage drop. Common terminals and common bus for instrument common shall be tagged "Instrument Common." Instrument signal wires of 4-20 mA or 1-5V shall be shielded wire. Telephone wires and telemetry equipment interconnection wires shall be shielded wires.

5. Provide a copper ground bus 0.1 by 0.5 by 6-inch minimum in enclosure to which all instrument grounds and panel enclosure are tied. Separate ground wire shall be run from instrument enclosure ground terminal directly to ground bus. Instrument ground wires looped from one instrument to another will not be accepted. Under no circumstances shall neutral side of power source or any other terminals used for grounding power circuits be used as an instrument common.

6. Wires to internal components shall be connected to inside of terminal strip. Wires to external components shall be connected to outside of terminal strip. No more than 2 wires shall be connected to one terminal point.

7. Panel wire duct shall be provided between each row of components and adjacent to each terminal strip. Wire ducts shall be a minimum of 1-inch wide and 3 inches deep with removable snap-on covers and perforated walls for easy wire entrance. Wire ducts shall be constructed of nonmetallic materials with a voltage insulation in excess of maximum voltage carried therein.

8. Floor-standing panels and consoles shall be equipped with a flange mounted 600V rated main non-automatic trip circuit breaker or disconnect switch. Single phase, 60 hertz power at voltage shown on Drawings shall be supplied to main disconnect. Panel fabricator shall provide any additional voltages and power requirements at control panel to meet requirements of equipment contained therein.

9. Disconnect and transformer shall have enclosed protected terminations to prevent accidental shock.

10. Relays, timers, etc., installed on panel subplate shall be provided with a minimum spacing between component and wire duct of 1.5 inches above and 1 inch below. Minimum spacing between adjacent components shall be 0.25 inch. Relays, timers, etc., shown in schematics are intended to show function. Additional relays may be required in conjunction with items shown to provide total number of contacts required. Where limit, pressure, float switches, etc., are used and more than SPDT contacts are indicated by schematics, provide additional contacts required by using auxiliary relays. However, if a DPDT switch is called for, using a SPDT with a relay will not be accepted. All control and pilot devices such as relays, timers, etc., shall be 120V, 3 amp rated except where noted with coil voltage as required. One N.O. spare contact shall be provided on each relay.

E. Panel/Subplate Layout:

1. Panel face-mounted equipment shall consist of pilot lights, push-buttons, selector switches, meters, indicating timer, etc. Spacing between horizontal rows of components shall be 1.5 inches minimum; spacing between vertical columns of components shall be 1.875 inches minimum. Components shall be grouped and/or located as indicated on Drawings. Distance from bottom row of components to floor shall be not less than 36 inches. Top row of recording and indicating instruments shall be centered approximately 60 inches above floor. Maximum height for annunciator windows shall be 85 inches above floor. In general, indicating lights, push-buttons, etc., shall be mounted in accordance with sequence of operation from left to right and top to bottom.

2. A minimum of 2 inches shall be provided between terminal strips and wire ducts or terminal strips and terminal strips. In general, terminal strips shall be mounted on vertical edges of subplate. Where terminal strips are mounted side-by-side, terminals shall be elevated 1.5 inches above subplate to allow wires to pass underneath.

3. Subplates shall have a minimum of 15 percent spare mounting space, and terminal strips shall have a minimum of 20 percent spare terminal blocks.

2.03 SWITCH, PUSH BUTTONS, LIGHTS

A. Selector switches shall be 120 VAC rated, oil-tight construction with standard operator knob.

B. Start push buttons shall be 120 VAC rated, oil-tight construction with extended guard and black color insert.

C. Stop push-buttons shall have a half-guard with red color insert. Contacts shall be rated NEMA B-150 and P-150.

D. Pilot lights shall be push-to-test oil-tight construction with cap colors and voltages as required. Nameplates for each switch and light shall conform to manufacturer's series and type with engraving as called for on Drawings.

2.04 RELAYS

A. Control Relays: Switching and output relays shall be plug-in type with contacts rated 120 VAC, 3 amp with 120 VAC or 24 VDC coil, indicating light, manual operator, and plastic transparent cover. Relays shall have a retainer mechanism to prevent loosening from vibration. Relays shall not be used for switching 1-5 VDC or 4-20 mA signals associated with instruments.

2.05 TIMING DEVICES

A. Solid-state timers shall be plug-in type.

B. Solid-state timers with ON or OFF delay cycles shall operate at 120 VAC, 60 hertz. Solid-state device may be analog or digital in operation. Time interval shall be as shown on Drawings or as required.

2.06 TERMINAL BLOCKS

A. Terminal blocks shall be 300 or 600 volt rated, channel-mounted box lug with pressure plate type or binding head screw type with pressure plate, and shall have a white marking strip. Terminal blocks shall be color-coded according to the following coloring scheme:

Black	120V power circuits de-energized when main disconnect is opened.
White	120V neutral conductors.
Red	120V control circuits de-energized when main disconnect is opened.
Yellow	120V control circuits which remain hot when main disconnect is opened.
Blue	Terminal blocks for DC wiring.
Gray	Terminal blocks for shields in DC wiring.
Green	Ground terminal blocks.

B. For terminals associated with 120V nonisolated input cards, individually fused terminal blocks shall be used for 120V power to field devices.

C. Provide a minimum of 20 percent spare terminals for each type and color of terminal used. All terminals of a given color shall be grouped with other terminals of the same color.

2.07 CONTROL POWER TRANSFORMERS

A. Control power transformers shall be sized to handle in-rush currents and to accommodate continuous load of circuits plus 25 percent future load with 5 percent or less voltage drop. Transformer primary voltage shall be as indicated on Drawings.

2.08 PHASE MONITORS

A. The Phase Monitor shall be an 8 pin, plug in style unit for an applied voltage of either a range from 200 to 240 VAC or 425 to 525 VAC. The Phase Monitor shall monitor Under Voltage, Pase Reversal, and Phase Imbalance. The Phase Monitor shall be able to monitor Over Voltage as an option, as well as having optional reset delay time ranges.

B. With the correct voltage applied, the Phase Monitor LED shall blink during the reset delay, and at the end of the reset delay, the LED shall come on steady, and the internal relay shall be energized.

C. The trip points for Under and Over Voltage for the 200 to 240 VAC range shall be 15% of setting, and the reset shall be 12% of setting. The trip points for Under and Over Voltage for the 425 to 525 VAC range shall be 10% of setting, and the reset shall be 8% of setting.

D. The Phase Imbalance shall have a trip delay of 5 seconds at a Phase Imbalance of 5%, and the delay shall approach zero as the Percentage of Phase Imbalance increases, with the reset being 4%.

E. The adjustment range shall be from 200 to 240 VAC or 425 to 525 VAC, with the center of the adjustable monitoring range either 230 VAC or 500 VAC.

F. The output relay shall contain one SPDT relay, rated 10A at 240 VAC, and one normally open contact between pins 6 and 7, also rated 10A, that closes when energized. The Phase Monitor shall be able to function as a diagnostic tool as well, blinking a series of pulses to identify the fault conditions Under Voltage, Over Voltage, Phase Imbalance, or Phase Reversal.

G. The Dual Voltage Phase Monitor shall be be provided.

PART 3 - EXECUTION

3.01 GENERAL

A. Examination, Installation, Field Quality Control, Demonstration: In accordance with Section 40 05 00.

B. Panel manufacturer shall have a representative present on site to attend final station startup.

END OF SECTION

SECTION 40 97 20

FLOW PROCESS MEASUREMENT DEVICES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Magnetic flow meter.

2. Ultrasonic flow meter.

1.02 SUBMITTALS

A. Shop Drawings: Submit in accordance with Sections 01 33 0 and 40 05 00, Shop Drawings covering the items included under this Section.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, manufacturers offering products which may be incorporated in Work include:

1. Magnetic Flow Meter:
   a. ABB.
   b. Siemens.
   c. Endress Hauser.
   d. Honeywell, Inc.
   e. Johnson Yokogawa Corp.
   f. Rosemount.
   g. Sparling-Tigermag.
   h. Toshiba.

2. Ultrasonic Flow Meter:
   a. Sparling.
   b. Nusonics.

2.02 MAGNETIC FLOW METER

A. Magnetic flow meters shall be either flanged or flangeless type as indicated. Meters 4 inches or smaller shall be wafer style. Meters 6-inch or larger shall be of flange design.

B. Meter body shall be Schedule 10, 304 stainless steel or Schedule 40 steel with 150-pound ANSI flange or AWWA Class D flange when ANSI is not an available option. Meters 4 inches or smaller shall be wafer or flangeless style and shall be designed for installation between 150 Class and 300 Class ANSI, DIN, or BS pipe flanges.

1. Wafer or flangeless style meters 4 inches or smaller shall have a ceramic, Teflon, or Tefzel liner and Hastelloy "C" or platinum electrodes as indicated.

2. Meters 6 to 12 inches shall have Teflon or polyurethane liner and Hastelloy "C" or platinum electrodes as indicated.

3. Meters 14 inches and larger shall have an Elastomer or polyurethane liner and Hastelloy "C" or platinum electrodes as indicated.

C. Liner material shall be suitable for the process flow indicated on Drawings. .

1. Meters 4 inches or smaller shall be furnished with a Teflon or Tefzel liner. Exception: Ceramic liner shall be furnished for meters 4 inches or smaller used for lime slurry, sludge, and abrasive process flows.

2. Teflon liner shall be furnished for meters 6 to 12 inches.

3. Polyurethane liner shall be furnished for meters 14 inches and larger, or if not indicated otherwise on Drawings or in the Specifications.

D. Electrodes shall be suitable for the process flow indicated on the drawings and shall be bullet nosed style made of Hastelloy "C." Exception: Platinum electrodes shall be provided for sodium hydroxide or other caustic process applications.

E. Start-up and acceptance check for flow meters shall be performed by a qualified employee of flow meter manufacturer. Service personnel of sales representative or of equipment supplier of this Section will not be accepted.

F. Meter below grade or larger than 10 inches shall be capable of withstanding continuous submergence in up to 30 feet of water without damage. Meters 10 inches or smaller shall be capable of accidental submergence in 30 feet of water for up to 48 hours. Field coil design shall be such that they shall not overheat or

otherwise be damaged if flow tube is not totally filled with fluid. Magmeters shall be provided with 2 grounding rings.

G. Magnetic flow meter signal converter shall consist of solid-state, feedback-type microprocessor circuitry. Operational parameters shall be user configurable locally via an integral push-button arrangement or via a remote intelligent terminal. Appurtenances, including hand-held programmer and/or programming software, shall be provided for local configuration of operational parameters. Converter shall change a low-level flow signal from sensor electrodes into a proportional isolated 4-20 mA DC signal. The converter shall have an extremely high input impedance and not be affected by quadrature noise. The unit shall be capable of accommodating uni-directional or bi-directional flow. Sensing of meter failure shall activate a user-configurable zero or 130 percent output signal and a failure alarm contact closure.

H. Where indicated on Drawings, a high-frequency digital proportional output shall be provided for use with high-accuracy totalizers. To eliminate errors, the converter shall incorporate an integral zero return circuit to provide a constant zero output signal in response to an external dry contact closure. An automatic empty pipe detector and low-flow cutoff shall be provided as standard.

I. Magmeter shall be electronically isolated for grounding. Where insulated or nonconductive pipe is used, only orifice plate-type grounding rings will be acceptable. Grounding electrodes which penetrate the liner will not be acceptable.

J. Unit shall be supplied with an integral or local conduit-mounted flow indicator calibrated in engineering units. Indicator shall be tagged showing design range in units being measured and shall be capable of simultaneously displaying flow rate and totalization with an alphanumeric display.

K. Zero stability shall be achieved by pulsing the sensing head magnetic field coils with a regulated direct current, first in one direction and then in opposite direction.

L. Continuous zero stability shall be obtained by signal sampling during the quiescent coil states. There shall be no zero offset or zero adjustments required. The converter shall not require calibration over its expected life under normal use.

M. Flow meter shall operate within Specifications on 120 volt AC plus 10 percent and 60 hertz plus 5 percent. Power consumption shall not exceed 25 VA for meters 24 inches and smaller, and 50 VA for meters 30 inches or greater.

N. Input span shall be adjustable between 0-1 and 0-30 feet per second and range adjustment shall be digital. Converter shall include adjustable damping circuitry.

Unit shall not be affected by power line aberrations such as those produced by SCR-type motor controllers or other voltage transients.

O. System accuracy, including primary magnetic flow meter, shall be plus 0.5 percent of rate for maximum flow velocities from 1.33 to 33.33 feet per second, and plus 1 percent of rate for maximum flow velocities from 0.7 to 1.32 feet per second. Repeatability shall be plus 0.1 percent of span. Rangeability shall meet or exceed 30:1 turndown.

P. The signal converter portion of the magnetic flow meter shall include both a magnetic driver to power the magnetic coils and the signal converter electronics. The converter shall have the ability to be either integrally or remotely mounted as specified. If not specified, converter shall be remotely mounted. It shall be housed in a NEMA 4X case. When remotely mounted, the signal cable shall be provided with the proper length.

Q. Magmeter manufacturer shall comply with ISO9000 Standards and the meter shall be FM approved. Signal converters shall be interchangeable without effect of meter accuracy or the need for recalibration for all meter sizes. Provide spool-piece for meters sized 12 inches and smaller.

2.3 ULTRASONIC FLOW METER

A. Ultrasonic flow meter shall offer no more obstruction to flow than an equivalent length of pipe. Flow tube end connections shall be 150-pound ANSI flange. Interior of flow tube shall be fused epoxy-coated. Exterior shall also be epoxy-coated. Each flow meter shall be flow laboratory wet calibrated.

B. Start-up and acceptance check for flow tubes shall be performed by a qualified employee of flow meter manufacturer. Service personnel of sales representative or of equipment supplier of this Section will not be accepted.

C. Calibration data shall be submitted as Shop Drawings for zero flow, 1-foot per second, full-range flow, and one point between full range and 1-foot per second for each flow tube.

D. A certificate traceable to NIST shall be provided for the flow laboratory to be used for calibration.

E. Manufacturer shall guarantee each flow meter will operate as specified for fluid to be measured. Solids content or other data may be obtained from ENGINEER at time of Bidding. Piping configurations for each installation shall be examined by manufacturer at Bid time. Any flow meter not performing to Specifications under conditions set forth by Drawings and ENGINEER shall be removed and replaced at

CONTRACTOR's expense. Replacement flow meter will be as directed by ENGINEER.

F. Flow-sensing transducers shall be mounted integral to flow meter and shall be field replaceable without shutting down process. Transducers mounted on outside of flow meter requiring acoustic energy to penetrate a metal pipe wall will not be accepted. Doppler-type acoustic flow meters will not be accepted. Flow meter shall be capable of steam cleaning up to maximum process temperature limit. Electronic converter package shall be field replaceable and interchangeable with other units without aid of test equipment. Sensor package shall be explosion-proof or intrinsically safe for hazardous explosive areas. General-purpose use shall be NEMA 4.

G. Unit shall be supplied with an integral or local conduit-mounted flow indicator calibrated 0-100 percent. Indicator shall be accurate and readable (markings) to plus 2 percent of full scale. Indicator shall be tagged showing the design range in units being measured.

H. Digital readouts shall be calibrated in units of flow.

I. Electrical connections shall be with NPT type conduit connectors to well-marked terminal blocks.

J. Electronics shall be microprocessor-based. Only field adjustments required shall be zero and full scale span. These shall be accomplished without the aid of external test equipment. Span and zero adjustments shall be noninteracting to less than plus 0.5 percent of full adjustment range.

K. Span adjustment shall be field changeable with internal calibrated switches or dials.

L. Printed circuits shall be coated for moisture and fungus protection.

M. Flow meter operation shall not be degraded or interrupted by the build-up of grease or other electrically conductive or nonconductive materials on inside wall of flow meter up to thicknesses of 0.75-inch. External or auxiliary cleaning devices designed to purge or otherwise remove pipe wall coatings cannot be used to meet the intent of Specification.

1. Operational Data:
    a. Temperature: Sensor and controller transmitter to operate within Specifications over ambient temperature range of -20 degrees F to 130 degrees F. Indoor-mounted units shall operate from plus 15 degrees F to 130 degrees F. Provide thermostatic controlled heaters when required for application.

b. Power: 120 volt AC plus 10 percent of 60 hertz plus 10 percent with a power consumption not to exceed 50 watts. Unit shall be unaffected by line transients and both power supply and output circuits shall have lightning spike protection.
c. Sample Rate: 100 complete samples per second minimum.
d. Noise and Reflection Blocking: Circuitry shall be provided to reject all electrical and mechanical noise and to reject false or reflected samples.
e. Loss of Signal: Electronics shall be capable of operating on as few as 2 percent of attempted samples without exceeding accuracy of Specification. Unit shall indicate loss of signal locally and on sustained loss of signal drive output to zero or full scale by switch selection. Output shall remain at zero for empty pipe conditions.
f. System Accuracy (Reynolds number above 100,000): Plus 1 percent of instantaneous value of flow from 1-25 fps and plus 0.02 fps from 0.1 to 1.0 fps of flow for installations having 10 diameters upstream of straight pipe, and 5 diameters downstream of straight pipe minimum. Accuracy of flow calibration facility shall be traceable to National Bureau of Standards. Accuracy shall not be affected by changes in fluid density or viscosity. Air bubbles shall not affect accuracy to a greater extent than fluid volume represented by bubbles.
g. Vibration: Flow tube and integral transmitter shall be capable of withstanding pipeline vibration of 1.5 G from 5 to 2,000 hertz.
h. Zero Stability: Plus 0.015 fps over entire operating and ambient temperature range.
i. Outputs: 4-20 mA linear with flow into 0-600 ohm. Output is to be isolated and floating to prevent ground loops when used with other control loops that have an established common.
j. A pulsed output shall be available when called for on Drawings.

PART 3 - EXECUTION

3.01 GENERAL

A. Examination, Installation, Field Quality Control, Demonstration: In accordance with Section 40 05 00.

END OF SECTION

APPENDIX A

GEOTECHNICAL REPORT

Draft Geotechnical Engineering Report

Pump Station 079 Replacement at 190 173rd Avenue
North Redington Beach, Pinellas County, Florida

Prepared for: ***Tetra Tech***
400 North Ashley Drive, Suite 2600
Tampa, Florida 33602

Prepared by: ***MC Squared, Inc.***
5808-A Breckenridge Parkway
Tampa, Florida 33610

Project No. T101604.196_G
August 2017

MC² GEOTECHNICAL • ENVIRONMENTAL MATERIALS TESTING

5808-A Breckenridge Parkway, Tampa, Florida 33610
Phone (813) 623-3399, Fax (813) 623-6636
www.mc2engineers.com

August 11, 2017

Mr. Thomas Cross, PE
Tetra Tech
400 North Ashley Drive, Suite 2600
Tampa, FL 33602

Subject: Draft Geotechnical Engineering Report
Pump Station 079 Replacement at 190 173rd Avenue
North Redington Beach, Pinellas County, Florida
MC² Project No. T101604.196_G

Dear Mr. Cross:

MC Squared, Inc. (**MC²**) has completed geotechnical engineering services at Pump Station 079 located at 190 173rd Avenue at North Redington Beach, Pinellas County, Florida. The purpose of this project was to assist the design team with geotechnical engineering recommendations for the addition of the proposed pump station and associated generator house and control panel.

Often, because of design and construction details that occur on a project, questions arise concerning subsurface conditions. **MC²** is pleased to continue our role as geotechnical consultants during the construction phase of the project.

We trust that this report will assist you in the design and construction of the proposed project and we appreciate the opportunity to be of service to you. Should you have any questions, please do not hesitate to contact us.

Respectfully submitted,
MC²

Jeffery L. Hooks, P.E.
Project Manager
Florida P.E. No. 67882

Jodonna J. Jimenez, P.E.
Project Engineer
Florida P.E. No. 47701

Bradley A. Crowson, E.I.
Staff Engineer

5808-A Breckenridge Parkway, Tampa, Florida 33610
Phone (813) 623-3399, Fax (813) 623-6636
www.mc2engineers.com

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APPENDIX

1 PROJECT INFORMATION

1.1 Project Authorization

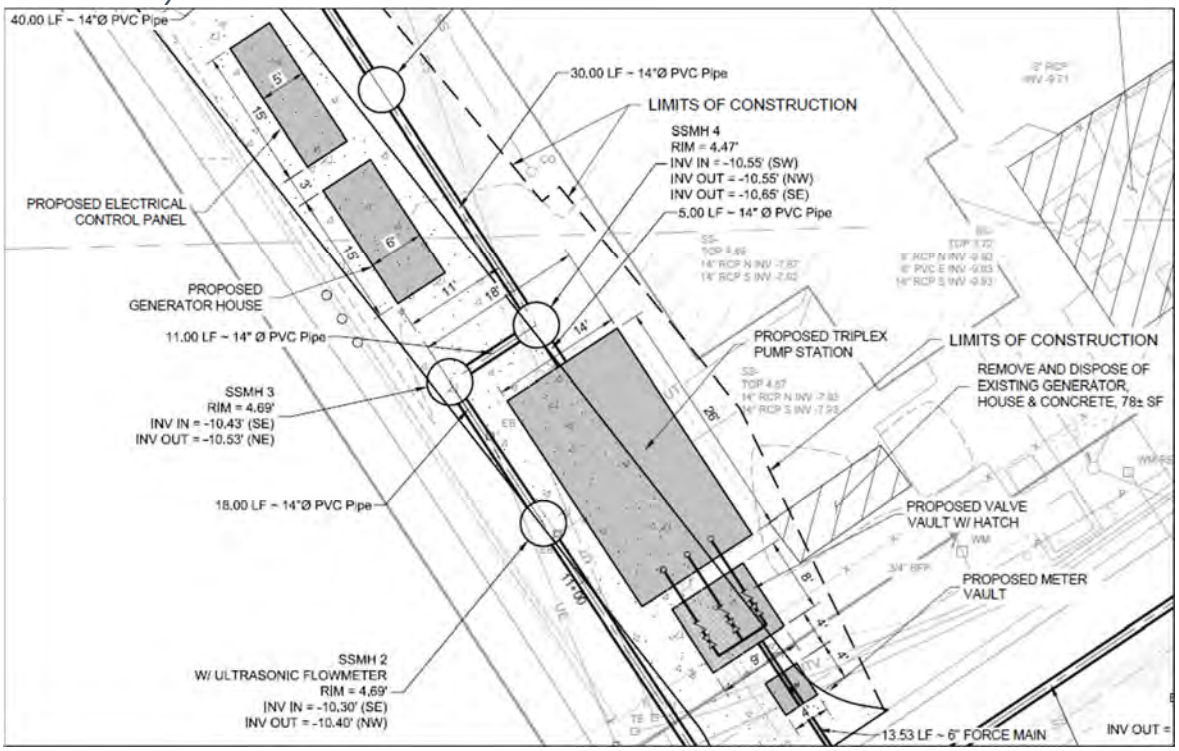
Authorization to proceed with this project was issued by **Mr. Thomas Cross, PE** of **Tetra Tech** through a subconsultant services agreement dated February 23, 2017 and in general accordance with our proposal dated January 26, 2017.

1.2 Project Description

The proposed project site is located at 190 173rd Avenue in North Redington Beach, Pinellas County, Florida. Project information was provided by **Mr. Thomas Cross, PE** of **Tetra Tech** through e-mail and verbal communications. Based on our understanding, geotechnical engineering services are required to support the design of a new pump station at the location noted. The pump station and associated structures are described as follows:

- A new 14-ft. x 26-ft. foundation for the proposed triplex Pump Station 079 at a depth of 22-ft. below the ground surface (bgs).
- A new 8-ft. x 15-ft. slab for the proposed generator house built at grade.
- A new 5-ft. x 15-ft. slab for the proposed electrical control panel built at grade.

Figure 1: Site Layout



Loads were not provided as of the time of this writing. If any of this project description information is incorrect or has changed, please inform **MC²** so that we may amend, if appropriate, the recommendations presented in this report.

2 SCOPE OF WORK AND SERVICES

The purpose of this report is to describe, in general terms, soil and groundwater conditions encountered at the site and to provide evaluations and recommendations to aid in the design and construction of the new pump station and associated structures. To achieve the aforementioned objective, our scope of services included the following:

1. Conducting a visual reconnaissance of the project site. Reviewing the USDA Soil Survey for Pinellas County and the USGS topographic maps.

2. Clearing utilities with local authorities thru Sunshine811 and with personnel knowledgeable about utilities on site.

3. Determining boring locations by measuring distances from known features.

4. Performing geotechnical explorations at the depths and locations selected and approved by **Tetra Tech** (**Boring Location Plan** in **Appendix**) as follows:

    - one (1) Standard Penetration Test (SPT) boring to a depth of 45 feet bgs within/near the proposed pump station footprint at an accessible location.

    - two (2) SPT borings to a depth of 35 feet bgs within/near the proposed generator house and electrical control panel slab locations.

5. Visually examining all recovered soil samples in the laboratory. Performing laboratory tests on selected representative samples to develop the soil legend for the project using the Unified Soil Classification System, as deemed appropriate. The laboratory testing included percent passing the No. 200 US standard sieve, Atterberg Limit testing, organic content and natural moisture content determinations to evaluate physical properties of the soil.

MC² presents the following data and recommendations in our report:

1. General assessment of area geology based on our past experience, study of geological literature and boring information.

2. General suitability of materials within the site for use as engineered fills and general backfill.

3. General location and description of potentially deleterious materials encountered in the borings, which may interfere with the proposed design, construction or performance, including existing fills or surficial organics.

4. Discuss critical design and/or construction considerations based on the soil and groundwater conditions developed from the borings including recommendations for shallow foundations, estimated settlement and earth pressure coefficient.

5. Address groundwater levels in the borings and estimate seasonal high groundwater. Provide general recommendations for de-watering if required. ***Please note that the responsibility of actual dewatering design at the site is not included in our services.***

6. Recommendations for foundation design and construction including recommendations for typical shallow foundations.

The scope of our services did not include an environmental assessment for determining the presence or absence of wetlands or hazardous or toxic materials in the soil, bedrock, groundwater, or air, on or below or around this site. Any statements in this report or on the boring logs regarding odors, colors, unusual or suspicious items or conditions are strictly for the information of our client. In addition, our scope of services did not include an evaluation of sinkholes or sinkhole activity.

3 SITE CONDITIONS

3.1 Site Features

The project site is located at 190 173rd Avenue, North Redington Beach, Pinellas County, Florida as shown in the **Appendix**. The site is generally level. The property is currently being used to house County equipment and has pump stations currently in service near where the proposed pump station 079 will be constructed. A carport is currently located within the footprint of the proposed new pump station. According to on-site County personnel, an existing storm water line traverses north-south along the path of the proposed improvements and is approximately 20 to 30-ft. deep.

3.2 USDA Soil Survey

Our review of the U.S. Department of Agriculture (USDA) - Soil Conservation Service (SCS) maps for Pinellas County indicates the improvements are located within one mapping unit: Matlacha and St. Augustine soils and Urban land (16).

Matlacha and St. Augustine soils and Urban land (16) has a parent material of sandy mine spoil or earthy fill and a typical profile of sand from 0 to 80 inches bgs. The material is somewhat poorly

drained and has a high capacity to transmit water. The depth to water table is about 24 to 36 inches.

This information was published in a report titled *The Soil Survey of Pinellas County, Florida* using Version 13, dated September 16, 2016. The aerial images were photographed from December 17, 2013 to February 28, 2014. A portion of the **USDA Soil Survey Map** of the project area is included in the **Appendix**.

The USDA Soil Survey is not an exact representation of the soils on the site. The mapping by USGS is based on interpretation of aerial maps with scattered shallow borings for confirmation. Accordingly, borders between mapping units are approximate and the change may be transitional. Differences may also occur from the typical stratigraphy, and small areas of other similar and dissimilar soils may occur within the soil mapping unit. As such, there may be differences in the mapped description and the boring descriptions obtained for this report. Development/urbanization can also cause differences in the typical stratigraphy. The survey is, however, a good basis for evaluating the shallow soil conditions of the area.

3.3 Topographic Map and Site History

Based on our review of the USGS topographic quadrangles titled "Seminole Quadrangle", the existing site is at an approximate elevation range of 5 to 10 feet (NGVD 1929 datum) (refer to the **USGS Topographic Map** in the **Appendix**). The elevation has not changed drastically since the man-made peninsula the site rests on was constructed.

The following was conveyed through conversations by on-site County personnel during our field exploration: A reported storm water pipeline along the project length and was constructed using open trench methods at a depth of 20 to 30 feet bgs. Just to the east of this pipeline and within the proposed construction limits is the former location of an old pump station that has been grouted, excavated and backfilled. The facility was abandoned after a pipeline burst and created a man-made "sinkhole" that damaged the pump station beyond repair.

4 FIELD EXPLORATION PROGRAM

The field exploration program consisted of performing SPT borings. The SPT borings for the pump station and associated generator house and electrical control panel structures were performed on July 25, 2017. The field exploration services were performed under the direct supervision of **MC²'s** qualified staff engineers and overseen by licensed professional engineers.

4.1 Standard Penetration Test Borings

A total of three (3) SPT borings were completed at the site in general accordance with ASTM D1586

(Standard Test Method for Penetration Test and Split Barrel Sampling of Soils) by a track-mounted drill rig using a wet-rotary procedure. Representative soil samples were obtained using the split-barrel sampling procedure discussed below. In this procedure, a 2-in. outer-diameter, split-barrel sampler is driven into the soil by a 140-lb hammer with a free-fall of 30-in. The number of blows required to drive the sampler through a 12-in. interval, after the initial 6-in. seating interval, is termed the Standard Penetration Resistance, or "N" value, and is indicated for each sample on the boring log. The "N" value may be taken as an indication of the relative density of soils in-situ.

The first four (4) feet in the borings were augered by hand in order to avoid potentially unmarked utilities and to help aid in the determination of the seasonal high groundwater level (SHWT). The borings were augered using a 4-in. diameter bucket auger turned into the soil in 4 to 6-in. increments. The soils were retrieved and the samples placed in jars, labeled and returned to our Tampa Office.

Soil samples, recovered during the field exploration program, were placed into air-tight, jars labeled with the project number, boring number and sample number and returned to our office to confirm field classification and perform laboratory testing, as required. All soil samples collected will be retained in house for 60 days from the date of release of this report and will be subsequently discarded without further notice unless requested otherwise in writing.

Groundwater, if encountered, is normally measured during the advancement of our borings and prior to the introduction of bentonite to the drilling fluid. Once bentonite is added, an accurate groundwater level is difficult to measure at the time of drilling. Upon completion of our drilling, all test borings were backfilled using bentonite pellets in general accordance with applicable procedures.

5 LABORATORY TESTING

5.1 Soil Classification Testing

A representative set of soil samples was tested in the laboratory to assist in the classification and determination of engineering characteristics of the soils based on their mechanical and physical behavior. Laboratory testing was accomplished in general accordance with applicable ASTM standards. Laboratory tests completed on soil samples retrieved for this project include:

- six (6) moisture content determinations,
- five (5) percent passing the No. 200 US standard sieve tests,
- three (3) Atterberg limit determination tests,
- one (1) organic content determination and
- visual classification in general accordance with applicable procedures.

Results for each of these laboratory tests are summarized in the following table and are also presented on the individual **Soil Profile** logs provided in the **Appendix.**

Table 1: Summary of Laboratory Testing

Boring No. (Depth) (ft.)	Moisture Content (%)	Percent Passing No. 200 Sieve (%)	Organic Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	USCS Classification
SPT-01 (23.5-25)	28.4	44.2	-	47	20	27	SC
SPT-01 (28.5-30)	55.6	91.9	-	81	28	53	CH
SPT-01 (43.5-45)	87.6	82.3	-	106	34	72	CH
SPT-02 (2-4)	14.8	13.5	-	-	-	-	SC
SPT-03 (6-6.5)	73.8	85.2	-	-	-	-	CH
SPT-03 (6.5-7)	191.1	12.0	37.13	-	-	-	SP-SM

6 SUBSURFACE CONDITIONS

6.1 Subsurface Soil Conditions

The subsurface conditions were explored using three (3) SPT borings, one (1) performed to a depth of 45-ft. bgs within or near the proposed pump station footprint and two (2) drilled to a depth of 35-ft. bgs within or near the proposed generator house and control panel locations. The approximate boring locations and depths were approved by **Tetra Tech.** The borings were located in the field by **MC²** personnel measuring distances from existing site features. The approximate boring locations are presented on the **Boring Location Plan** in the **Appendix.**

The surface description discussed below is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The **Subsurface Boring Profiles** included in the **Appendix** and **individual Boring Profiles,** should be reviewed for specific information at individual boring locations. These profiles include soil description, stratification, penetration resistances, and laboratory test results. The stratification shown on the boring profiles represents the conditions only at the actual boring location. Variations may occur and should be expected between boring locations.

In general, the borings performed consisted of layers of loose to medium dense, fine SAND to SAND with silt (SP, SP-SM) mixed with layers of very loose to medium dense, SAND with clay (SP-SC) and/or clayey SAND (SC) and/or soft to firm CLAY with sand (CH) from the surface to approximately 15 to 23-ft. bgs. Following these shallow soils, layers of stiff to very hard CLAY with sand (CH) was encountered interbedded with layers of medium dense to very dense, clayey SAND (SC) that extended to the boring termination depths.

6.2 Groundwater Conditions

The groundwater depth was measured from 4.5 to 5-ft. bgs in the boreholes at the time of drilling. We estimate the seasonal high groundwater to be at about 1.5 to 2-ft. bgs.

Generally speaking, groundwater levels tend to fluctuate during periods of prolonged drought and extended rainfall and are affected by tidal and/or man-made influences such as drainage conveyance systems. In addition, a seasonal effect will also occur in which higher groundwater levels are normally recorded in rainy seasons. If the groundwater level is critical to design or construction, temporary observation wells should be installed along the alignment to monitor groundwater fluctuations over a period of time and permit more accurate determinations of wet and dry seasonal levels. Fluctuation of the groundwater levels should be anticipated. We recommend that the Contractor determine the actual groundwater levels at the time of the construction to determine groundwater impact on the construction procedure.

7 EVALUATIONS AND CONCLUSIONS

The following evaluations and conclusions have been developed on the basis of the previously described project characteristics, our review of published data, information provided by the project team members, our site exploration and subsurface conditions encountered.

Once final design plans and specifications are available, a general review by **MC²** is strongly recommended as a means to check that the evaluations made in preparation of this report are correct and that earthwork and foundation recommendations are properly interpreted and implemented.

1. We compared the USDA soil survey information with the subsurface information collected in our test borings. The data provided in the soil survey indicates sand from 0 to 80-in. bgs. Our test borings encountered shallow clayey soils near the ground surface starting at approximately 2-ft. bgs. There were no conditions noted on the soil survey in the area of the project improvements that are detrimental to this project.

2. Our review of the USGS Topographic Map did not indicate any features that appeared out of the ordinary and required further clarification.

3. It is our understanding that all pipe for this project will be constructed using open trench installation methods. In the bedding zone, soils not classified as SP, SP-SM, SP-SC, or SM, will require over-excavation and placement of proper bedding material. Very dense soils, cemented clayey sand, or rock, if encountered, will require over-excavation at least 1 foot below invert.

4. Excavation for the pipe may be through clayey SANDS or stiff to very hard CLAY. The Contractor should be made aware of these conditions prior to excavation.

5. The proposed pump station was evaluated using the soil conditions found at Boring SPT-01 at the proposed bearing depth of 22-ft. Based on the foundation dimensions provided by Thomas Cross and the construction recommendations provided in this report, the subsurface conditions are suitable for support of this structure on the assumed mat foundation.

6. Uplift of the pipe or pump station structures placed below the groundwater table will need to be evaluated for buoyancy, and if required, counteractive measures will need to be part of the design. The bottom of excavations can also experience uplift thus causing unstable foundation conditions. Groundwater will need to be lowered below the excavation bottom to prevent unstable conditions.

7. We calculated settlement of the structures, as required, utilizing GeoStudio software 2012. Empirical correlations based on SPT N-values were used to estimate the soil modulus for the various soil layers then applying the analyses using a finite element analysis to predict settlement. The settlement calculations were performed assuming the load of the structure is 3,000 psf or less for the pump station and 2,000 psf for the remaining planned structures. Estimated settlements are expected to be less than 1 inch for the pump station and 1-1/2 inch or less for the generator house and electrical panel slab. A majority of the settlement for the generator house and electrical panel slab will occur during construction. Differential settlements are expected to be half this amount.

8. Seasonal high groundwater depths range from 1.5 to 2-ft. bgs. The pipe and below grade structures should be designed in such a way as to counteract the effects of uplift or buoyancy using in your calculation either the seasonal high groundwater or 100-year flood elevation, whichever is higher.

9. If the pipe will be installed with open trench methods, some at a depth considerably below the groundwater level, groundwater control will be needed during construction of the pipeline. Dewatering at this project, depending on the depth required, may range from simple sump pumps to well points or cutoff walls. A qualified dewatering contractor should design the dewatering system.

10. Most of west-central Florida, including Pinellas County, can be characterized as buried karst terrain with limestone and dolostone bedrock mantled by surficial and/or shallow subsurface strata of sandy and clay soils. The limestone and dolostone bedrock is prone to dissolution from slightly acidic groundwater and infiltrating meteoric waters; therefore, the potential for the occurrence of sinkholes is relatively widespread. However, variations

in the potential for sinkhole occurrence arise out of the variations in the geology, hydrology and human impacts on the natural environment.

Our scope did not include an evaluation for sinkhole activity. However, it is our opinion that the geologic conditions observed in the borings performed at the site were not consistent with sinkhole activity. If the County determines that the proposed construction presents a high risk to the health and safety of persons, then we should be contacted to perform these services.

Based on our evaluations and conclusions, the following are our recommendations for the various pipes, pump station structure and associated structures planned for this project.

8 RECOMMENDATIONS

8.1 Pipe Installation Recommendations

It is our understanding that all pipe for this project will be constructed using open trench installation methods placed in soils consisting of SAND to SAND with silt, SAND with clay, clayey SAND or possibly CLAY with sand. The majority of these soils are capable of providing a firm surface with which to lay the pipe provided the recommendations herein are followed. These recommendations are in general accordance with Pinellas County Public Works Standards and the Florida Department of Transportation. These standards should be followed for the proposed construction.

Prior to construction, the groundwater level should be lowered to a depth of 18-in. below the elevation of the proposed excavation bottom (see **Section 8.8 Drainage and Groundwater Considerations**). The pipe trenches should be excavated to widths sufficient to provide adequate working room and where possible, the sides of trenches should be vertical up to the spring line of the installed pipe. All trench excavations should be performed in accordance with federal, state and local standards. Trench excavation to design grade should take place just before placement of the bedding material and pipe installation.

Soils not considered as suitable foundation to include muck, clay or other soft material should be over-excavated a minimum of 4-in. below the bedding zone. Soils encountered in our test borings classified as SM or SC with greater than 35% passing the No. 200 U.S. Standard sieve, and CL or CH require over-excavation. Very dense, hard or lumpy material as well as any rock or boulders encountered, should be over-excavated a minimum of 12-in. below the bedding zone. The over-excavated material should be replaced with structural fill. Soil encountered within our borings classified as SP, SP-SM, SP-SC or SM or SC with less than 35% passing the No. 200 U.S. Standard sieve are suitable structural fill material. The fill material should be compacted to a density approximately the same or greater than the natural material into which the trench or pit was cut.

The Contractor may also choose to use No. 57 stone up to the bedding zone in moist or wet areas. We recommend that the No. 57 stone be wrapped in filter fabric to prevent the migration of fines downward into the stone.

In areas not requiring over-excavation, the bedding zone soils should be loosened below the middle third of the outside of the diameter of the pipe and pipe placed upon it. Compact outer portions to 98% of the soil's modified Proctor maximum dry density within ±2% of the soils optimum moisture content in accordance with AASHTO T-180/ASTM D-1557. Backfill around the pipe, to 12 in. above the pipe, should be placed in no greater than 6-in. layers evenly deposited on both sides of the pipe. Hand tamp material below the haunch that cannot be reached by mechanical tampers. Continue compaction to 12-in. above the pipe to a density of 98% of the soil's modified Proctor maximum dry density.

Above the pipe and in unpaved areas such as we have on this project, the backfill can continue to grade in no greater than 12-in. loose lifts compacted to 98% of the soil's modified Proctor maximum dry density within ±2% of the soils optimum moisture content in accordance with AASHTO T-180/ASTM D-1557. Soils found in our borings classified as SP, SP-SM, SP-SC, SM are suitable as backfill soils in this zone. Clayey sands (SC) and clay soils (CL, CH) should not be used for backfill.

Do not allow heavy construction equipment to cross over pipes until placing and compaction of backfill material to at least 4-ft. above the crown of pipe. Where excavation for the pipe are constructed in close proximity to existing structures, take all reasonable precautions and measures to prevent damage to those structures from, but not limited to, dewatering and compaction vibrations. Surface water and groundwater control will be needed depending on the invert depth of the pipe and groundwater depths at the time of construction. Dewatering is described in **Section 8.8** of this report.

Backfill compaction tests should be performed every 500 feet per lift in pipe trenches and for every lift of backfill placed at utility structures.

8.2 Foundation Recommendations

Pump Station Structure (SPT-01)

We have based our analysis of the pump station structure on the criteria provided by Tetra Tech to include a foundation depth of 22-ft. and an overall slab dimension of 14 feet x 26 feet. We assume the foundation is to be a mat slab. Where appropriate, the use of shallow foundations is typically the most cost effective, provided that the structure can be designed to accommodate the magnitude of anticipated total and differential settlements. With this foundation system, the structure loads are transmitted to the subsoil at a pressure suited for the properties of the soil.

These properties are typically governed by the allowable soil bearing pressure and the total and differential settlement criteria.

Subsurface conditions encountered within the proposed pump station footprint are generally suitable for development of the proposed structure utilizing the planned mat foundation provided the site preparation recommendations outlined in **Section 8.7.1** are followed and the estimated magnitude of total and differential settlement are tolerable. For this structure founded at a depth of 22-ft. and the assumed loadings, there will be a net decrease in pressure due to the over-excavation of soils to this elevation. Therefore, settlement of the structure should be minimal and tolerable. Based on our SPT boring performed, the material encountered at a depth of 22 feet is expected to be either clayey SAND or CLAY. This material should be over excavated if soft soils are encountered and backfilled with mechanically densified and/or compacted structural fill. To provide a leveling pad, No. 57 stone wrapped in a geo-fabric can be placed below the proposed mat foundation.

The net allowable bearing pressure for support of the pump station structure on the existing soils should not exceed 3,000 psf. Should the footprint, elevation or assumed loads change, **MC²** must be contacted to reevaluate bearing and settlement. The modulus of subgrade reaction has been calculated using empirical data and is estimated to be 100 pci. The mat design may be conducted using a modulus of subgrade reaction (ks) which is a function of the applied load and expected settlement and size of the foundation. The modulus of subgrade reaction also depends on the foundation stiffness and size. A coefficient of friction between concrete and soil of 0.4 can be used for sliding resistance.

Generator House & Electrical Control Panel Structures (SPT-02 & SPT-03)

As of this writing, we understand that the planned generator house and electrical control panel slabs will have overall slab dimensions of 15-ft. x 6-ft. and 15-ft. x 5-ft., respectively. We anticipate that these structures will be concrete slabs placed at existing surface elevation. The soils within these structural footprints consist of loose to medium dense SAND and clayey SAND (SP, SP-SM, and SC) which are suitable for support of the proposed structure. The foundation soils should be prepared in accordance with our recommendations in **Section 8.7** of this report.

Settlement was estimated to be 1-1/2 inches or less based on a contact pressure of 2000 psf. Lighter contact pressures and compaction of the near surface soils will reduce this settlement estimate. All pipe connected to these structures should be designed to allow for this movement.

The modulus of subgrade reaction for the mat foundations for the generator house and electrical control panel slab was calculated using empirical data and is estimated to be 45 pci. A coefficient of friction between concrete and soil of 0.4 can be used for sliding resistance.

8.3 Uplift Resistance

The groundwater depth ranges between 4.5 to 5-ft. bgs at the time of our exploration and could be higher at other times of the year, therefore, uplift due to buoyancy should be expected and should be part of the pipe and pump station design. The anticipated maximum ground water levels or 100-year flood level, whichever is higher, should be considered for design. Dewatering for the pipe should be continuous until enough fill is placed over the pipe to counteract uplift hydrostatic pressure. For the pump station structure, uplift resistance can be created by both the dead weight of the structure as well as the buoyant weight of the backfill above the pipe or projecting parts of the base slab. A factor of safety of 1.5 should be used in design calculations for uplift resistance.

For the pump station structure, the buoyant weight of a wedge of soil from the outside upper edge of the base of the extended slab upward at a 30-degree angle to the ground surface can be added to the resistance forces. The resistance force for the pipe will be the buoyant weight of the soil from the outer diameter of the pipe upwards. The backfill soil buoyant weight should be used in calculating the weight of soil below the high water level. We estimate the buoyant weight of the fine sands is approximately 48 pcf.

8.4 Lateral Earth Pressures

Below grade walls, where required, will be subject to lateral earth pressures. For walls which are restrained (braced) and adjacent to moderately compacted backfill, design is usually based on "at-rest" earth pressures. Active pressures are usually employed for unrestrained retaining wall design. Several earth pressure theories could be utilized. One of the most straightforward is the equivalent fluid pressure or Rankine Theory.

Table 2: Earth Pressure Information

Earth Pressure Condition	Coefficient of Earth Pressure (K)	Unsubmerged Fluid Density (1) (pcf)	Submerged Fluid Density (2) (pcf)
At-Rest (K_o)	0.50	55	24
Active (K_a)	0.33	36	16
Passive (K_p)	3.00	330	143
(1) These fluid densities are based on a clean sand backfill with an average internal friction angle of 30 degrees and a moist unit weight of 110 pcf. (2) Hydrostatic and seepage forces should be added to the submerged fluid densities when calculating total forces acting on retaining walls.			

The above pressures do not include any surcharge effects for sloped backfill, point or area loads behind the walls and assume that adequate drainage provisions have been incorporated. The lateral earth pressures acting on below grade walls will be resisted by the sliding resistance forces along the base of the wall footing and the passive resistance resulting from footing embedment

at the wall toe. Passive resistance could be neglected for a safer design (due to possible excavation or erosion in front of the wall at a future time).

8.5 Temporary Structure Excavations

Side slopes for temporary excavations may stand near one (1) horizontal to one (1) vertical (1H:1V) for short dry periods of time and a maximum excavation depth of four (4) feet. Where restrictions do not permit slopes to be constructed as recommended above, the excavation should be shored in accordance with current OSHA requirements. In addition, any open cut excavations adjacent to existing structures should be evaluated by a geotechnical engineer on a case by case basis. During construction, excavated materials should not be stockpiled at the top of the slope within a horizontal distance equal to the excavation depth.

Excavation slopes should conform to OSHA, State of Florida and any other local regulations. The dewatering system chosen for use on this project should consider the nature of the permeable upper sands encountered at the project site. The contractor should also assess equipment loads and vibrations when considering slopes or excavation bracing.

8.6 Federal Excavation Regulations

In Federal Register Volume 54, No. 209 (October 1989), the United States Department of Labor, Occupational Safety and Health Administration (OSHA) amended its "Construction Standards for Excavations, 29 CFR, Part 1926, Subpart P". This document was issued to better insure the safety of workmen entering trenches or excavations. It is mandated by this federal regulation that all excavations, whether they be utility trenches, basement excavations, or footing excavations, be constructed in accordance with the revised OSHA guidelines. It is our understanding that these regulations are being strictly enforced and if they are not closely followed, the owner and the contractor could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's responsible person, as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

We are providing this information solely as a service to our client. **MC²** is not assuming responsibility for construction site safety or the contractor’s activities; such responsibility is not being implied and should not be inferred.

8.7 Construction Recommendations

8.7.1 Site Preparation

Site preparation for each structure should include stripping/removal of surface (topsoil) and shallow (within 10 feet below foundations) organics where present prior to replacing with properly compacted structural fill [clean sands (SP/SP-SM/SP-SC)]. We recommend that any proposed construction areas to receive fill be evaluated by proof-rolling prior to fill placement. Proof-rolling should be performed by traversing the construction areas with a loaded dump truck or similar compaction equipment weighing at least 20 tons. Proof-rolling operations should be observed by a representative of **MC²**. Unstable soils which are revealed by proof-rolling and which cannot be adequately densified in place should be removed and replaced under the recommendations of the **MC²** representative. The contractor should exercise caution during construction, proof-rolling and compaction of soils so as not to cause settlement of the existing structures induced by vibrations. The Contractor must control and adjust the vibration so as to not disturb existing structures and/or subsurface utilities that may be in the vicinity of the project. The contractor is solely responsible for any settlement caused by his actions.

After clearing and grubbing and proof-rolling, we recommend that the upper 12-in. of the subgrade in the area of the concrete slab should be compacted to a minimum of 98% of the soil's modified Proctor maximum dry density +/-2% of the optimum moisture content as determined by ASTM designation D-1557. If fill is needed, the fill should be placed in level lifts not to exceed 12-in. loose thickness. The fill should be compacted to a minimum of 98% of the soil's modified Proctor maximum dry density +/-2% of the optimum moisture content as determined by the current version of ASTM designation D-1557.

It is possible that some soft or loose soils will not be identified and properly remediated during site preparation. We recommend that the bearing soils beneath slab-on-grade areas and below the pump station mat foundation excavation be checked by an engineering representative to assess the suitability of the soils. Evaluations should be performed prior to reinforcement and concrete placement. If unsuitable bearing soils are encountered, these soils will need to be re-compacted in place, removed and replaced with properly compacted fill, or foundations deepened, to achieve suitable bearing. This backfilling may be done with a very lean concrete or with a well-compacted, suitable fill such as clean sand, gravel, or crushed No.57 or No.67 stone wrapped in geo-fabric.

Foundation bearing surface evaluations should be performed and concrete placed as quickly as possible to avoid exposure of the footing bottoms to changes in moisture content. If it is required that foundation excavations be left open for more than one day, they should be protected to reduce evaporation or entry of moisture.

8.7.2 Selection and Placement of Fill

After the stripped site has been proof-rolled and accepted by the Geotechnical Engineer, the fill required to bring the site to final grade may be placed in properly compacted lifts. Fill material should be inorganic, non-plastic granular soil (clean to slightly silty or slightly clayey sands, Unified Soil Classification (SP/SP-SM/SP-SC) with less than 12 percent passing the No. 200 sieve, free of detrimental materials such as organics, clay clods, debris, roots, rocks larger than 1 inch in greatest dimension, etc. The majority of the upper portion of the on-site near surface sandy soils (thickness varies from place-to-place) with the exception of root laden topsoil will meet this requirement. Careful evaluation should be made of any slightly organic to organic soils and clayey soils prior to use. The planned fill soils should be evaluated to determine that they meet the recommended material properties.

The fill should be placed in level lifts not to exceed 12-in. loose thickness using a static drum compactor. The fill should be compacted to at least 98% of the soil's modified Proctor maximum dry density +/-2% of the optimum moisture content as determined by ASTM designation D1557. In-place density tests should be performed on each lift by an experienced engineering technician working under the direction of a licensed Geotechnical Engineer to verify that the recommended degree of compaction has been achieved. Within small excavations such as around utilities or adjacent to walls, we recommend the use of smaller hand or remote guided equipment. A loose lift thickness of 4-in. is recommended when using such equipment. We suggest the following minimum testing frequency, per layer of fill placed: one test per 2,500 square feet of building/structure area. This fill should extend a minimum of 10 feet beyond structure lines to prevent possible erosion or undermining of footing bearing soils.

8.8 Drainage and Groundwater Considerations

Groundwater will be a concern during the installation of the piping, depending on final grades and the time of year construction is performed. We recommend that the Contractor determine the groundwater table prior to construction to determine the need for dewatering. For limited, relatively shallow excavations below the groundwater level, pumping from the excavation or sumps should be sufficient to control groundwater seepage. Deeper and larger excavations may require more extensive dewatering measures such as well points or cut-off walls. Recharge of groundwater a short distance from the dewatering location is recommended to avoid significant drawdowns which may trigger undue subsidence/settlement of existing structures in the vicinity.

If temporary sheet pile walls are required for excavation support during construction of piping and/or other structures, the sheet pile walls should be designed by others using the soil parameters presented in this report. The soil parameters are given for the structures mentioned above.

Excavated areas should be sloped toward one corner to facilitate removal of any collected rainwater, groundwater or surface water runoff. Positive site drainage should be provided to reduce infiltration of surface water around the perimeter of any above-ground structures and beneath slabs. All grades should be sloped away from the structures and surface drainage should be collected and discharged such that water is not permitted to infiltrate the immediate area surrounding structures.

Depending on groundwater levels and the effectiveness of dewatering at the time of construction, seepage may enter the excavated areas from the bottom and sides. Such seepage will act to loosen soils and create difficult working conditions. Groundwater levels should be determined immediately prior to construction. Groundwater should be kept at least 18 in. below the working area to facilitate proper material placing and compaction. Some contractors like to place a gravel working bed in wet areas. Fine gravel, such as No. 57, and No. 67 stone may be used as long as the gravel is wrapped in a filter fabric (Mirafi N 140 or equivalent) to reduce the risk of fines filtering into the open voids in the gravel. The gravel, where used, should be compacted and the compaction confirmed by visual observation.

9 REPORT LIMITATIONS

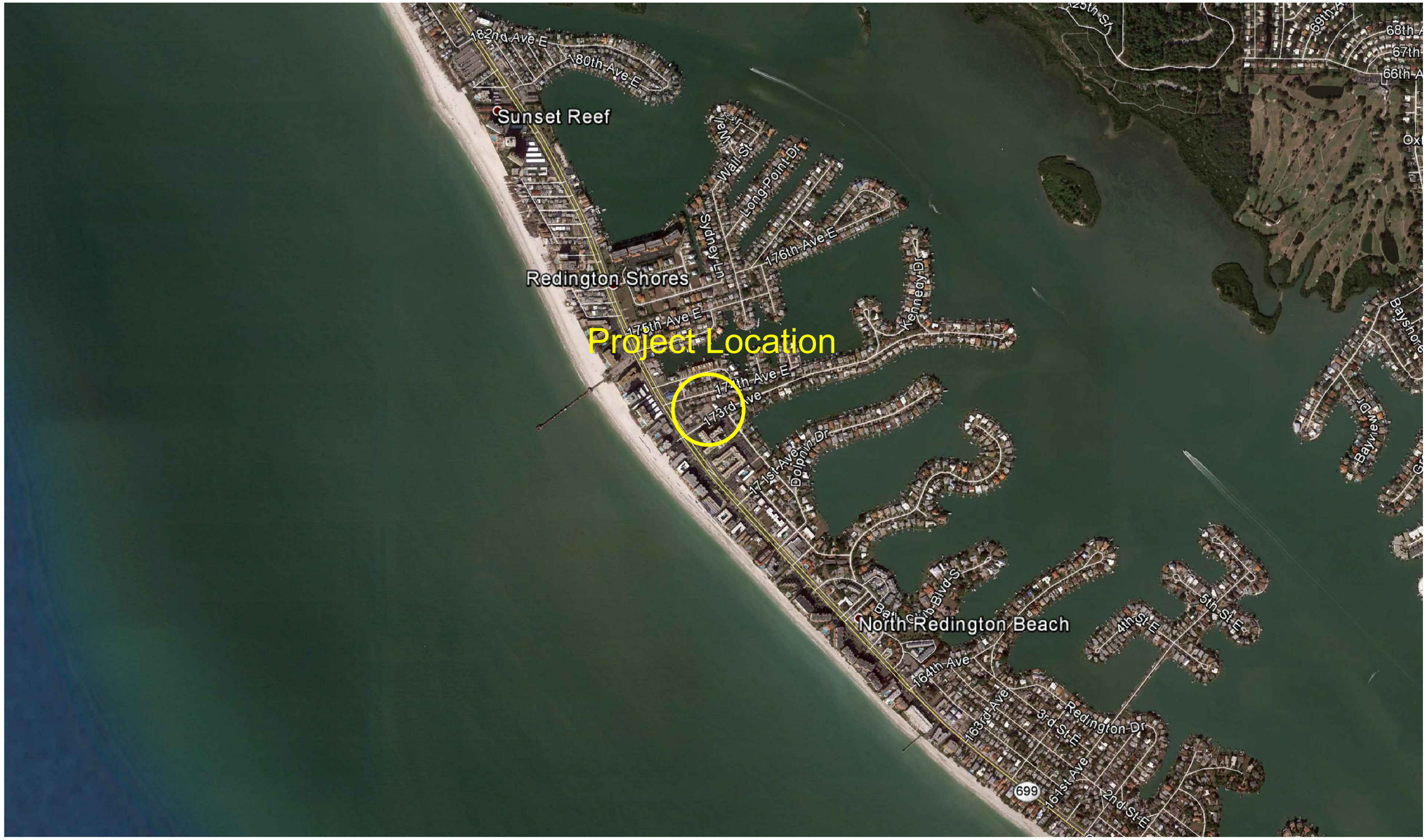
The recommendations detailed herein are based on the available limited soil information obtained by **MC²** and information provided by **Tetra Tech** for the proposed project. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, **MC²** should be notified immediately to determine if changes of recommendations are required. In the event that **MC²** is not retained to perform these functions, **MC²** can't be responsible for the impact of those conditions on the performance of the project.

The geotechnical engineer warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

After the plans and specifications are more complete, the geotechnical engineer should be provided the opportunity to review the final design plans and specifications to assess that our engineering recommendations have been properly incorporated into the design documents. At that time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use of **Tetra Tech and their client**.

APPENDIX

Summary of Soil Parameters – Table No. 3
Project Location Map – Sheet 1
Boring Location Map – Sheet 2
USGS Topographic Map – Sheet 3
USDA Soil Survey Map – Sheet 4
Subsurface Boring Profiles – Sheet 5
Subsurface Boring Profile Legend – Sheet 6
Individual Soil Profiles (4 Sheets)
Test Procedures



Source: Google Earth
Image Date: 1/11/17

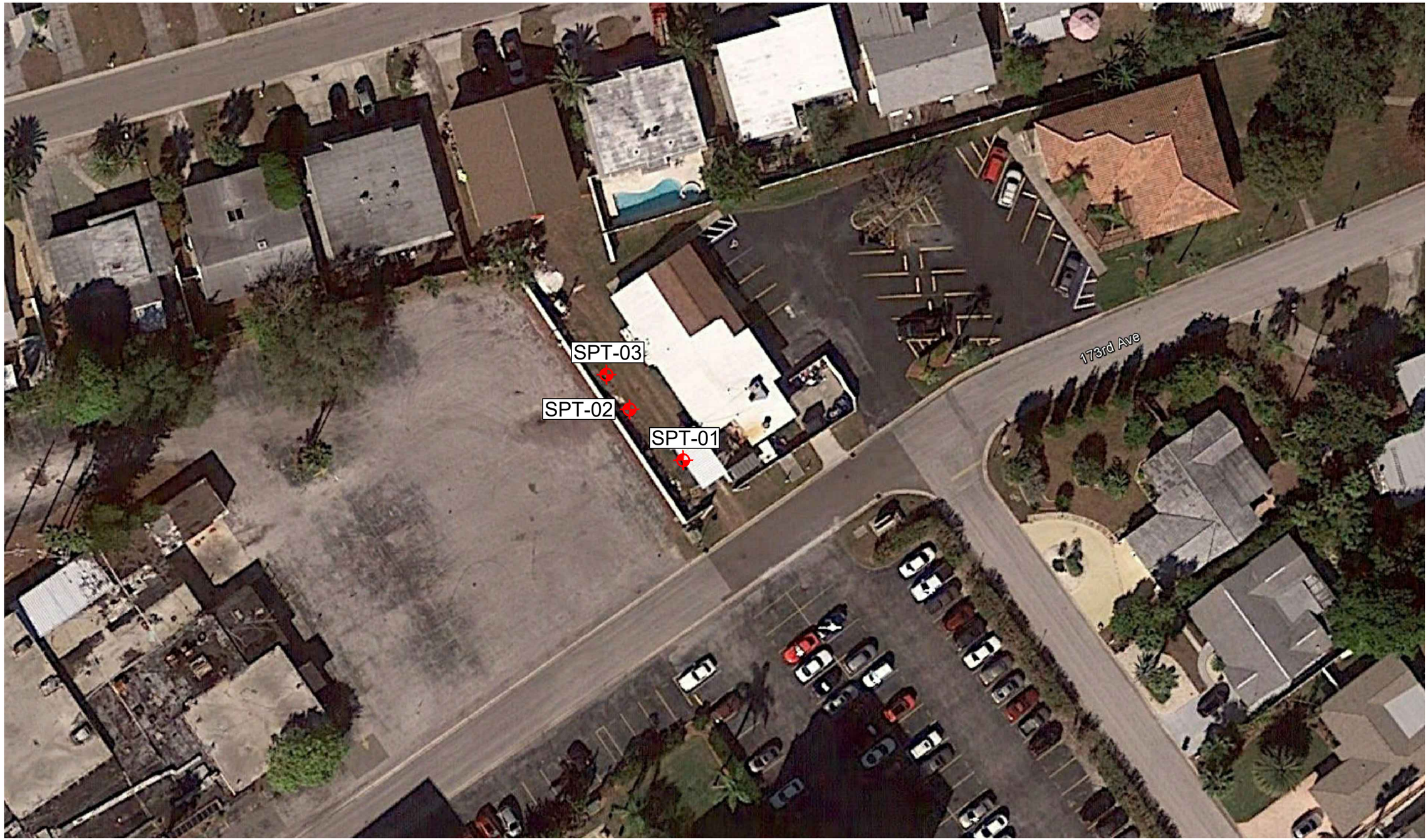
DATE	NAME	REVISION	APPROVED BY:

MC SQUARED, INC.
Geotechnical Consultants
5808-A Breckenridge Parkway
Tampa, FL 33610
Ph:813-623-3399 Fax:813-623-6636

FLORIDA ENGINEERING CERTIFICATE OF AUTHORIZATION No. 9191
Jodonna J. Jimenez, P.E.
FLORIDA LICENSE No. 47701

	NAME	DATE
DESIGNED BY:	TC	08/02/2017
DRAWN BY:	TC	08/02/2017
CHECKED BY:	JH	08/04/2017
SUPERVISED BY:	JJ	

Project Location Map	MC² PROJ. NO.	SHEET NO.
PS 079 Replacement at 173rd Ave. Pinellas County, Florida	T101604.196	1



LEGEND:

Approximate SPT Boring Location

Source: Google Earth
Image Date: 1/11/17

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MC SQUARED, INC.
Geotechnical Consultants
5808-A Breckenridge Parkway
Tampa, FL 33610
Ph:813-623-3399 Fax:813-623-6636

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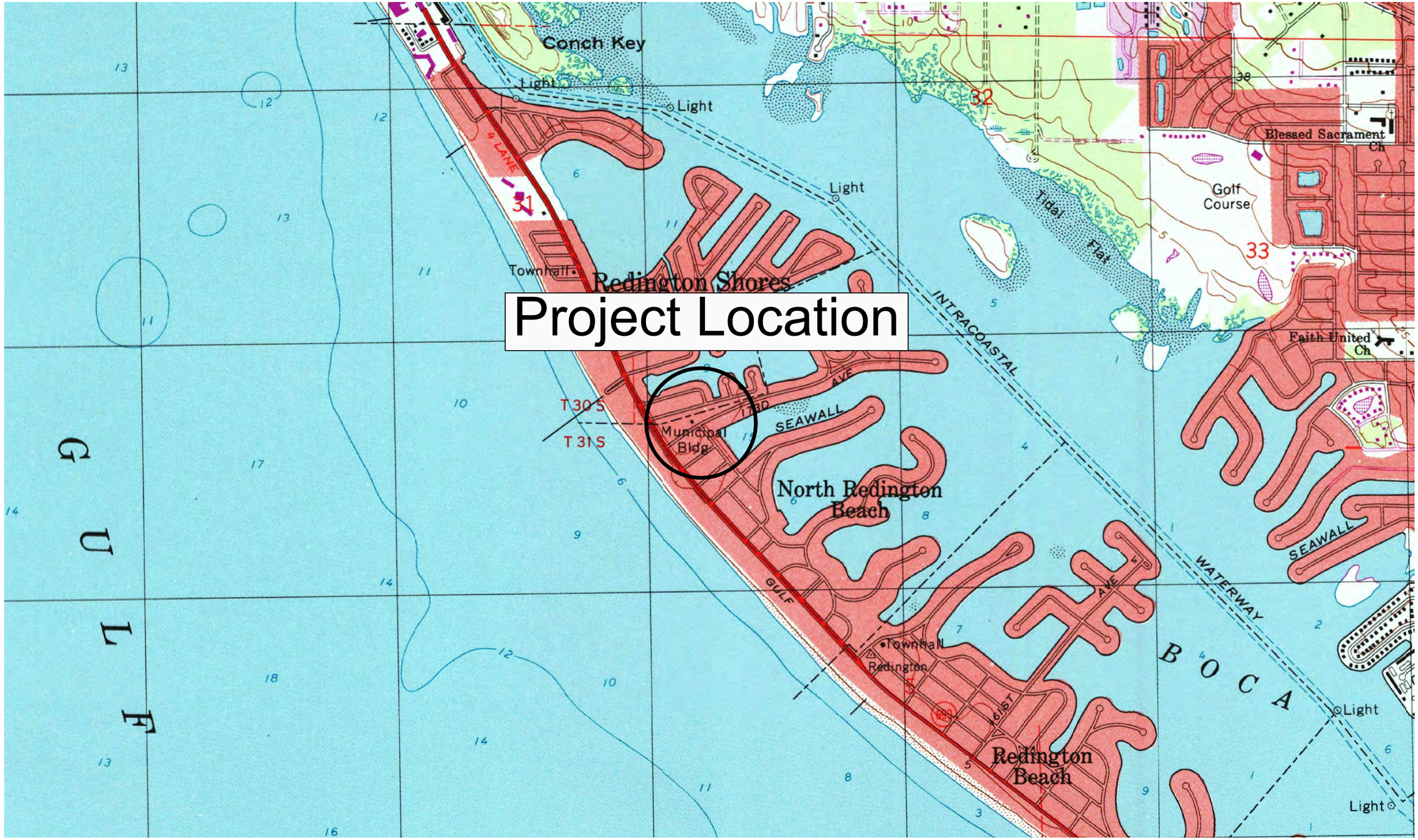
Boring Location Map

PS 079 Replacement at 173rd Ave.
Pinellas County, Florida

MC² PROJ. NO.: T101604.196

SHEET NO.: 2



SEMINOLE QUADRANGLE
FLORIDA - PINELLAS COUNTY
7.5 - MINUTE SERIES

SOURCE: United States Geological Survey

DATE	NAME	REVISION	APPROVED BY:

MC SQUARED, INC.
Geotechnical Consultants
5808-A Breckenridge Parkway
Tampa, FL 33610
Ph:813-623-3399 Fax:813-623-6636

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USGS Topographic Map	MC² PROJ. NO.	SHEET NO.
PS 079 Replacement at 173rd Ave. Pinellas County, Florida	T101604.196	3

SOURCE: United States Department of Agriculture

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MC SQUARED, INC.
Geotechnical Consultants
5808-A Breckenridge Parkway
Tampa, FL 33610
Ph:813-623-3399 Fax:813-623-6636

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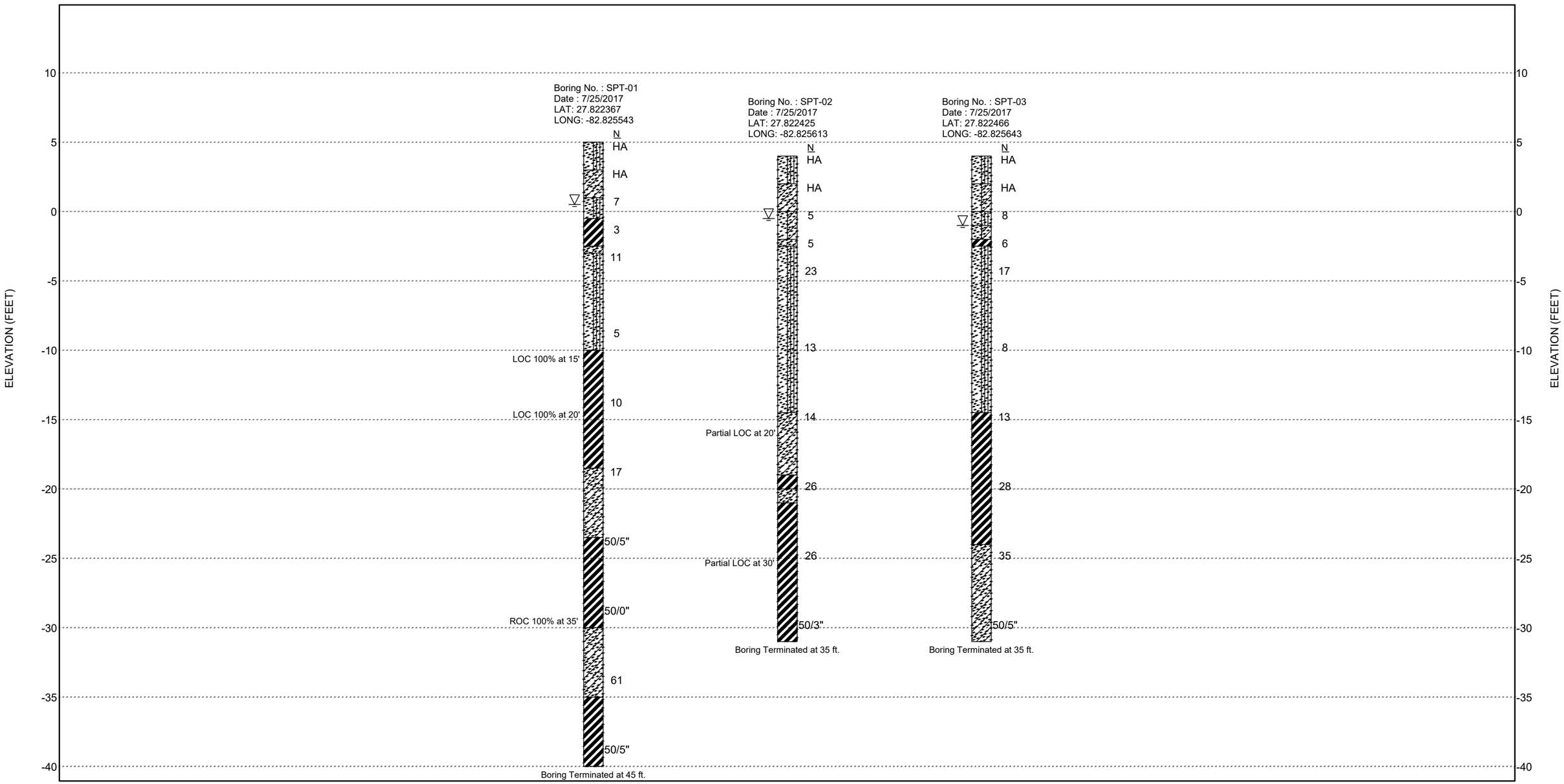
USDA Soil Survey Map	MC² PROJ. NO.	SHEET NO.
PS 079 Replacement at 173rd Ave. Pinellas County, Florida	T101604.196	4



*N Values Drawn At Top Of Interval
*HA = Hand Auger
*LOC = Loss of Circulation

DATE	NAME	REVISION	APPROVED BY

MC SQUARED INC.
Geotechnical Consultants
5808-A Breckenridge Parkway
Tampa, FL 33610
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SUBSURFACE BORING PROFILES

PS 079 Replacement at 173rd Ave.
Pinellas County, Florida

MC² PROJ. NO.: T101604.196

SHEET NO.: 5

LEGEND

- Top Soil
- Asphalt
- Concrete
- (GAB) Graded Aggregate Base
- Limerock Base
- No. 57 Stone
- Fill
- (SP) Poorly Graded Sand
- (SP-SM) Poorly Graded Sand With Silt
- (SP-SC) Poorly Graded Sand With Clay
- (SM) Silty Sand
- (SC) Clayey Sand
- (MH) Elastic Silt
- (ML) Silt
- (CL-ML) Silty Clay
- (CH) Fat Clay
- (CL) Lean Clay
- (OH) Organic Clay
- (OL) Organic Silt
- Peat
- Bedrock
- Limestone
- (WLS) Weathered Limestone
- (PWR) Partially Weathered Rock
- Granite
- Gneiss
- Bedrock
- Schist

NOTES

▽	Water Table At Time Of Drilling
▼	Water Table After 24 Hours
GNE	Groundwater Not Encountered
GNA	Groundwater Not Apparent
GNM	Groundwater Not Measured
CL	Center Line
RT	Right Of Center Line
LT	Left of Center Line
BGS	Below Ground Surface
HA	Hand Auger
PA	Power Auger
NMC	Natural Moisture Content (%)
-200	Fines Passing A No. 200 Sieve (%)
PI	Plasticity Index
NP	Non Plastic
LL	Liquid Limit
OC	Organic Content (%)

N	SPT N-Value
WOH	Weight-Of-Hammer
WOR	Weight-Of-Rod
CPT	Cone Penetrometer Test
SPT	Standard Penetration Test
DT	Dilatometer Test
LOC	Loss Of Circulation
ROC	Regain Of Circulation
REC	Rock Core Recovery(%)
RQD	Rock Quality Designation
ST	Shelby Tube Sample
q_u	Unconfined Compressive Strength From Pocket Penetrometer In tsf

GRANULAR MATERIALS- RELATIVE DENSITY	SPT (BLOWS/FT)
VERY LOOSE	≤ 4
LOOSE	5-10
MEDIUM	11-30
DENSE	31-50
VERY DENSE	GREATER THAN 50
SILTS AND CLAYS CONSISTENCY	**SPT (BLOWS/FT)**
VERY SOFT	≤ 2
SOFT	3-4
FIRM	5-8
STIFF	9-15
VERY STIFF	16-30
HARD	30-50
VERY HARD	GREATER THAN 50

SPT Spoon Inside Diameter 1 3/8"
SPT Spoon Outside Diameter 2"

ASTM Standard Drop Safety Hammer
Average Hammer Drop Height 30"
Hammer Weight 140 lbs

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MC SQUARED, INC.
Geotechnical Consultants
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Tampa, FL 33610
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Legend

PS 079 Replacement at 173rd Ave.
Pinellas County, Florida

MC² PROJ. NO.: T101604.196

SHEET NO.: 6

Table No. 3
Summary of Soil Parameters
Pump Station 079 Replacement at 190 173rd Avenue
North Redington Beach, Pinellas County, Florida
MC² Project No. T101604.196

Boring ID	Depth (ft)	N Value Range	Soil Classification	Average Unit Weight (γ)**		Angle of Internal Friction Ø ** (degrees)	Earth Pressure Coefficients*			Average Undrained Cohesion C_u ** (psf)
				Saturated (pcf)	Submerged (pcf)		At Rest (K_o)	Active (K_a)	Passive (K_p)	
Proposed Pump Station Structures										
SPT-01	0-5.5	7	SP-SM, SC	105	42.6	29	0.515	0.347	2.882	0
	5.5-8	3	CH, SC	110	47.6	0	1.000	1.000	1.000	375
	8-15	5-11	SP-SM	105	42.6	29	0.515	0.347	2.882	0
	15-23.5	10	CH	120	57.6	0	1.000	1.000	1.000	1,250
	23.5-28.5	17	SC	110	47.6	31	0.500	0.333	3.000	0
	28.5-35	> 50	CH	125	62.6	0	1.000	1.000	1.000	3,000
	35-40	> 50	SC	125	62.6	0	1.000	1.000	1.000	3,600
	40-45	> 50	CH	125	62.6	0	1.000	1.000	1.000	3,000
SPT-02	0-18.5	5-23	SP-SM, SP-SC, SC	105	42.6	29	0.515	0.347	2.882	0
	18.5-23	14	SC	110	47.6	31	0.500	0.333	3.000	0
	23-35	26- >50	CH, SC	125	62.6	0	1.000	1.000	1.000	3,000
SPT-03	0-6	8	SP-SM, SP-SC	105	42.6	29	0.515	0.347	2.882	0
	6-6.5	6	CH	115	52.6	0	1.000	1.000	1.000	750
	6.5-18.5	6-17	SP-SM	105	42.6	29	0.515	0.347	2.882	0
	18.5-28	13-18	CH	120	57.6	0	1.000	1.000	1.000	1,850
	18.5-40	35- >50	SC	125	62.6	0	1.000	1.000	1.000	3,600

*Values are for level (non-sloping) backfill; no surcharge loads on backfill

**Based on empirical correlations

NOTE: Hand augers were performed in the top 4 feet at all test boring locations to avoid utilities

Soil Profile

BORING ID: SPT-01

MC² Geotechnical • Environmental Materials Testing

CLIENT Tetra Tech
PROJECT NAME PS 079 Replacement at 173rd Ave.
PROJECT NUMBER T101604.196
PROJECT LOCATION Pinellas County, Florida
DATE STARTED 7/25/17 **COMPLETED** 7/25/17
GROUND ELEVATION 5 ft **HOLE SIZE** 4" inches
DRILLING CONTRACTOR Standard Drilling
GROUND WATER LEVELS:
DRILLING METHOD Mud Rotary
AT TIME OF DRILLING 4.5 ft / Elev 0.5 ft
LOGGED BY B. Crowson **CHECKED BY** J. Hooks
AT END OF DRILLING ---
NOTES LAT: 27.822367, LONG: -82.825543
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	4	SP-SM	Grayish brown, poorly graded fine SAND with silt	HA 1		
	2	SC	Light grayish brown, clayey fine SAND with shell fragments	HA 2		
5	0	SP-SM	Loose, light grayish brown, poorly graded fine SAND with silt Shell fragments	SS 3	6-4-3-1 (7)	
	-2	CH	Soft, gray, brown, fat CLAY	SS 4	1-2-1-2 (3)	
		SC	Very loose, brown, clayey fine SAND			
	-4		Loose to medium dense, gray, poorly graded fine SAND with silt Roots (8' - 9.5')	SS 5	3-5-6-8 (11)	
10	-6	SP-SM				
	-8					
15	-10		Shell fragments (13.5' - 23.5')	SS 6	5-3-2 (5)	
	-12	CH	Stiff, blueish gray, light grayish brown, fat CLAY LOC 50% at 15'			
20	-14			SS 7	3-5-5 (10)	
	-16		LOC 100% at 20'			
	-18					
25	-20	SC	Medium dense, greenish gray, clayey fine SAND	SS 8	6-9-8 (17)	
	-22					
	-24	CH	Very hard, light greenish gray, light grayish brown, fat CLAY with sand and shell fragments	SS 9	38-50/5"	
30	-26					
	-28					
35	-30		No sample recovered from 33.5' - 38.5'	SS 10	50/0"	

● SPT N VALUE ●
⊕ ORGANIC CONTENT % ⊕
PL MC LL
□ FINES CONTENT (%) □
20 40 60 80

(Continued Next Page)

Soil Profile

BORING ID: SPT-01

MC² Geotechnical • Environmental Materials Testing

CLIENT Tetra Tech **PROJECT NAME** PS 079 Replacement at 173rd Ave.

PROJECT NUMBER T101604.196 **PROJECT LOCATION** Pinellas County, Florida

DEPTH (ft)	ELEV. (ft)	GRAPHIC LOG	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
35							
	-32		SC	Very dense, light grayish brown, clayey fine SAND with shell fragments Circulation Regained at 35'			
	-34				SS 11	18-22-39 (61)	
40							
	-36		CH	Very hard, greenish gray, fat CLAY			
	-38						
					SS 12	32-47-50/5"	
45	-40			Bottom of hole at 45.0 feet.			
	-42						
	-44						
	-46						
	-48						
	-50						
	-52						
	-54						
	-56						
	-58						
	-60						
	-62						
	-64						
	-66						
	-68						
	-70						

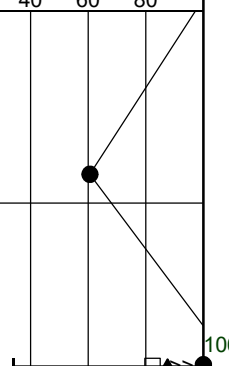
● SPT N VALUE ●

⊕ ORGANIC CONTENT % ⊕

PL MC LL

☐ FINES CONTENT (%) ☐

20 40 60 80



MC2 REPORT W ELEV. T16.196 173RD AVE.GPJ MC2.GDT 8/8/17

Soil Profile

BORING ID: SPT-02

MC² Geotechnical • Environmental Materials Testing

CLIENT Tetra Tech
PROJECT NAME PS 079 Replacement at 173rd Ave.
PROJECT NUMBER T101604.196
PROJECT LOCATION Pinellas County, Florida
DATE STARTED 7/25/17 **COMPLETED** 7/25/17
GROUND ELEVATION 4 ft **HOLE SIZE** 4" inches
DRILLING CONTRACTOR Standard Drilling
GROUND WATER LEVELS:
DRILLING METHOD Mud Rotary
AT TIME OF DRILLING 4.5 ft / Elev -0.5 ft
LOGGED BY B. Crowson **CHECKED BY** J. Hooks
AT END OF DRILLING ---
NOTES LAT: 27.822425, LONG: -82.825613
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	4	SP-SM	Grayish brown, poorly graded fine SAND with silt	HA 1		
	2	SC	Light grayish brown, clayey fine SAND	HA 2		
	0	SP-SC	Loose, light grayish brown, poorly graded fine SAND with clay	SS 3	4-3-2-1 (5)	
5	-2	SC	Loose, brown, clayey fine SAND	SS 4	2-2-3-4 (5)	
	-4	SP-SM	Loose to medium dense, gray to light gray, poorly graded fine SAND with silt Shell fragments (6.5' - 23.5)	SS 5	8-11-12-18 (23)	
10	-6					
	-8					
	-10			SS 6	4-6-7 (13)	
15	-12					
	-14					
	-16	SC	Medium dense, light blueish gray, clayey fine SAND	SS 7	4-6-8 (14)	
20	-18		Partial LOC at 20'			
	-20	CH	Very stiff, light gray, fat CLAY	SS 8	25-14-12 (26)	
25	-22	SC	Medium dense, light gray, clayey fine SAND			
	-24	CH	Very stiff to hard, gray, fat CLAY with limestone fragments	SS 9	9-14-12 (26)	
30	-26		LOC 100% at 30'			
	-28					
	-30			SS 10	50/3"	
35						

SPT N VALUE
ORGANIC CONTENT %
PL MC LL
FINES CONTENT (%)
20 40 60 80

>>

Bottom of hole at 35.0 feet.

MC2 REPORT W ELEV. T16.196 173RD AVE.GPJ MC2.GDT 8/8/17

Soil Profile

BORING ID: SPT-03

MC² Geotechnical • Environmental Materials Testing

CLIENT Tetra Tech
PROJECT NAME PS 079 Replacement at 173rd Ave.
PROJECT NUMBER T101604.196
PROJECT LOCATION Pinellas County, Florida
DATE STARTED 7/25/17 **COMPLETED** 7/25/17
GROUND ELEVATION 4 ft **HOLE SIZE** 4" inches
DRILLING CONTRACTOR Standard Drilling
GROUND WATER LEVELS:
DRILLING METHOD Mud Rotary
AT TIME OF DRILLING 5.0 ft / Elev -1.0 ft
LOGGED BY B. Crowson **CHECKED BY** J. Hooks
AT END OF DRILLING ---
NOTES LAT: 27.822466, LONG: -82.825643
AFTER DRILLING ---

DEPTH (ft)	ELEV. (ft)	USCS Group Symbol	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	RECOVERY % (RQD)
0	4	SP-SM	Grayish brown, poorly graded fine SAND with silt	HA 1		
	2	SP-SC	Light grayish brown, poorly graded clayey fine SAND	HA 2		
5	0	SP-SM	Loose, very light gray, poorly graded fine SAND with silt	SS 3	5-2-6-5 (8)	
	-2	SP-SC	Loose, very light gray, poorly graded fine SAND with clay			
		CH	Firm, gray, fat CLAY with sand	SS 4	3-3-3-4 (6)	
	-4		Loose, gray, poorly graded fine SAND with silt and organics (6.5'-7')			
10	-6		Shell fragments (8'- 14')	SS 5	6-7-10-10 (17)	
	-8	SP-SM				
	-10		Loose to medium dense,gray, poorly graded fine SAND with silt	SS 6	5-4-4 (8)	
15	-12					
	-14					
	-16		Stiff to very stiff, light blueish gray, fat CLAY with limestone fragments	SS 7	4-5-8 (13)	
20	-18	CH				
	-20			SS 8	7-7-11 (18)	
25	-22					
	-24		Dense to very dense, light gray, clayey fine SAND			
	-26			SS 9	13-18-17 (35)	
30	-28	SC				
	-30			SS 10	50/5"	
35						

SPT N VALUE
ORGANIC CONTENT %
PL MC LL
FINES CONTENT (%)
20 40 60 80
191.1
>>

Bottom of hole at 35.0 feet.

MC2 REPORT W ELEV. T16.196 173RD AVE.GPJ MC2.GDT 8/8/17

TEST PROCEDURES

The general field procedures employed by MC Squared, Inc. (**MC²**) are summarized in the American Society for Testing and Materials (ASTM) Standard D420 which is entitled "Investigating and Sampling Soil and Rock". This recommended practice lists recognized methods for determining soil and rock distribution and groundwater conditions. These methods include geophysical and in-situ methods as well as boring.

Standard Drilling Techniques

To obtain subsurface samples, boring are drilled using one of several alternate techniques depending upon the subsurface conditions. Some of these techniques are:

In Soils:

a) Continuous hollow stem augers.
b) Rotary boring using roller cone bits or drag bits, and water or drilling mud to flush the hole.
c) "Hand" augers.

In Rock:

a) Core drilling with diamond-faced, double or triple tube core barrels.
b) Core boring with roller cone bits.

Hollow Stem Augering: A hollow stem auger consists of a hollow steel tube with a continuous exterior spiral flange termed a flight. The auger is turned into the ground, returning the cuttings along the flights. The hollow center permits a variety of sampling and testing tools to be used without removing the auger.

Mud Rotary: In situations where unconsolidated materials are anticipated, the direct-rotary or “mud” rotary method may be used as a more effective method for obtaining soil samples. The fluid used, which is typically stored in an aluminum tub (also known as a “mudtub”), is a mix of water and bentonite, also known as a bentonite slurry or “mud”. This fluid circulates into the borehole and then returns to the mudtub using a pump system. A loss of circulation, partially or otherwise, may signify a void at that sample depth. The key advantage of using this drilling method is that it stabilizes the borehole wall while drilling in unconsolidated formations, due to the buildup of a filter cake on the wall.

Core Drilling: Soil drilling methods are not normally capable of penetrating through hard cemented soil, weathered rock, coarse gravel or boulders, thin rock seams, or the upper surface of sound, continuous rock. Material which cannot be penetrated by auger or rotary soil-drilling methods at a reasonable rate is designated as “refusal material”. Core drilling procedures are required to penetrate and sample refusal materials.

Prior to coring, casing may be set in the drilled hole through the overburden soils, to keep the hole from caving and to prevent excessive water loss. The refusal materials are then cored according to ASTM D-2113 using a diamond-studded bit fastened to the end of a hollow, double or triple tube core barrel. This device is rotated at high speeds, and the cuttings are brought to the surface by circulating water. Core samples of the material penetrated are protected and retained in the swivel-mounted inner tube. Upon completion of each drill run, the core barrel is brought to the surface, the core recovery is measured, and the core is placed, in sequence, in boxes for storage and transported to our laboratory.

Sampling and Testing in Boreholes

Several techniques are used to obtain samples and data in soils in the field; however the most common methods in this area are:

a) Standard Penetrating Testing
b) Undisturbed Sampling
c) Dynamic Cone Penetrometer Testing
d) Water Level Readings

The procedures utilized for this project are presented below.

Standard Penetration Testing: At regular intervals, the drilling tools are removed and soil samples obtained with a standard 2-inch diameter split tube sampler connected to an A or N-size rod. The sampler is first seated 6 inches to penetrate any loose cuttings, and then driven an additional 12 inches with blows of a 140-pound safety hammer falling 30 inches. Generally, the number of hammer blows required to drive the sampler the final 12 inches is designated the "penetration resistance" or "N" value, in blows per foot (bpf). The split barrel sampler is designed to retain the soil penetrated, so that it may be returned to the surface for observation. Representative portions of the soil samples obtained from each split barrel sample are placed in jars, sealed and transported to our laboratory.

The standard penetration test, when properly evaluated, provides an indication of the soil strength and compressibility. The tests are conducted according to ASTM Standard D1586. The depths and N-values of standard penetration tests are shown on the Boring Logs. Split barrel samples are suitable for visual observation and classification tests but are not sufficiently intact for quantitative laboratory testing.

Water Level Readings: Water level readings are normally taken in the boring and are recorded on the Boring Records. In sandy soils, these readings indicate the approximate location of the hydrostatic water level at the time of our field exploration. In clayey soils, the rate of water seepage into the boring is low and it is generally not possible to establish the location of the hydrostatic water level through short-term water level readings. Also, fluctuation in the water level should be expected with variations in precipitation, surface run-off, evaporation, and other factors. For long-term monitoring of water levels, it is necessary to install piezometers.

The water levels reported on the Boring Logs are determined by field crews immediately after the drilling tools are removed, and several hours after the boring are completed, if possible. The time lag is intended to permit stabilization of the groundwater level that may have been disrupted by the drilling operation.

Occasionally the boring will cave-in, preventing water level readings from being obtained or trapping drilling water above the cave-in zone.

BORING LOGS

The subsurface conditions encountered during drilling are reported on a field boring log prepared by the Driller. The log contains information concerning the boring method, samples attempted and recovered, indications of the presence of coarse gravel, cobbles, etc., and observations of groundwater. It also contains the driller's interpretation of the soil conditions between samples. Therefore, these boring records contain both factual and interpretive information. The field boring records are kept on file in our office.

After the drilling is completed a geotechnical professional classifies the soil samples and prepares the final Boring Logs, which are the basis for our evaluations and recommendations.

SOIL CLASSIFICATION

Soil classifications provide a general guide to the engineering properties of various soil types and enable the engineer to apply his past experience to current problems. In our investigations, samples obtained during drilling operations are examined in our laboratory and visually classified by an engineer. The soils are classified according to consistency (based on number of blows from standard penetration tests), color and texture. These classification descriptions are included on our Boring Logs.

The classification system discussed above is primarily qualitative and for detailed soil classification two laboratory tests are necessary; grain size tests and plasticity tests. Using these test results the soil can be classified according to the AASHTO or Unified Classification Systems (ASTM D-2487). Each of these classification systems and the in-place physical soil properties provides an index for estimating the soil's behavior. The soil classification and physical properties are presented in this report.

The following table presents criteria that are typically utilized in the classification and description of soil and rock samples for preparation of the Boring Logs.

Relative Density of Cohesionless Soils From Standard Penetration Test		**Consistency of Cohesive Soils**	
Very Loose	≤ 4 bpf	Very Soft	≤ 2 bpf
Loose	5 - 10 bpf	Soft	3 - 4 bpf
Medium Dense	11 - 30 bpf	Firm	5 - 8 bpf
Dense	31 - 50 bpf	Stiff	9 - 15 bpf
Very Dense	> 50 bpf	Very Stiff	16 - 30 bpf
		Hard	30 – 50 bpf
(bpf = blows per foot, ASTM D 1586)		Very Hard	> 50 bpf

Relative Hardness of Rock		**Particle Size Identification**	
Very Soft	Very soft rock disintegrates or easily compresses to touch; can be hard to very hard soil.	Boulders	Larger than 12"
Soft	May be broken with fingers.	Cobbles	3" - 12"
Moderately Soft	May be scratched with a nail, corners and edges may be broken with fingers.	Gravel	
		Coarse	3/4" - 3"
		Fine	4.76mm - 3/4"
Moderately Hard	Light blow of hammer required to break samples.	Sand	
		Coarse	2.0 - 4.76 mm
		Medium	0.42 - 2.00 mm
		Fine	0.42 - 0.074 mm
Hard	Hard blow of hammer required to break sample.	Fines (Silt or Clay)	Smaller than 0.074 mm

Rock Continuity		**Relative Quality of Rocks**	
RECOVERY = $\frac{\text{Total Length of Core}}{\text{Length of Core Run}}$ x 100 %		**RQD** = $\frac{\text{Total core, counting only pieces > 4" long}}{\text{Length of Core Run}}$ x 100 %	
Description	Core Recovery %	Description	RQD %
Incompetent	Less than 40	Very Poor	0 - 25 %
Competent	40 - 70	Poor	25 - 50 %
Fairly Continuous	71 - 90	Fair	50 - 75 %
Continuous	91 - 100	Good	75 - 90 %
		Excellent	90 - 100 %

Table No. 1
Summary of Soil Parameters
Pump Station 079 Replacement at 173rd Avenue
Pinellas County, Florida
MC² Project No. T101604.196

Boring ID	Depth (ft)	N Value Range	Soil Classification	Average Unit Weight (γ)**		Angle of Internal Friction Ø ** (degrees)	Earth Pressure Coefficients*			Average Undrained Cohesion C_u ** (psf)
				Saturated (pcf)	Submerged (pcf)		At Rest (K_o)	Active (K_a)	Passive (K_p)	
Proposed Pump Station Structures										
SPT-01	0-5.5	7	SP-SM, SC	105	42.6	29	0.515	0.347	2.882	0
	5.5-8	3	CH, SC	110	47.6	0	1.000	1.000	1.000	375
	8-15	5-11	SP-SM	105	42.6	29	0.515	0.347	2.882	0
	15-23.5	10	CH	120	57.6	0	1.000	1.000	1.000	1,250
	23.5-28.5	17	SC	120	57.6	31	0.485	0.320	3.124	0
	28.5-35	> 50	CH	125	62.6	0	1.000	1.000	1.000	3,000
	35-40	> 50	SC	125	62.6	0	1.000	1.000	1.000	3,600
	40-45	> 50	CH	125	62.6	0	1.000	1.000	1.000	3,000
SPT-02	0-18.5	5-23	SP-SM, SP-SC, SC	105	42.6	29	0.515	0.347	2.882	0
	18.5-23	14	SC	115	52.6	31	.485	.320	3.124	0
	23-35	26- >50	CH, SC	125	62.6	0	1.000	1.000	1.000	3,000
SPT-03	0-6	8	SP-SM, SP-SC	105	42.6	29	0.515	0.347	2.882	0
	6-6.5	6	CH	115	52.6	0	1.000	1.000	1.000	750
	6.5-18.5	6-17	SP-SM	105	42.6	29	0.515	0.347	2.882	0
	18.5-28	13-18	CH	120	57.6	0	1.000	1.000	1.000	1,850
	18.5-40	35- >50	SC	125	62.6	0	1.000	1.000	1.000	3,600

*Values are for level (non-sloping) backfill; no surcharge loads on backfill

**Based on empirical correlations

NOTE: Hand augers were performed in the top 4 feet at all test boring locations to avoid utilities.