

CITY OF  
TAMPA, FLORIDA

NOTICE TO BIDDERS, INSTRUCTIONS TO BIDDERS  
PROPOSAL, BID BOND, FORM OF NOTICE OF AWARD,  
AGREEMENT, PERFORMANCE BOND AND  
SPECIFICATIONS

FOR

**Contract 21-C-00027**

# **Virginia Pump Station Rehabilitation**

City of Tampa  
CONTRACT ADMINISTRATION DEPARTMENT  
TAMPA MUNICIPAL OFFICE BUILDING  
306 E. JACKSON STREET - 4<sup>TH</sup> FLOOR NORTH  
TAMPA, FLORIDA 33602

MAY 2022

CITY OF TAMPA  
CONTRACT ADMINISTRATION DEPARTMENT  
306 E. Jackson Street 280A4N  
Tampa, FL 33602

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**BID NOTICE MEMO**

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**Electronic Bids are not allowed for these projects.**

**Physical Bids will be received no later than 1:30 p.m.** at the above address on the indicated Date(s) for the following Project(s):

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**CONTRACT NO.:** 21-C-00027; Virginia Pump Station Rehabilitation

**BID OPENING:** 1:30PM, Tuesday, June 21, 2022 **ESTIMATE:** \$1,120,000 **SCOPE:** Furnishing all labor, materials, and equipment to remove and replace pumps, pump bases, risers, motors, concrete pedestals, valves and appurtenances, construction of a new submersible pump station including, but not limited to, two (2) 3hp NP3085 Flygt submersible pumps with mixed flush valves and bases, bypass pumping, riser pipes, discharge piping and valves, partial reconstruction of wet well, installing structural coating in wet well, electrical upgrades, installation of new discharge force main, removal and installation of wastewater gravity sewer pipes, removal of existing pavement, ditch and curbs, regrading of existing roadway, installation of brick pavement, installation of storm pipes, inlets, storm structures, outfall structure, rip rap, removal and installation of new water main and services.

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Bids will be opened in the 4th Floor Conference Room, Tampa Municipal Office Building, 306 E. Jackson Street, Tampa, Florida 33602. The public is not allowed to attend in person.

To view the Bid Opening follow these instructions:  
To join the meeting from your computer, tablet or smartphone.

<https://global.gotomeeting.com/join/173279197>

You can also dial in using your phone. (For supported devices, tap a one-touch number below to join instantly.)  
United States: +1 (646) 749-3131 - One-touch: tel:+16467493131,,173279197#

Access Code: 173-279-197

Join from a video-conferencing room or system. Dial in or type: 67.217.95.2 or inroomlink.goto.com  
Meeting ID: 173 279 197 Or dial directly: 173279197@67.217.95.2 or 67.217.95.2##173279197

New to GoToMeeting? Get the app now and be ready when your first meeting starts:  
<https://global.gotomeeting.com/install/173279197>

In accordance with the Americans with Disabilities Act ("ADA") and Section 286.26, Florida Statutes, persons with disabilities needing a reasonable accommodation to participate in this public hearing or meeting should contact the City of Tampa's ADA Coordinator at least 48 hours prior to the proceeding. The ADA Coordinator may be contacted by phone at 813-274-3964, email at TampaADA@tampagov.net, or by submitting an ADA - Accommodations Request online form available at <http://www.tampagov.net/ADARequest>.

Please note that the City of Tampa may not be able to accommodate any request received less than 48 hours before the scheduled public hearing or meeting.

Plans and Specifications and Addenda for this work may be examined at, and downloaded from, [www.demandstar.com](http://www.demandstar.com).  
Files are also available at <http://www.tampagov.net/contract-administration/programs/construction-project-bidding>.

**Email Questions to:** [contractadministration@tampagov.net](mailto:contractadministration@tampagov.net) .

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NOTICE TO BIDDERS  
CITY OF TAMPA, FLORIDA  
Contract 21-C-00027; Virginia Pump Station Rehabilitation

Sealed Proposals will be received by the City of Tampa no later than 1:30 P.M., June 21, 2022 in the 4<sup>th</sup> Floor Conference Room, Tampa Municipal Office Building, 306 E. Jackson Street, Tampa, Florida, there to be publicly opened and read aloud.

The proposed work is to include, but not be limited to, furnishing all labor, materials, and equipment to remove and replace pumps, pump bases, risers, motors, concrete pedestals, valves and appurtenances, construction of a new submersible pump station including, but not limited to, two (2) 3hp NP3085 Flygt submersible pumps with mixed flush valves and bases, bypass pumping, riser pipes, discharge piping and valves, partial reconstruction of wet well, installing structural coating in wet well, electrical upgrades, installation of new discharge force main, removal and installation of wastewater gravity sewer pipes, removal of existing pavement, ditch and curbs, regrading of existing roadway, installation of brick pavement, installation of storm pipes, inlets, storm structures, outfall structure, rip rap, removal and installation of new water main and services with all associated work required for a complete project in accordance with the Contract Documents.

The Instructions to Bidders, Proposal, Form of Bid Bond, Agreement, Form of Public Construction Bond, Specifications, Plans and other Contract Documents are posted at DemandStar.com. Backup files may be downloaded from <http://www.tampagov.net/contract-administration/programs/construction-project-bidding>. One set may be available for reference at the office of the Contract Administration Department, Municipal Office Building, Fourth Floor North, City Hall Plaza, Tampa, Florida 33602.

Each Proposal must be submitted on the Proposal form included in the Specifications and must be accompanied by a certified check or cashier's check on a solvent bank or trust company in compliance with Section 255.051, Florida Statutes, made payable to the City of Tampa, in an amount of not less than five per cent of the total bid, or a Bid Bond, of like amount, on the form set forth in the Contract Documents, as a guarantee that, if the Proposal is accepted, the Bidder will execute the Proposed Contract and furnish a Public Construction Bond within twenty (20) days after receipt of Notice of Award of Contract.

To be eligible to submit a proposal, a Bidder must hold the required and/or appropriate current license, certificate, or registration (e.g. DBPR license/certificate of authorization, etc.) in good standing at the time of receipt of Bids. **Per Section 489.131, Florida Statutes, Proposals submitted for the construction, improvement, remodeling, or repair of public projects must be accompanied by evidence that the Bidder holds the required and/or appropriate current certificate or registration, unless the work to be performed is exempt under Section 489.103, Florida Statutes.**

The City of Tampa reserves the right to reject any or all Bids and to waive any informalities in the Bid and/or Bid Bond. Acceptance or rejection of Proposals will be made as soon as practicable after the Proposals are received, but the City reserves the right to hold Proposals for ninety (90) days from the date of Opening.

Bid Protest Procedures: Unless subsequently indicated otherwise, in a revised posting on the Department's web page for Construction Project Bidding, the City of Tampa intends to award the referenced project to the lowest bidder listed in the tabulation posted on or about the date of Bid Opening. A bidder aggrieved by this decision may file a protest not later than 4:30 P.M., five (5) business days from the first posting thereof, pursuant to City of Tampa Code Chapter 2, Article V, Division 3, Section 2-282, Procurement Protest Procedures. Protests not conforming therewith shall not be reviewed.

Pursuant to Section 2-282, City of Tampa Code, during the solicitation period, including any protest and/or appeal, NO CONTACT with City officers or employees is permitted from any bidder or proposer, other than as specifically stated in this solicitation and as follows:  
Director of the Contract Administration Department (CAD)  
Contracts Management Supervisor, Jim Greiner  
Contract Officer, Jody Gray  
City legal department

Any Requests For Information must be submitted by email to [ContractAdministration@tampagov.net](mailto:ContractAdministration@tampagov.net)

A person or affiliate who has been placed on the convicted vendor list following a conviction for a public entity crime may not submit a bid on a contract to provide any goods or services to a public entity, may not submit a bid on a contract with a public entity for the construction or repair of a public building or public work, may not submit bids on leases of real property to a public entity, may not be awarded or perform work as a contractor, supplier, subcontractor, or consultant under a contract with any public entity, and may not transact business with any public entity in excess of the threshold amount provided in Section 287.017, for CATEGORY TWO for a period of 36 months from the date of being placed on the convicted vendor list." Refer to Section 287.133, Florida Statutes.

Pursuant to Section 287.087, Florida Statutes, under certain circumstances preference may be given to businesses with a drug-free workplace program that meets the requirements of said Section.

INSTRUCTIONS TO BIDDERS  
SECTION 1 - SPECIAL INSTRUCTIONS

I-1.01 GENERAL:

The proposed work is the Virginia Pump Station Rehabilitation in the City of Tampa, as required for a complete project, as shown on the plans and detailed in the specifications. The work is located on land owned or controlled by the City of Tampa.

To be eligible to submit a proposal, a Bidder must hold the required and/or appropriate current license, certificate, or registration (e.g. DBPR license/certificate of authorization, etc.) in good standing at the time of receipt of Bids. **Per Section 489.131, Florida Statutes, Proposals submitted for the construction, improvement, remodeling, or repair of public projects must be accompanied by evidence that the Bidder holds the required and/or appropriate current certificate or registration, unless the work to be performed is exempt under Section 489.103, Florida Statutes.**

I-1.02 FORM PREPARATION AND PRESENTATION OF PROPOSALS: Replace the second sentence with the following: Submission of the entire specification book is not required.

I-1.03 ADDENDA – Section I-2.03 is replaced with the following: No interpretation of the meaning of the Plans, Specifications, or other Contract Documents will be made to any Bidder orally.

Every request for such interpretation must be in writing, addressed to the City of Tampa, Contract Administration Department, 306 E. Jackson St., 4th Floor, Tampa, Florida 33602 and then emailed to [ContractAdministration@tampagov.net](mailto:ContractAdministration@tampagov.net). To be given consideration, such request must be received at least seven (7) days prior to the date fixed for the opening of the Proposals. Any and all such interpretations and any supplemental instructions will be in the form of written addenda which, if issued, will be posted on DemandStar.Com and on the Department's web page. Failure of any Bidder to receive any such addenda shall not relieve said Bidder from any obligation under his Proposal as submitted. All addenda so issued shall become part of the Contract Documents.

I-1.04 INSTRUCTIONS TO BIDDERS

**SECTION 2 – GENERAL INSTRUCTIONS.** Section I-2.07 SIGNATURE AND QUALIFICATIONS OF BIDDERS is replaced with the following:

Proposals must be signed in ink by the Bidder with signature in full. When firm is a Bidder, the Proposal shall be signed in the name of the firm by one or more partners. When a corporation is a bidder the officer signing shall set out the corporate name in full beneath which he shall sign his name and give the title of his office.

If the bidder referred to in Section I-2.07 is a corporation, it must submit; upon request, a copy of its filed Articles of Incorporation. In addition, if the bidder was incorporated in another state, it must establish that it is authorized to do business in the State of Florida. If the bidder is using a fictitious name, it must submit upon request, proof of registration of such name with the Clerk of the Circuit Court of the County where its principal place of business is. Failure to submit what is required is grounds to reject the bid of that bidder.

**SECTION 2 – GENERAL INSTRUCTIONS.** Section I-2.14 NONDISCRIMINATION IN EMPLOYMENT is changed to add the following to the end of the existing text:

The following provisions are hereby incorporated into any contract executed by or on behalf of the City. Contractor shall comply with the following Statement of Assurance: During the performance of the Contract, the Contractor assures the City, that the Contractor is in compliance with Title VII of the 1964 Civil Rights Act, as amended, the Florida Civil Rights Act of 1992, and the City of Tampa Code of Ordinances, Chapter 12, in that Firm/Contractor does not on the grounds of race, color, national origin, religion, sex, sexual orientation, gender identity or expression, age, disability, familial status, or marital status, discriminate in any form or manner against said Firm's/Contractor's employees or applicants for employment. Contractor understands and agrees that the Contract is conditioned upon the veracity of this Statement of Assurance, and that violation of this condition shall be considered a material breach of the Award/Contract. Furthermore, Contractor herein assures the City that said Contractor will comply with Title VI of the Civil Rights Act of 1964 when federal grant(s) is/are

INSTRUCTIONS TO BIDDERS  
SECTION 1 - SPECIAL INSTRUCTIONS

involved. This Statement of Assurance shall be interpreted to include Vietnam-Era Veterans and Disabled Veterans within its protective range of applicability. Firm/Contractor further acknowledges and agrees to provide the City with all information and documentation that may be requested by the City from time to time regarding the solicitation, selection, treatment and payment of subcontractors, suppliers and vendors in connection with this Award/Contract. Firm/Contractor further acknowledges that it must comply with City of Tampa Code of Ordinances, Chapter 26.5.

I-1.05 TIME FOR COMPLETION:

The work shall be arranged to be completed in accordance with a progress schedule approved by the Construction Engineer.

The time for completion of this project, referred in Article 4.01 of the Agreement, shall be 365 consecutive calendar days. The period for performance shall start from the date indicated in the Notice To Proceed.

I-1.06 LIQUIDATED DAMAGES:

The amount of liquidated damages, referred to in Article 4.06 of the Agreement, for completion of this project shall be \$500 per calendar day.

I-1.07 BASIS OF AWARD OF CONTRACT:

The basis of award referred to in Item I-2.11 of Instructions to Bidders shall be the greatest amount of work, which can be accomplished within the funds available as budgeted. The award may be made on the basis of the total bid, base bid, alternates(s) if any, unit bids if any, or any combination thereof deemed to be in the best interest of the City.

Unless all bids are rejected, the award will be made within 90 days after opening proposals.

I-1.08 GROUND BREAKING CEREMONY:

Arrangement may be made by the City in coordination with the Contractor, for construction to commence with a Ground Breaking Ceremony. Details will be discussed at the pre-construction conference.

I-1.09 INSURANCE:

The insurance required for this project shall be as indicated on the attached and incorporated Special Instructions pages beginning with page INS-1 entitled CITY OF TAMPA INSURANCE REQUIREMENTS, which among other things requires the Contractor to provide a Certificate of Insurance to the City prior to commencing work. The City may from time to time use a third-party vendor to manage its insurance certificates and related documentation which vendor may periodically initiate contact, requests for information, etc. on the City's behalf.

I-1.10 TESTING:

The Contractor shall perform all Quality Control (QC) testing to meet the FDOT requirements in the Florida Department of Transportation, JULY 2020 Standard Specifications for Road and Bridge Construction

INSTRUCTIONS TO BIDDERS  
SECTION 1 – SPECIAL INSTRUCTIONS

I-1.11 EQUAL BUSINESS OPPORTUNITY PROGRAM (EBO) REQUIREMENTS / PROJECT SUBCONTRACTING GOAL(S)

**BIDDERS MUST SUBMIT COMPLETED AND SIGNED CITY OF TAMPA FORMS MBD-10 AND MBD-20 WITH THEIR BIDS. BIDS SUBMITTED WITHOUT THESE COMPLETED FORMS (INCLUDING SIGNATURES) WILL BE DEEMED NON-RESPONSIVE. INSTRUCTIONS ON COMPLETING THE FORMS ARE INCLUDED AFTER EACH FORM IN THIS BID PACKAGE.**

**THE CHECKED BOX INDICATES SECTION THAT APPLIES TO THIS BID.**



**SUBCONTRACTING GOAL – (WMBE and SLBE)**

In accordance with the City of Tampa's EBO Program, Chapter 26.5, City of Tampa Code, the subcontracting goal(s) has/have been established for subcontracting with City-certified underutilized WMBEs (Women and Minority Business Enterprises) and/or SLBEs (Small Local Business Enterprises) on this project (hereinafter "Goal"). *The Goal is based, in part, upon the availability of City-certified firms to perform the anticipated scope of work (Bid is subject to the subcontracting project goal(s) section for which a corresponding numerical percent is indicated).* Project Industry Category: Construction

- Project Goal(s): \_\_\_\_\_% **U-WMBE (Underutilized Woman and Minority Business Enterprise) (EBO Program)**  
per MBD Form-70 the U-WMBE subcontract Classification for Construction is African American (BBE)
- \_\_\_\_\_% **SLBE (Small Local Business Enterprise) (EBO Program)** only City-certified SLBEs
- \_\_\_\_\_ **15% U-WMBE/SLBE Combined (EBO Program)**  
per MBD Form-70 the U-WMBE subcontract Classification for Construction is African American (BBE)  
together with City-certified SLBEs
- \_\_\_\_\_% **WMBE/SLBE ASPIRATIONAL (EBO Program)** An all-inclusive SLBE/WMBE goal; any City certified firm counts towards goal attainment.

BIDDERS MUST SOLICIT ALL COMPANIES ON THE ATTACHED AVAILABILITY CONTACT LIST at least **five (5) City business days or more prior to bid opening as a first step** to demonstrate Good Faith Efforts to achieve the Goal. Substantive documentation that demonstrates Good Faith Efforts to achieve the Goal **must be submitted with the bid**, including emails, faxes, phone calls, letters, and other communication with City-certified firms. Bidders may explore other potential opportunities for subcontracting by consulting the current directory of all certified firms posted by the City of Tampa at <https://tampa.diversitysoftware.com> as the Availability Contact List may not be inclusive of all firms that could count toward Goal attainment. However, ONLY SUBCONTRACTING with those specific WMBEs designated as "underutilized" by Classification in the appropriate industry category (and, if made applicable by being specifically included in the above Goal, SLBEs) will count toward meeting the Goal. Making Good Faith Efforts through these and other means (not pro-forma) is the responsibility of the Bidder. See the attached Good Faith Effort Compliance Plan (GFCEP) (MBD Form-50) for specific requirements.

GOOD FAITH EFFORT COMPLIANCE PLAN (GFCEP) REQUIRED (MBD FORM-50). When a Goal has been established, the Bidder **must submit** with its bid a Good Faith Effort Compliance Plan (GFCEP) using the attached MBD Form-50 together with supporting documentation as specified therein. **Submittals that do not contain MBD Form-50 when a Goal has been established will be deemed non-responsive.** Additional explanation and documentation is required whenever a City-certified subcontractor's quote is not utilized. Any additional information regarding GFCEP (post-bid) shall be only upon the City's request for clarification of information submitted with bid and not to "cure" omissions or deficiencies of the bid.

**NOTE:** When U-WMBEs are included in a Goal, only those City-certified subcontractors whose WMBE Classification is designated "underutilized" will count toward Goal attainment. Refer to **MBD Form-70** to identify underutilized WMBEs by subcontract Classification for the applicable project industry category. A prime bidder who is a City-certified WMBE and/or SLBE is not exempt from the **GFCEP MBD Form-50** requirements.



**SUBCONTRACTING GOAL – (DBE) FDOT DISADVANTAGED BUSINESS ENTERPRISE PROGRAM**

The City of Tampa is required to use the Florida Department of Transportation (FDOT) Disadvantaged Business Enterprise (DBE) program on contracts with Federal Highway Administration (FHWA) funds. Effective October 1, 2017 through to September 30, 2020, the overall FDOT DBE aspirational goal is **10.65%** and is *race neutral*, meaning that FDOT believes the aspirational DBE goal may be achieved entirely through ordinary, competitive procurement methods. Despite the absence of a contract specific DBE goal on this project, the City encourages bidders to seek out and use DBEs and other minority, small businesses. For assistance in identifying certified DBEs, FDOT offers the use of its supportive services program accessed via FDOT's Equal Opportunity Office at <http://www.fdot.gov/equalopportunity/serviceproviders.shtm>. FDOT DBE rules and regulations apply to this solicitation, including the requirement to report bidder opportunity information in the FDOT Equal Opportunity Compliance (EOC) web-based application within three (3) business days of submission of the bid for ALL subcontractors who quoted bidder for this specific project. The five (5) char/digit LAP Agreement Contract Number for this project is G \_\_\_\_\_. The web address to the EOC system is: <https://fdotwp1.dot.state.fl.us/EqualOpportunityCompliance/Account.aspx/LogIn?ReturnUrl=%2fEqualOpportunityCompliance>

**NOTE:** Regardless of FDOT DBE program applicability, for data collection purposes bidder still **must submit** City Forms MBD-10 and MBD-20 completed and signed with its bid or the bid will be deemed non-responsive.

**DIVERSITY MANAGEMENT INITIATIVE (DMI) DATA REPORTING FORMS REQUIRED FOR ALL CONTRACTS**

Bidder **must submit**, with its bid, completed and signed Forms MBD-10 and MBD-20 to be considered a responsive bid. Specifically, the 'Schedule of All Solicited Sub-(Contractors/Consultants/Suppliers) (Form MBD-10)' listing all subcontractors (including non-certified) solicited and 'Schedule of All -To Be Utilized Sub-(Contractors/Consultants/Suppliers) (Form MBD-20)' listing all subcontractors (including non-certified) to be utilized. Supplemental forms, such as 'Form MBD-40 Official Letter Of Intent' (LOI), can be submitted with the bid or once declared lowest-responsive bidder. After an award, 'DMI Sub-(Contractors/Consultants/Suppliers) Payment Form (Form MBD-30)' is to be submitted with payment requests to report payments to subcontractors and using the on-line automated MBD compliance software system available at <https://tampa.diversitysoftware.com>

**For additional information about the WMBE and SLBE programs contact the Minority and Small Business Development Office at 813-274-5522. (3-18)**



INSTRUCTIONS TO BIDDERS  
SECTION 1 - SPECIAL INSTRUCTIONS

I-1.11 BID SECURITY:

Surety companies shall have a rating of not less than B+ Class VI as evaluated in the most recently circulated Best KeyRating Guide Property/Casualty.

I-1.12 PUBLIC CONSTRUCTION BOND:

The Bidder who is awarded the Contract will be required to furnish a Public Construction Bond upon the form provided herein, equal to 100 percent of the Contract price, such Bond to be issued and executed by (a) surety company(ies) acceptable to the City and licensed to underwrite contracts in the State of Florida. After execution of the Agreement and before commencing work, the Contractor must provide the City a certified copy of the officially recorded Bond.

I-1.13 AGREEMENT

**SECTION 2 – POWERS OF THE CITY’S REPRESENTATIVES**, new Article 2.05:

Add the following:

Article 2.05 CITY’S TERMINATION FOR CONVENIENCE:

The City may, at any time, terminate the Contract in whole or in part for the City’s convenience and without cause. Termination by the City under this Article shall be by a notice of termination delivered to the Contractor, specify the extent of termination and the effective date.

Upon receipt of a notice of termination, the Contractor shall immediately, in accordance with instructions from the City, proceed with performance of the following duties regardless of delay in determining or adjusting amounts due under this Paragraph:

- (a) cease operations as specified in the notice;
- (b) place no further orders and enter into no further subcontracts for materials, labor, services or facilities except as necessary to complete continued portions of the Contract;
- (c) terminate all subcontracts and orders to the extent they relate to the Work terminated;
- (d) proceed to complete the performance of Work not terminated; and
- (e) take actions that may be necessary, or that the City may direct, for the protection and preservation of the terminated Work.

The amount to be paid to the Contractor by the City because of the termination shall consist of:

- (a) for costs related to work performed on the terminated portion of the Work prior to the effective date including termination costs relative to subcontracts that are properly chargeable to the terminated portion of the Work;
- (b) the reasonable costs of settlement of the Work terminated, including accounting, legal, clerical and other expenses reasonable necessary for the preparation of termination settlement proposals and supporting data; additional costs of termination and settlement of subcontracts excluding amounts of such settlements; and storage, transportation, and other costs incurred which are reasonably necessary for the preservation, protection or disposition of the terminated Work; and
- (c) a fair and reasonable profit on the completed Work unless the Contractor would have sustained a loss on the entire Contract had it been completed.

Allowance shall be made for payments previously made to the Contractor for the terminated portion of the Work, and claims which the City has against the Contractor under the Contract, and for the value of materials supplies, equipment or other items that are part of the costs of the Work to be disposed of by the Contractor.

**SECTION 5 – SUBCONTRACTS AND ASSIGNMENTS**, Article 5.01, Page A-7, last paragraph:

Change “...twenty-five (25) percent...” to “...fifty-one (51) percent...”

**SECTION 8 – CONTRACTOR’S EMPLOYEES**, Article 8.03, Page A-9, delete Article 8.03 in its entirety and

Replace with the following new article:

ARTICLE 8.03 EMPLOYMENT OPPORTUNITIES

The Contractor shall, in the performance of the work required to be done under this Contract, employ all workers without discrimination and must not maintain, provide or permit facilities that are segregated.

INSTRUCTIONS TO BIDDERS  
SECTION 1 - SPECIAL INSTRUCTIONS

**SECTION 10 – PAYMENTS**, Article 10.05, Page A-10, 1<sup>st</sup> Paragraph, 1<sup>st</sup> Sentence:  
Change "...fair value of the work done, and may apply for..." to "...fair value of the work done, and shall apply for..."

**SECTION 10 – PAYMENTS**, Article 10.05, Page A-10, 1<sup>st</sup> Paragraph, 1<sup>st</sup> Sentence:  
Change "...fair value of the work done, and may apply for..." to "...fair value of the work done, and shall apply for..." Note: Retainage as referenced in Article 10.05 is limited to a maximum of five percent (5%).

**SECTION 11 – MISCELLANEOUS PROVISIONS**, Article 11.02, Page A-12, 1<sup>st</sup> Paragraph, 2<sup>nd</sup> Sentence:  
Delete the 2<sup>nd</sup> Sentence in its entirety and replace it with the following new 2<sup>nd</sup> Sentence:

Without limiting application of Article 11.07, below, whenever the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall indemnify, defend, and hold harmless the City Indemnified Parties (as defined below) from any and all Claims (as defined below) for infringement by reason of the use of any such patented design, device, tool, material, equipment, or process, to be performed under the Contract and damages which may be incurred by reason of such infringement at any time during the prosecution or after completion of the work.

**SECTION 11 – MISCELLANEOUS PROVISIONS**, Article 11.03, Page A-12:  
Delete Article 11.03 in its entirety and replace with the following new article:  
ARTICLE 11.03 INTENTIONALLY OMITTED.

**SECTION 11 – MISCELLANEOUS PROVISIONS**, Article 11.07, Page A-12:  
Delete Article 11.07 in its entirety and replace with the following new article:  
ARTICLE 11.07 INDEMNIFICATION PROVISIONS

Whenever there appears in this Agreement, or in the other Contract Documents made a part hereof, an indemnification provision within the purview of Chapter 725.06, Laws of Florida, the monetary limitation on the extent of the indemnification under each such provision shall be One Million Dollars or a sum equal to the total Contract price, whichever shall be the greater.

Contractor releases and agrees to defend, indemnify and hold harmless the City, its officers, elected and appointed officials, employees, and/or agents (collectively, "City Indemnified Parties") from and against any and all losses, liabilities, damages, penalties, settlements, judgments, charges, or costs (including without limitation attorneys' fees, professional fees, or other expenses) of every kind and character arising out of any and all claims, liens, is entitled to indemnification hereunder. This obligation shall in no way be limited in any nature whatsoever by any limitation on the amount or type of Contractor's insurance coverage.

The parties agree that to the extent the written terms of this indemnification are deemed by a court of competent jurisdiction to be in conflict with any provisions of Florida law, in particular Sections 725.06 and 725.08, Florida Statutes, the written terms of this indemnification shall be deemed by any court of competent jurisdiction to be modified in such a manner as to be in fully and complete compliance with all such laws and to contain such limiting conditions or limitations of liability, or to not contain any unenforceable or prohibited term or terms, such that this indemnification shall be enforceable in accordance with and to the maximum extent permitted by Florida law.

The obligation of Contractor under this Article is absolute and unconditional; it is not conditioned in any way on any attempt by a City Indemnified Party to collect from an insurer any amount under a liability insurance policy, and is not subject to any set-off, defense, deduction, or counterclaim that the Contractor might have against the City Indemnified Party. The duty to defend hereunder is independent and separate from the duty to indemnify, and the duty to defend exists regardless of any ultimate liability of Contractor, the City, and any City Indemnified Party. The

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duty to defend arises immediately upon presentation of a Claim by any party and written notice of such Claim being provided to Contractor. Contractor's defense and indemnity obligations hereunder will survive the expiration or earlier termination of this Contract.

Contractor agrees and recognizes that the City Indemnified Parties shall not be held liable or responsible for any Claims which may result from any actions or omissions of Contractor in which the City Indemnified Parties participated either through providing data or advice and/or review or concurrence of Contractor's actions. In reviewing, approving or rejecting any submissions by Contractor or other acts of Contractor, the City in no way assumes or shares any responsibility or liability of Contractor or any tier of subcontractor/subconsultant/supplier, under this Contract.

In the event the law is construed to require a specific consideration for such indemnification, the parties agree that the sum of Ten Dollars and 00/100 (\$10.00), receipt of which is hereby acknowledged, is the specific consideration for such indemnification and the providing of such indemnification is deemed to be part of the specifications with respect to the services provided by Contractor.

**SECTION 11 – MISCELLANEOUS PROVISIONS**, Article 11.12, Page A-13:

Change Article 11.12 to add the following new language after existing text:

The City of Tampa is a public agency subject to Chapter 119, Florida Statutes. In accordance with Florida Statutes, 119.0701, Contractor agrees to comply with Florida's Public Records Law, including the following:

1. Contractor shall keep and maintain public records required by the City to perform the services under this Agreement;
2. Upon request by the City, provide the City with copies of the requested records, having redacted records in total on in part that are exempt from disclosure by law or allow the records to be inspected or copied within a reasonable time (with provision of a copy of such records to the City) on the same terms and conditions that the City would provide the records and at a cost that does not exceed that provided in Chapter 119, Florida Statutes, or as otherwise provided by law;
3. Ensure that records, in part or in total, that are exempt or that are confidential and exempt from disclosure requirements are not disclosed except as authorized by law for the duration of the Agreement term and following completion (or earlier termination) of the Agreement if Contractor does not transfer the records to the City;
4. Upon completion (or earlier termination) of the Agreement, Contractor shall within 30 days after such event either transfer to the City, at no cost, all public records in possession of the Contractor or keep and maintain the public records in compliance with Chapter 119, Florida Statutes. If Contractor transfers all public records to the City upon completion (or earlier termination) of the Agreement, Contractor shall destroy any duplicate records that are exempt or confidential and exempt from public records disclosure requirements. If Contractor keeps and maintains public records upon completion (or earlier termination) of the Agreement, Contractor shall meet all applicable requirements for retaining public records. All records stored electronically must be provided to the City in a format that is compatible with the information technology systems of the agency.

The failure of Contractor to comply with Chapter 119, Florida Statutes, and/or the provisions set forth in this Article shall be grounds for immediate unilateral termination of the Agreement by the City; the City shall also have the option to withhold compensation due Contractor until records are received as provided herein.

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**IF CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THIS AGREEMENT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT 813-274-8598, JIM.GREINER@TAMPAGOV.NET, AND CONTRACT ADMINISTRATION DEPARTMENT, TAMPA MUNICIPAL OFFICE BUILDING, 4TH FLOOR, 306 E. JACKSON ST. TAMPA, FLORIDA 33602.**

I-1.14 Contractors must utilize the U.S. Department of Homeland Security's E-Verify Systems to verify the employment eligibility of all persons employed during the term of the Contract to perform employment duties within the State of Florida and all persons, including subcontractors, assigned by Contractor to perform work pursuant to the contract.

E-Verify. In accordance with Section 448.095, Florida Statutes, the Contractor agrees to register with and utilize the U.S. Department of Homeland Security's E-Verify system to verify the employment eligibility of all new employees hired during the term of the Contract for the services specified in the Contract. The Contractor must also include a requirement in subcontracts that the subcontractor must register with and utilize the E-Verify system to verify the employment eligibility of all new employees hired by the subcontractor during the Contract term. If the Contractor enters into a contract with a subcontractor, the subcontractor must provide the Contractor with an affidavit stating that the subcontractor does not employ, contract with, or subcontract with an unauthorized alien. The Contractor shall maintain a copy of such affidavit for the duration of the Contract. If the City has a good faith belief that the Contractor has knowingly violated Section 448.09(1), Florida Statutes, the City shall terminate the Contract with the Contractor, and the Contractor may not be awarded a contract with the City for at least 1 year after the date on which the Contract was terminated. The Contractor is liable for any additional costs incurred by the City as a result of the termination of the Contract. If the City has a good faith belief that a subcontractor knowingly violated the law, but the Contractor has otherwise complied with the law, the City shall promptly notify the Contractor and order the Contractor to immediately terminate the contract with the subcontractor.

I-1.15 GENERAL PROVISIONS; G-2.02 Copies Furnished to Contractor: Replace the first paragraph with the following:

The Contractor shall acquire for its use copies of the plans and specifications as needed, which may be downloaded from the City's web site, at <http://www.tampagov.net/contract-administration/programs/construction-project-bidding>.

Bidder as part of the solicitation process (and as Contractor if Bidder is successful) may hold, come into possession of, and/or generate certain building plans, blueprints, schematic drawings, including draft, preliminary, and final formats, which depict the internal layout and structural elements of a building, facility, or other structure owned or operated by the City or an agency (singularly or collectively "Exempt Plans"), which pursuant to Section 119.071(3), Florida Statutes, are exempt from Section 119.07(1), Florida Statutes and Section 24(a), Art. I of the Florida State Constitution. Contractor certifies it has read and is familiar the exemptions and obligations of Section 119.071(3), Florida Statutes; further that Contractor is and shall remain in compliance with same, including without limitation maintaining the exempt status of such Exempt Plans, for so long as any Exempt Plans are held by or otherwise in its possession.

I-1.16 PAYMENT DISPUTE RESOLUTION

Any dispute pertaining to pay requests must be presented to the City pursuant to Executive Order 2003-1.

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I-1.17 SCRUTINIZED COMPANIES CERTIFICATION

Section 287.135, Florida Statutes, prohibits agencies or local governmental entities from contracting for goods or services of any amount with companies that are on the Scrutinized Companies that Boycott Israel List or are engaged in a boycott of Israel, and of \$1 million or more with companies that are on either the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, or are engaged in business operations in Cuba or Syria. Specifically, Section 287.135(2), Florida Statutes, states: "A company is ineligible to, and may not, bid on, submit a proposal for, or enter into or renew a contract with an agency or local governmental entity for goods or services of: (a) Any amount if, at the time of bidding on, submitting a proposal for, or entering into or renewing such contract, the company is on the Scrutinized Companies that Boycott Israel List, created pursuant to s. 215.4725, or is engaged in a boycott of Israel; or (b) One million dollars or more if, at the time of bidding on, submitting a proposal for, or entering into or renewing such contract, the company: 1. Is on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, created pursuant to s. 215.473; or 2. Is engaged in business operations in Cuba or Syria."

Upon submitting its bid or proposal, a bidder/proposer: (i) certifies the company is not in violation of Section 287.135, Florida Statutes, and shall not be in violation at the time the company enters into or renews any resulting contract; and (ii) agrees any such resulting contract shall be deemed to contain a provision that allows the City, at its option, to terminate such contract for cause if the company is found to have submitted a false certification, been placed on one or any of the foregoing Lists, been engaged in a boycott of Israel, or been engaged in business operations in Cuba or Syria.

I-1.18 FLORIDA'S PUBLIC RECORDS LAW; DATA COLLECTION

Pursuant to Section 119.071(5)(a)2a, Florida Statutes, social security numbers shall only be collected from Bidders and/or Contractor by the City should such number be needed for identification, verification, and/or tax reporting purposes. To the extent Bidder and/or Contractor collects an individual's social security number in the course of acting on behalf of the City pursuant to the terms and conditions of its Proposal or, if awarded, the Agreement, Bidder and/or Contractor shall follow the requirements of Florida's Public Records Law.

I-1.19 APPRENTICESHIP REQUIREMENTS AND REPORTING FORM

Bidders shall comply with the conditions of the Apprenticeship Requirements and Reporting Form, Ordinance No. 2021-33, incorporated into the Contract and as specified therein.

# INSTRUCTIONS TO BIDDERS

## SECTION 2 GENERAL INSTRUCTIONS

### I-2.01 BIDDER'S RESPONSIBILITY

Before submitting Proposals, Bidders shall carefully examine the entire site of the proposed work and adjacent premises and the various means of approach and access to the site, and make all necessary investigations to inform themselves thoroughly as to the facilities necessary for delivering, placing and operating the necessary construction equipment, and for delivering and handling materials at the site, and inform themselves thoroughly as to all difficulties involved in the completion of all the work in accordance with the Contract Documents.

Bidders must examine the Plans, Specifications, and other Contract Documents and shall exercise their own judgment as to the nature and amount of the whole of the work to be done, and for the bid prices must assume all risk of variance, by whomsoever made, in any computation or statement of amounts or quantities necessary to complete the work in strict compliance with the Contract Documents.

Elevations of the ground are shown on the Plans and are believed to be reasonably correct, but are not guaranteed to be absolutely so and are presented only as an approximation. Bidders shall satisfy themselves as to the correctness of all elevations.

The City may have acquired, for its own use, certain information relating to the character of materials, earth formations, probable profiles of the ground, conditions below ground, and water surfaces to be encountered at the site of the proposed work. This information, if it exists, is on file at the offices of the Department of Public Works and Bidders will be permitted to see and examine this information for whatever value they consider it worth. However, this information is not guaranteed, and Bidders should satisfy themselves by making borings or test pits, or by such other methods as they may prefer, as to the character, location, and amounts of water, peat, clay, sand, quicksand, gravel, boulders, conglomerate, rock, gas or other material to be encountered or work to be performed.

Various underground and overhead structures and utilities are shown on the plans. The location and dimensions of such structures and utilities, where given, are believed to be reasonably correct, but do not purport to be absolutely so. These structures and utilities are plotted on the Plans for the information of the Bidders, but information so given is not to be construed as a representation or assurance that such structures will be found or encountered as plotted, or that such information is complete or accurate.

### I-2.02 FORM, PREPARATION AND PRESENTATION OF PROPOSALS

Each Proposal shall be submitted upon the Proposal Form and in accordance with the instructions included herein. The Proposal Form must not be detached herefrom. All blank spaces for bid prices must be filled in, in both words and figures, with the unit or lump sum prices, or both, for which the Proposal is made. The computed total price for each unit price Contract Item shall be determined by multiplying the estimated quantity of the item, as set forth in the Proposal Form, by the corresponding unit price bid for such item. The resulting product shall be entered in the appropriate blank space under the column headed "Computed Total Price for Item". The lump sum price bid for each lump sum price Contract Item shall also be entered in the column headed "Computed Total Price for Item". If a Proposal contains any omissions, erasures, alterations, additions, or items not called for in the itemized Proposal, or contains irregularities of any kind, such may constitute sufficient cause for rejection of the Proposal. In case of any discrepancy in the unit price or amount bid for any item in the Proposal, the price as expressed in written words will govern. In no case is the Agreement Form to be filled out or signed by the Bidder.

In the case of certain jobs bid Lump Sum a "Schedule of Unit Prices" must be filled out as an attachment to the Lump Sum proposal. These prices may be used as a guide for the negotiation of change orders, at the City's option.

The proposal must be signed and certified and be presented on the prescribed form in a sealed envelope on/or before the time and at the place stated in the Notice of Bidders, endorsed with the name of the person, firm or corporation presenting it, the date of presentation, and the title of the work for which the Proposal is made.

Unless the apparent low bidder is now engaged in or has recently completed contract work for the City of Tampa, he, if requested, shall furnish to the City, after the opening of bids and prior to award, a summary statement of record of construction experience over the past three (3) years with proper supporting evidence, and, if required by the City, shall also furnish a list of equipment and other facilities pertinent to and available for the proper execution of the proposed work, and a statement of financial resources to the extent necessary to establish ability to carry on the proposed work. The City may make further investigations as considered necessary with respect to responsibility of the Bidder to whom it appears may be awarded the Contract.

If forwarded by mail, the sealed envelope containing the Proposal, endorsed as directed above, must be enclosed in another envelope addressed as specified in the Notice to Bidders and sent by registered mail.

### I-2.03 ADDENDA AND INTERPRETATIONS

No interpretation of the meaning of the Plans, Specifications, or other Contract Documents will be made to any Bidder orally.

Every request for such interpretation must be in writing, addressed to the Contract Administration Department, Tampa Municipal Office Building, 4th Floor North, City Hall Plaza, Tampa, Florida 33602. To be given consideration, such request must be received at least seven (7) days prior to the date fixed for the opening of the Proposals. Any and all such interpretations and any supplemental instructions will be in the form of written addenda which, if issued, will be sent by certified mail, with return receipt requested, to all prospective bidders at the respective addresses furnished, for such purposes, not later than three (3) working days prior to the date fixed for the opening of the Proposals, and if requested, a copy will be delivered to the prospective bidder's representative. Failure of any Bidder to receive any such addenda shall not relieve said Bidder from any obligation under his Proposal as submitted. All addenda so issued shall become part of the Contract Documents.

### I-2.04 BID SECURITY

Each Proposal must be accompanied by a certified or cashier's check issued by a solvent bank or trust company and payable at sight to the City of Tampa, in compliance with Section 255.051 Florida Statutes, or a Bid Bond upon the form provided herein, in an amount of not less than five percent of the sum of the computed total amount of the Bidder's Proposal as a guarantee that if the Proposal is accepted, the Bidder will execute and fill in the proposed Contract and Public Construction Bond within twenty (20) days after notice of award of the Contract. Certified checks shall have all necessary documentary revenue stamps attached if required by law. Surety on Bid Bonds shall be a duly authorized surety company authorized to do business in the State of Florida, and all such Bonds shall be issued or countersigned by a local resident producing agent, and satisfactory evidence of the authority of the person or persons executing such Bond to Execute the same shall be submitted with the Bond. Bid Bonds shall be issued by a surety company acceptable to the City.

Within ten (10) days after the opening of Proposals, the bid security of all but the three lowest Bidders will be returned. The bid security of the remaining two Bidders whose Proposals are not accepted will be

returned within ten (10) days after the execution of the Contract, or, if no such Contract has been executed, within ninety (90) days after the date of opening Proposals. The bid security of the Bidder whose Proposal is accepted will be returned only after he has duly executed the Contract and furnished the required Public Construction Bond and insurance.

Should it be necessary for the City to retain the bid security and said bid security is in the form of checks, the checks of these Bidders will be returned if replaced by Bid Bonds in an amount equal to the amount of the checks of such Bidders in such form and issued by a surety company acceptable to the City.

A Bidder may withdraw his Proposal before the time fixed for the opening of Proposals, without prejudice to himself, by communicating his purpose, in writing, to the Mayor and City Council, and when his communication is received, the Proposal will be handed to him or his authorized agent unopened. No Bidder may withdraw his Proposal within ninety (90) days after the day of opening Proposals.

The Bidder whose Proposal is accepted shall enter into a written contract, upon the Agreement form included herein, for the performance of the work and furnish the required Public Construction Bond within twenty (20) days after written notice by the City of Award of Contract has been served on such Bidder personally or after receipt of the written notice by registered mail to such Bidder at the address given in his Proposal.

If the Bidder to whom a Contract is awarded refuses or neglects to execute it or fails to furnish the required Public Construction Bond within twenty (20) days after receipt by him of the Notice of Award of Contract, the amount of his bid security shall be forfeited and shall be retained by the City as liquidated damages, and not as a penalty, it being now agreed that said sum is a fair estimate of the amount of damages that the City will sustain in case said Bidder fails to enter into a Contract and furnish the required Public Construction Bond. If a Bid Bond was furnished, the full amount of the Bond shall become due and payable as liquidated damages caused by such failure. The full amount of the bid security shall be forfeited as liquidated damages without consideration of the fact that an award may be less than the full amount of the Bidder's Proposal, excepting that the award shall be within the conditions of said Proposal relating to the basis of consideration for an award. No plea of mistake in the bid or misunderstanding of the conditions of forfeiture shall be available to the Bidder for the recovery of his deposit or as a defense to any action based upon the neglect or refusal to execute a contract.

#### I-2.05 LAWS AND REGULATIONS

The Bidder who is awarded the Contract must comply with all laws of the State of Florida, and all applicable Ordinances of the City of Tampa respecting labor and compensation and with all other statutes, ordinances, rules and regulations applicable and having the force of law.

#### I-2.06 PUBLIC CONSTRUCTION BOND

The Bidder who is awarded the Contract will be required to furnish a Public Construction Bond upon the form provided herein, equal to 100 percent of the Contract price, such Bond to be executed by a surety company acceptable to the City of Tampa and licensed to underwrite contracts in the State of Florida. Surety companies shall have a rating of not less than: B+ Class VI as evaluated in the most recently circulated BEST'S KEY RATING GUIDE PROPERTY-LIABILITY.

#### I-2.07 SIGNATURE AND QUALIFICATIONS OF BIDDERS

Proposals must be signed in ink by the Bidder with signature in full. When a firm is a Bidder, the Proposal shall be signed in the name of the firm by one or more of the partners. When a corporation is a Bidder the officer signing shall set out the corporate name in full beneath which he shall sign his name and give the title of his office. The Proposal shall also bear the seal of the corporation attested by its secretary. Anyone signing the Proposal as agent must file with it legal evidence of his authority to do so.

Bidders who are nonresident corporations shall furnish to the City a

duly certified copy of their permit to transact business in the State of Florida, signed by the Secretary of State, within ten days of the notice to do so. Such notice will be given to Bidders who are nonresident corporations, to whom it appears an award will be made, and the copy of the permit must be filed with the City before the award will be made. Failure to promptly submit this evidence of qualification to do business in the State of Florida may be basis for rejection of the Proposal.

#### I-2.08 REJECTION OF PROPOSALS

The City reserves the right to reject any Proposal if investigation of the Bidder fails to satisfy the City that such Bidder is properly qualified to carry out the obligations and to complete the work contemplated therein. Any or all Proposals will be rejected if there is reason to believe that collusion exists among Bidders. Proposals will be considered irregular and may be rejected if they show serious omissions, alterations in form, additions not called for, conditions or unauthorized alternates, or irregularities of any kind. The City reserves the right to reject any or all Proposals and to waive such technical errors as may be deemed best for the interests of the City.

#### I-2.09 QUANTITIES ESTIMATED ONLY

The estimate of quantities of the various items of work and materials, if set forth in the Proposal Form, is approximate only and is given solely to be used as a uniform basis for the comparison of Proposals.

The quantities actually required to complete the Contract work may be less or more than so estimated, and if awarded a Contract for the work specified, the Contractor agrees that he will not make any claim for damages or for loss of profits because of a difference between the quantities of the various classes of work assumed for comparison of Proposals and quantities of work actually performed. The City further reserves the right to vary the quantities in any amount.

#### I-2.10 COMPARISON OF PROPOSALS

Except jobs bid on a "One Lump Sum" basis, proposals will be compared on the basis of a total computed price arrived at by taking the sum of the estimated quantity of each item and the corresponding unit price of each item, and including any lump sum prices on individual items.

The computed total prices for individual Contract Items and the total computed price for the entire Contract, as entered by the Bidder in the Proposal Form, are for convenience only and are subject to correction in the tabulation and computation of the Proposals.

#### I-2.11 BASIS OF AWARD

The Contract will be awarded, if at all, to the lowest responsible Bidder or Bidders, as determined by the City and by the terms and conditions of the Contract Documents. Unless all bids are rejected, the award will be made within ninety (90) days after the opening of Proposals. The successful Bidder will be required to possess, or obtain, a valid City Occupational License.

#### I-2.12 INSURANCE REQUIRED

The successful Bidder and his subcontractors will be required to procure and pay for insurance covering the work in accordance with the provisions of Article 6.02 of the Agreement as indicated on special instructions pages beginning with INS-1.

#### I-2.13 NO ASSIGNMENT OF BID

No Bidder shall assign his bid or any rights thereunder.

#### I-2.14 NONDISCRIMINATION IN EMPLOYMENT

Contracts for work under this Proposal will obligate the contractors and subcontractors not to discriminate in employment practices.

Bidders must, if requested, submit with their initial bid a signed statement as to whether they have previously performed work subject to the President's Executive Order Nos. 11246 and 11375.

Bidders must, if requested, submit a compliance report concerning their employment practices and policies in order to maintain their eligibility to receive the award of the Contract.

Successful Bidders must, if requested, submit a list of all subcontractors who will perform work on the project and written,

signed statement from authorized agents of the labor pools with which they will or may deal for employees on the work together with supporting information to the effect that said labor pools practices and policies are in conformity with Executive Order No. 11246 and that said labor pools will affirmatively cooperate in or offer no hindrance to the recruitment, employment and equal treatment of employees seeking employment and performing work under the Contract, or a certification as to what efforts have been made to secure such statements when such agents or labor pools have failed or refused to furnish them prior to the award of the Contract.

#### I-2.15 LABOR STANDARDS

The Bidder's attention is directed to the Contract Provisions of the Labor Standards for federally assisted projects which may be attached to and made a part of the Agreement.

#### I-2.16 NOTICE TO LABOR UNIONS

If applicable, the successful Bidder will be required to provide Labor Unions and other organizations of workers a completed copy of the form entitled "Notice to Labor Unions or Other Organizations of Workers", and such form may be made a part of the Agreement.

#### I-2.17 NOTICE TO PROSPECTIVE FEDERALLY-ASSISTED CONSTRUCTION CONTRACTORS

A Certification of Nonsegregated Facilities, as required by the May 9, 1967, Order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted to said Secretary prior to the award of a federally-assisted construction and Contract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity Clause. The form of certification may be bound herein following the form of Bid Bond.

Contractors receiving federally-assisted construction Contract awards exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide for the forwarding of the following notice to prospective subcontractor for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the Equal Opportunity Clause:

#### NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATIONS OF NONSEGREGATED FACILITIES

"A Certification of Nonsegregated Facilities, as required by the May 9, 1967, Order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity Clause."

"Contractors receiving subcontract awards exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause will be required to provide from the forwarding of this notice to prospective subcontractors for supplies and construction contracts where the subcontracts exceed \$10,000 and are not exempt from the provisions of the Equal Opportunity Clause."

The United States requires a pre-award conference if a proposed construction contract exceeds one million dollars to determine if the the prospective contractor is in compliance with the Equal Employment Opportunity requirements of Executive Order 11246 of September 24, 1965. In such instances, a meeting may be scheduled at which the prospective contractor must specify what affirmative action he has taken or proposed to take to assure equal employment opportunity which must be approved by the United States before award of the contract will be authorized.

Bidders must be prepared to submit an Equal Employment Opportunity (EEO) plan at a pre-award conference. The plan must include bidding opportunities offered by the Bidder to minority subcontractors.

On October 13, 1971, President Nixon issued Executive Order 11246 emphasizing the government's commitment to the promotion of minority business enterprise. Accordingly, the United States is firmly

committed to the utilization of available resources to support this important program. U.S. agencies are most interested in realizing minority participation on the subject. Achieving equal employment opportunity compliance is required through Executive Order 11246. WE cannot emphasize too strongly that minority subcontractors be extended subcontractors bidding opportunities as but one step in your affirmative action policy.

Due to the importance of this contract, U.S. Agencies may conduct an EEO Conference prior to the award of the Contract. It is suggested that the responsive Bidder confirm the minority subcontractors he contacted for bids or quotations in his EEO plan submitted at the conference.

#### I-2.18 EEO AFFIRMATIVE ACTION REQUIREMENTS

By the submission of a Proposal, each Bidder acknowledges that he understands and will agree to be bound by the equal opportunity requirements of Federal regulations which shall be applicable throughout the performance of work under any contract awarded pursuant to solicitation. Each Bidder agrees that if awarded a contract, he will similarly bind contractually each subcontractor. In policies, each Bidder further understands and agrees that if awarded a contract, he must engage in Affirmative Action directed to promoting and ensuring equal employment opportunity in the work force used under the contract (and he must require contractually the same effort of all subcontractors whose subcontracts exceed \$100,000). The Bidder understands and agrees that "Affirmative Action" as used herein shall constitute a good faith effort to achieve and maintain minority employment in each trade in the on-site work force used on the project. \*\*\*\*\* END of SECTION \*\*\*\*\*



# CITY OF TAMPA INSURANCE REQUIREMENTS

Prior to commencing any work or services or taking occupancy under that certain written agreement or award (for purposes of this document, Agreement) between the City of Tampa, Florida (City) and Firm/Awardee/Contractor/Consultant/Lessee/non-City party, etc. (for purposes of this document, Firm) to which this document is attached and incorporated as an Exhibit or otherwise, and continuing during the term of said Agreement (or longer if the Agreement and/or this document so requires), Firm shall provide, pay for, and maintain insurance against claims for injuries to persons (including death) or damages to property which may arise from or in connection with the performance of the Agreement (including without limitation occupancy and/or use of certain property/premises) by Firm, its agents, representatives, employees, suppliers, subtenants, or subcontractors (which term includes sub-consultants, as applicable) of any tier subject to the terms and conditions of this document. Firm's maintenance of insurance coverage as required herein is a material element of the Agreement and the failure to maintain or renew coverage or provide evidence of same (defined to include without limitation Firm's affirmative duty to provide from time to time upon City's request certificates of insurance, complete and certified copies of Firm's insurance policies, forms, and endorsements, information on the amount of claims payments or reserves chargeable to the aggregate amount of coverage(s) whether during the term of the Agreement or after as may be requested by the City in response to an issue or potential claim arising out of or related to the Agreement to which Firm's insurance obligations hereunder may apply or possibly help mitigate) may be treated as a material breach of the Agreement. Should at any time Firm not maintain the insurance coverages required, City at its sole option (but without any obligation or waiver of its rights) may (i) terminate the Agreement or (ii) purchase such coverages as City deems necessary to protect itself (charging Firm for same) and at City's option suspending Firm's performance until such coverage is in place. If Firm does not reimburse City for such costs within 10 days after demand, in addition to any other rights, City shall also have the right to offset such costs from amounts due Firm under any agreement with the City. All provisions intended to survive or to be performed subsequent to the expiration or termination of the Agreement shall survive, including without limitation Firm's obligation to maintain or renew coverage, provide evidence of coverage and certified copies of policies, etc. upon City's request and/or in response to a potential claim, litigation, etc.

The City reserves the right from time to time to modify or waive any or all of these insurance requirements (or to reject policies) based on the specific nature of goods/services to be provided, nature of the risk, prior experience, insurer, coverage, financial condition, failure to operate legally, or other special circumstances. If Firm maintains broader coverage and/or higher limits than the minimums shown herein, the City requires and shall be entitled to such broader coverage and/or higher limits maintained by Firm. Any available insurance proceeds in excess of the specified minimum limits of insurance and coverage shall be available to the City. No representation is made that the minimum insurance requirements are sufficient to cover Firm's interests, liabilities, or obligations. Required insurance shall not limit Firm's liability.

Firm acknowledges and agrees Firm and not the City is the party in the best position to determine applicability (e.g. "IF APPLICABLE"), confirm, and/or verify its insurance coverage. Acceptance by the City, or by any of its employees, representatives, agents, etc. of certificates or other documentation of insurance or policies pursuant to the terms of this document and the Agreement evidencing insurance coverages and limits does not constitute approval or agreement that the insurance requirements have been met or that coverages or policies are in compliance. Furthermore, receipt, acceptance, and/or approval of certificates or other documentation of insurance or policies or copies of policies by the City, or by any of its employees, representatives, agents, etc., which indicate less coverage than required does not constitute a waiver of Firm's obligation to fulfill these insurance requirements.

## MINIMUM SCOPE AND LIMIT OF INSURANCE <sup>1</sup>

A. Commercial General Liability (CGL) Insurance on the most current Insurance Services Office (ISO) Form CG 00 01 or its equivalent on an "occurrence" basis (Modified Occurrence or Claims Made forms are not acceptable without prior written consent of the City). Coverage must be provided to cover liability contemplated by the Agreement including without limitation premises and operations, independent contractors, contractual liability, products and completed operations, property damage, bodily, personal and advertising injury, contractual liability, explosion, collapse, underground coverages, personal injury liability, death, employees-as-insureds. Products and completed operations liability coverage maintained for at least 3 years after completion of work. Limits shall not be less than \$1M per occurrence and \$2M general aggregate for Agreements valued at \$2M or less; if valued over \$2M, a general aggregate limit that equals or exceeds the Agreement's value. If a general aggregate limit applies; it shall apply separately to the project/location (ISO CG 2S 03 or 2S 04 or equivalent). **(ALWAYS APPLICABLE)**

B. Automobile Liability (AL) Insurance in accordance with Florida law, as to the ownership, maintenance, and use of all owned, non-owned, leased, or hired vehicles. AL insurance shall not be less than: (a) \$500,000 combined single limit each occurrence bodily injury and property damage for Agreements valued at \$100,000 or less or (b) \$1M combined single limit each occurrence bodily injury and property damage for Agreements valued over \$100,000. If transportation of hazardous material involved, the MCS-90 endorsement (or equivalent). **(ALWAYS APPLICABLE)**

C. Worker's Compensation (WC) & Employer's Liability Insurance for all employees engaged under the Agreement, Worker's Compensation as required by Florida law. Employer's Liability with minimum limits of (a) \$500,000 bodily injury by accident and each accident, bodily injury by disease policy limit, and bodily injury by disease each employee for Agreements valued at \$100,000 and under or (b) \$1M bodily injury by accident and each accident, bodily injury by disease policy limit, and bodily injury by disease each for all other Agreements. **(ALWAYS APPLICABLE)**

D. Excess (Umbrella) Liability Insurance for Agreements valued at \$2M or more, at least \$4M per occurrence in excess of underlying limits and no more restrictive than underlying coverage for all work performed by Firm. May also compensate for a deficiency in CGL, AL, or WC. **(ALWAYS APPLICABLE)**

E. Builder's Risk Insurance for property loss exposure associated with construction/renovation/additions to buildings or structures, including materials or fixtures to be incorporated. Must be "All Risk" form with limits of no less than the project's completed value, have no coinsurance penalties, eliminate the "occupancy clause", cover Firm (together with its contractors, subcontractors of every tier, and suppliers), and name City as a Loss Payee. **(IF APPLICABLE)**

F. Installation Floater coverage for property (usually highly valued equipment or materials such as compressors, generators, etc.) during its installation. Coverage must be "All Risk" including installation and transit for no less than 100% of the installed replacement cost value. **(IF APPLICABLE)**

G. Architects & Engineers Liability/ Professional Liability (E&O)/ Contractors Professional Liability (CPL)/ Medical Malpractice Insurance where Agreement involves Florida-regulated professional services (e.g. architect, engineer, design-builder, CM, accountant, appraiser, investment banker medical professional) at any tier, whether employed or independent, vicarious design liability exposure (e.g. construction means & methods, design supervision), value engineering, constructability assessments/reviews, BIM process, and/or performance specifications. Limits of at least \$1M per occurrence and \$2M aggregate; deletion of design/ build liability exclusions, as applicable, and maintained for at least 3 years after completion of work/services and City's acceptance of same. **(IF APPLICABLE)**

H. Railroad Protective Liability CRPL Insurance for construction within 50ft of operated railroad track(s) or where affects any railroad bridge, trestle, tunnel, track(s) roadbed, or over/under pass. Subject to involved rail road's approval prior to commencement of work. **(IF APPLICABLE)**.

I. Pollution and/or Asbestos Legal Liability Insurance where Agreement involves asbestos and/or environmental hazards/contamination risks (defined broadly, e.g. lead, mold, bacteria, fuel storage, underground work, cleanup (owned or non-owned sites), pollutant generation/transportation, marine/natural resource damage, contamination claim, restitution, business interruption, mold, fungus, lead-based paint, 3rd party claims/removal, etc.), with limits of at least \$1M per occurrence and \$2M aggregate, maintained for at least 3 years after Agreement completion. **(IF APPLICABLE)**

J. Cyber Liability Insurance where Agreement involves portals allowing access to obtain, use, or store data; managed dedicated servers; cloud hosting services; software/hardware; programming; and/or other IT services

<sup>1</sup> "M" indicates million(s), for example \$1M is \$1,000,000

and products are involved. Limits of not less than \$2M per occurrence and \$2M aggregate. Coverage sufficiently broad to respond to duties and obligations undertaken by Firm, and shall include, but not be limited to, claims involving infringement of intellectual property/copyright, trademark, trade dress, invasion of privacy violations, damage to or destruction of electronic information, information theft, release of confidential and/or private information, alteration of electronic information, extortion, virus transmission, and network security. Coverage, as applicable and with sufficient limits to respond, for breach response costs, regulatory fines and penalties, credit monitoring expenses. **(IF APPLICABLE)**

K. Drone/UAV Liability Insurance where Agreements involves unmanned aerial vehicles/drones. Coverage to include products and completed operations, property damage, bodily injury with limits no less than \$1M per occurrence, and \$2M aggregate; may be provided by CGL endorsement subject to City's prior written approval. **(IF APPLICABLE)**

L. Longshore & Harbor Workers' Compensation Act/Jones Act for work being conducted near, above, or on "navigable waters" for not less than the above Employer's Liability Insurance limit. **(IF APPLICABLE)**

M. Garagekeeper/Hangerkeeper/Marina Operator Legal Liability Insurance and/or Hull/P&I Insurance where parking lot, valet, dealership, garage services, towing, etc. and/or operation of a hangar, marina, or air

plane/ship repairer, providing safe berth, air/watercraft storage/docking (on land/ in water), fueling, tours, charters, ferries, dredges, tugs, mooring, towing, boat/aircraft equipment/repair/alteration/maintenance, etc.; cover- age against liability for damage to vehicles air/watercraft, their machinery in Firm's care, custody, or control both private & commercial. Limits at least equal to greater of \$1M, value of max number of vehicles that may be in Firm's custody, or of most costly object in Firm's custody. **(IF APPLICABLE)**

N. Property Insurance and Interruption of Business CIOB) Insurance where premises, building, structure, or improved real property is leased, licensed, or otherwise occupied by Firm. Property Insurance against all risks of loss to any occupant/tenant improvements at full replacement cost with no coinsurance penalty, including fire, water, leak damage, and flood, as applicable, vandalism and malicious mischief endorsements. IOB by which minimum monthly rent will be paid to City for up to 1 year if premises are destroyed, rendered inaccessible or untenable, including disruption of utilities, water, or telecommunications. **(IF APPLICABLE)**

O. Liquor Liability/Host Liquor Liability where Firm directly or indirectly provides alcoholic beverages, limits of at least \$1M per occurrence and \$1M aggregate. **(IF APPLICABLE)**

P. Educators Legal Liability Insurance where day care, after school program, recreational activities, etc. limits per G above. **(IF APPLICABLE)**

### ADDITIONAL REQUIREMENTS

ACCEPTABILITY OF INSURERS- Insurance is to be placed with insurers admitted in the State of Florida and who have a current A.M. Best rating of no less than **A-:VII** or, if not rated by A.M. Best, as otherwise approved by the City in advance and in writing.

ADDITIONAL INSURED - **City, its elected officials, departments, officers, officials, employees, and volunteers together with, as applicable, any associated lender of the City shall be covered as additional insureds on all liability coverage** (e.g. CGL, AL, and Excess (Umbrella) Liability) as to liability arising out of work or operations performed by or on behalf of Firm including materials, parts, or equipment furnished in connection with such work or operations and automobiles owned, leased, hired, or borrowed by or on behalf of Firm. Coverage can be provided in the form of an endorsement to Firm's insurance (at least as broad as ISO Form CG 20 10 11 85 or **both** CG 10 20, CG 20 26, CG 20 33, or CG 20 38 **and** CG 20 37 if later revisions used).

CANCELLATION/NON-RENEWAL – Each insurance policy shall provide that at least 30 days written notice must be given to City of any cancellation, intent to non-renew, or material reduction in coverage (except aggregate liability limits) and at least 10 days' notice for non-payment of premium. Firm shall also have an independent duty to notify City in like manner, within 5 business days of Firm's receipt from its insurer of any notices of same. If any policy's aggregate limit is reduced, Firm shall directly take steps to have it reinstated. Notice and proof of renewal/continued coverage/certifications, etc. shall be sent to the City's notice (or Award contact) address as stated in the Agreement with a copy to the following:

- Contract Administration Department, 306 E Jackson St, Tampa, FL 33602     Purchasing Department, 306 E Jackson Street, Tampa, FL 33602  
 Other: \_\_\_\_\_

CERTIFICATE OF INSURANCE (COI) – to be provided to City by insurance carrier prior to Firm beginning any work/services or taking occupancy and, if the insurance expires prior to completion of the work or services or Agreement term (as may be extended), a renewal COI at least 30 days before expiration to the above address(es). COIs shall specifically identify the Agreement and its subject (project, lease, etc.), shall be sufficiently comprehensive to insure City (named as additional insured) and Firm and to certify that coverage extends to subcontractors' acts or omissions, and as to permit the City to determine the required coverages are in place without the responsibility of examining individual policies. **Certificate Holder must be The City of Tampa, Florida.**

CLAIMS MADE – If any liability insurance is issued on a claims made form, Firm agrees to maintain such coverage uninterrupted for at least 3 years following completion and acceptance of the work either through purchase of an extended reporting provision or purchase of successive renewals. The Retroactive Date must be shown and be a date not later than the earlier of the Agreement date or the date performance/occupancy began thereunder.

DEDUCTIBLES/ SELF-INSURED RETENTIONS (SIR) – must be disclosed to City and, if over \$500,000, approved by the City in advance and in writing, including at City's option being guaranteed, reduced, or eliminated (additionally if a SIR provides a financial guarantee guaranteeing payment of losses and related investigations, claim administration, and defense expenses). Firm shall be fully responsible for any deductible or SIR (without limiting the foregoing a policy with a SIR shall provide or be endorsed to provide that the SIR may be satisfied by either the City or named insured). In the event of loss which would have been covered but for a deductible or SIR, City may withhold from any payment due Firm, under any agreement with the City, an amount equal to same to cover such loss should full recovery not be obtained under the policy.

PERFORMANCE- All insurance policies shall be fully performable in Hillsborough County, Florida (the County), and construed in accordance with Florida law. Further, all insurance policies must expressly state that the insurance company will accept service of process in the County and that the exclusive venue for any action concerning any matter under those policies shall be in the appropriate state court of the County.

PRIMARY POLICIES - Firm's insurance coverage shall be primary insurance coverage at least as broad as ISO CG 20 01 04 13 as to the City, its elected officials, departments, officers, employees, and volunteers. Any insurance or self-insurance maintained by the City, its elected officials, departments, officers, employees, and volunteers shall be excess of the Firm's insurance and shall not contribute with it.

SUBCONTRACTORS/INDEPENDENT ASSOCIATES/CONSULTANTS/SUBTENANTS/SUBLICENSEE - **Firm shall require and verify that all such entities maintain insurance meeting all requirements stated herein with the City as an additional insured** by endorsement (ISO FORM CG 20 38, or broader) or otherwise include such entities within Firm's insurance policies. Upon City's request, Firm shall furnish complete and certified copies of copies of such entities' insurance policies, forms, and endorsements.

SUBCONTRACTOR DEFAULT INSURANCE CONTROLLED INSURANCE PROGRAM, WRAP-UP. Use requires express prior written consent of City Risk Manager.

UNAVAILABILITY- To the fullest extent permitted by law, if Firm is out of business or otherwise unavailable at the time a claim is presented to City, Firm hereby assigns to the City all of its right, title and interest (but not any liabilities or obligations) under any applicable policies of insurance.

WAIVER OF SUBROGATION – With regard to any policy of insurance that would pay third party losses, Firm hereby grants City a waiver of any right to subrogation which any insurer of Firm may acquire against the City by virtue of the payment of any loss under such insurance. Firm agrees to obtain any endorsement that may be necessary to affect such waiver, but this provision shall apply to such policies regardless.

WAIVER/RELEASE AGREEMENT – Where Firm has a defined group of persons who might be exposed to harm (e.g. participants in an athletic event/program, volunteers) any waiver or release agreement used by Firm whereby such persons (and their parent/guardian as applicable) discharge Firm from claims and liabilities, shall include the City, its elected officials, departments, officers, officials, employees, and volunteers to the same extent as Firm.

## Procurement Guidelines To Implement Minority & Small Business Participation

### Underutilized WMBE Primes by Industry Category

<b>FORMAL PROCUREMENT</b>	Construction	Construction-Related	Professional	Non-Professional	Goods
	Black	Asian	Black	Black	Black
	Hispanic	Native Am.	Hispanic	Asian	Hispanic
	Native Am.	Woman	Asian	Native Am.	Asian
	Woman		Native Am.		Native Am.
			Woman		Woman

### Underutilized WMBE Sub-Contractors / Sub-Consultants

<b>SUB WORK</b>	Construction	Construction-Related	Professional	Non-Professional	Goods
	Black	Black	Black	Black	Black
		Asian	Hispanic	Asian	Asian
		Native Am.	Asian	Native Am.	Native Am.
		Woman	Native Am.		Woman
			Woman		

#### Policy

The Guidelines apply to formal procurements and solicitations. WMBE participation will be narrowly-tailored.

#### Index

- Black = Black/African-American Business Enterprise
- Hispanic = Hispanic Business Enterprise
- Asian = Asian Business Enterprise
- Native Am. = Native American Business Enterprise
- Woman = Woman Business Enterprise (Caucasian)

#### Industry Categories

**Construction** is defined as: new construction, renovation, restoration, maintenance of public improvements and underground utilities.

**Construction-Related Services** are defined as: architecture, professional engineering, landscape architecture, design build, construction management services, or registered surveying and mapping.

**Professional Services** are defined as: attorney, accountant, medical doctor, veterinarian, miscellaneous consultant, etc.

**Non-Professional Services** are defined as: lawn maintenance, painting, janitorial, printing, hauling, security guard, etc.

**Goods** are defined as: all supplies, materials, pipes, equipment, machinery, appliances, and other commodities.

#### MBD Form-70

**Virginia Avenue Pump Station Rehabilitation  
FY22 Project 21-C-00027  
U-WMBE Availability Contact List**

**(The Underutilized WMBE Industry Category for Construction Subcontracts is BBE )**

This Certified Contact List is the minimum contacts available and may require further searches for certified firms to meet Good Faith Efforts.												
#s	Business Name	Phone	Fax	Email	Address 1	City	State	Zip	Business Description	FEIN	Cert. Type	Ethnicity
1	MBattle Construction llc	727-214-4301	727-517-3774	moebattle@hotmail.com	470 maple way	safety harbor FL	FL	34695	Stormwater Piping Modification	760840117	BBE	African American
2	Barnes, Ferland and Associates, Inc	407-896-8608	407-896-1822	pbarnes@bfaenvironmental.com	1230 Hillcrest Street, Suite 100	Orlando FL	FL	32803	Wastewater Gravity Line & F	993237612	BBE	African American
2	Gilliam Construction LLC	941-723-1000	941-723-1001	ggilliamconstruction@yahoo.com	2315 17th St E	Palmetto FL	FL	34221	Wastewater Gravity Line & F	64098717	BBE	African American
2	MBattle Construction llc	727-214-4301	727-517-3774	moebattle@hotmail.com	470 maple way	safety harbor FL	FL	34695	Wastewater Gravity Line & F	60840117	BBE	African American
2	McKenzie Contracting	813-454-4429	813-994-5840	SMorton@mckenziecontractingllc.com	7712 E Broadway Ave	Tampa FL	FL	33619	Wastewater Gravity Line & F	63561860	BBE	African American
4	MBattle Construction llc	727-214-4301	727-517-3774	moebattle@hotmail.com	470 maple way	safety harbor FL	FL	34695	Water Line Replacement	760840117	BBE	African American
5	Aviman Management, LLC	302-377-5788	302-543-7403	levi@avimanmanagement.com	550 N Reo Street	Tampa FL	FL	33609	Pipe Supply	320098022	BBE	African American
5	SUCA Pipe Supply Inc.	813-249-7902	813-249-7902	simau44@yahoo.com	4910 Lowell Rd	Tampa FL	FL	33624	Pipe Supply	992499571	BBE	African American
5	Suca Pipe Supply, Inc. One	813-249-7902	813-249-7902	mactwinau1@yahoo.com	4910 Lowell Road	Tampa FL	FL	33624	Pipe Supply	263669556	BBE	African American
5	TERRELL INDUSTRIES, INC.	727-823-4424	727-823-3977	gradyterrell@terrellindustries.com	2067 1ST AVENUE NORTH	ST PETERSBURG FL	FL	33713	Pipe Supply	950530148	BBE	African American
6	Battle Tested Photography	813-943-4330		jj@battletestedphotos.com	28655 Seashell Ct	Wesley Chap FL	FL	33545	Video Services	831943735	BBE	African American
6	Kerrick Williams Photography LLC	404-966-8145	866-571-7149	kerrick@kerrickwilliams.com	5508 N 50th St	Tampa FL	FL	33610	Video Services	272468473	BBE	African American
6	Uhora Films LLC	813-220-2051		uborafilms@gmail.com	17847 D Sailfish Drive	Lutz FL	FL	33558	Video Services	821230551	BBE	African American
7	Abacron LLC	813-539-8087		abacronllc@gmail.com	7113 Whittier st	Tampa FL	FL	33617	Painting Services	834687515	BBE	African American
7	BUN Construction Co., Inc.	813-931-8270	813-931-9185	bunconstruction@tampabay.rr.com	4135 E. Hillsborough Avenue	Tampa FL	FL	33610	Painting Services	993362663	BBE	African American
7	Fletcher Painting, Inc.	407-290-1188	407-290-9309	stacy@fletcherenterprise.com	4355 Fairmont Street Suite 8	Orlando FL	FL	32808	Painting Services	993587717	BBE	African American
7	Obi Global, LLC	813-400-8562		obi.global@gmail.com	11507 Dr. MLK Blvd	Mango FL	FL	33550	Painting Services	471881723	BBE	African American
7	The Painting Contractor, LLC	513-504-1288	513-873-8137	rich@thepaintingcontractor.com	20050 Heritage Point Dr.	Tampa FL	FL	33647	Painting Services	113747263	BBE	African American
9	BUN Construction Co., Inc.	813-931-8270	813-931-9185	bunconstruction@tampabay.rr.com	4135 E. Hillsborough Avenue	Tampa FL	FL	33610	Fencing	993362663	BBE	African American
9	Fresh Start Development, Inc.	813-758-5345	813-333-5949	freshstartdevelop@yahoo.com	5508 N 50th St	Tampa FL	FL	33610	Fencing	203857845	BBE	African American
10	Global Construction and Home Repair LLC	813-239-4231	813-684-3074	globalchrepair@gmail.com	522 S Saint Cloud Avenue	Valrico FL	FL	33594	Earthwork	473004378	BBE	African American
10	MBattle Construction llc	727-214-4301	727-517-3774	moebattle@hotmail.com	470 maple way	safety harbor FL	FL	34695	Earthwork	760840117	BBE	African American
11	African American Urban Decay Fund	813-410-4959		info@aaudf.com	2111 w saint sophia street	Tampa FL	FL	33607	Brick Street Replacement	464858219	BBE	African American
11	LMCC Specialty Contractors	407-298-6936	407-290-1217	lynn@mimsconstruction.com	119 S. Pine hills Rd.	Orlando FL	FL	32811	Brick Street Replacement	993442318	BBE	African American
11	WC Boxes, Inc.	813-478-1102	813-864-4386	wcindustries2003@gmail.com	17620 Lake Key Drive	Odessa FL	FL	33556	Brick Street Replacement	472682190	BBE	African American
12	E/S Concrete Service, Inc.	727-560-0957	727-821-5029	enorisslysr@yahoo.com	726 E. Harbor Drive	St. Petersburg FL	FL	33705	Concrete Driveways	993119582	BBE	African American

African American/Black Business Enterprises (BBE) shall count toward the subcontract goal. Refer to MBD Form 70 - Procurement Guidelines.

Virginia Avenue Pump Station Rehabilitation

FY22 Project 21-C-00027

U-WMBE Availability Contact List

(The Underutilized WMBE Industry Category for Construction Subcontracts is BBE )

#S	Business Name	Phone	Fax	Email	Address 1	City	State	Zip	Business Description	FEIN	Cert. Type	Ethnicity
12	Excel 4 LLC	407-480-8976	407-480-8976	excel4llc@yahoo.com	318 N. John Young Parkway Ste #6	Kissimmee	FL	34741	Concrete Driveways	454149326	BBE	African American
13	Aviman Management, LLC	302-377-5788	302-543-7403	levi@avimanmanagement.com	550 N Reo Street	Tampa	FL	33609	Concrete Curb	320098022	BBE	African American
13	E/S Concrete Service, Inc.	727-560-0957	727-821-5029	enorisslysr@yahoo.com	726 E. Harbor Drive	St. Petersburg	FL	33705	Concrete Curb	993119582	BBE	African American
14	A Purpose Construction LLC	727-417-4106		andrew@apurposeconst.com	6001 Leeland St S	St. Petersburg	FL	33715	Concrete	322640354	BBE	African American
14	Allen Masonry & General Contractor, Inc.	813-924-3337	813-982-0894	domna@allenmasonrygc.com	9822 Davis Family Pl	Thonotosass	FL	33592	Concrete	993752366	BBE	African American
14	Associated Cost Engineers of Delaware, Inc.	407-704-7803	407-704-7937	jwade@aceconstructionmanagement.com	801 North Pine Hills Road	Orlando	FL	32808	Concrete	322333771	BBE	African American
14	Aviman Management, LLC	302-377-5788	302-543-7403	levi@avimanmanagement.com	550 N Reo Street	Tampa	FL	33609	Concrete	320098022	BBE	African American
14	Denson Construction Inc.	863-709-1001	863-709-1071	pete@denson-construction.com	4270 HOLDEN ROAD	LAKELAND	FL	33811	Concrete	993571944	BBE	African American
14	E/S Concrete Service, Inc.	727-560-0957	727-821-5029	enorisslysr@yahoo.com	726 E. Harbor Drive	St. Petersburg	FL	33705	Concrete	993119582	BBE	African American
14	Excel 4 LLC	407-480-8976	407-480-8976	excel4llc@yahoo.com	318 N. John Young Parkway Ste #6	Kissimmee	FL	34741	Concrete	454149326	BBE	African American
14	Fresh Start Development, Inc.	813-758-5345	813-333-5949	freshstartdevelop@yahoo.com	5508 N 50th St	Tampa	FL	33610	Concrete	203857845	BBE	African American
14	Global Construction and Home Repair LLC	813-239-4231	813-684-3074	globalchrepair@gmail.com	522 S Saint Cloud Avenue	Valrico	FL	33594	Concrete	473004378	BBE	African American
14	LMCC Specialty Contractors	407-298-6936	407-290-1217	lynn@mimsconstruction.com	119 S. Pine hills Rd.	Orlando	FL	32811	Concrete	993442318	BBE	African American
14	Provisions Construction & Development, Inc.	407-985-2442	407-985-2440	marrington@provisionscdi.com	3401 Lake Breeze Drive Bldg 601	Orlando	FL	32808	Concrete	462802435	BBE	African American
14	WC Boxes, Inc.	813-478-1102	813-864-4386	wcindustries2003@gmail.com	17620 Lake Key Drive	Odessa	FL	33556	Concrete	472682190	BBE	African American
15	4678 Landscaping Incorporated	813-850-7950		4678.landscapinginc@gmail.com	11319 VILLAS ON THE GREEN DR	RIVERVIEW	FL	33579	Sodding	342268587	BBE	African American
15	BENEMON & BENEMON ENTERPRISES, LLC	813-952-0432		jamesbenemon69@gmail.com	510 HICKORY LAKE DR	BRANDON	FL	33511	Sodding	344660830	BBE	African American
15	BUN Construction Co., Inc.	813-931-8270	813-931-9185	bunconstruction@tampabay.rr.com	4135 E. Hillsborough Avenue	Tampa	FL	33610	Sodding	993362663	BBE	African American
15	Cut-Ups Lawn Service	813-361-8871	813-238-2397	cutupslawnservice@yahoo.com	3217 East Powhatan Ave.	Tampa	FL	33610	Sodding	311412916	BBE	African American
15	Dean's Environmental Inc	813-428-2011		dean8855@gmail.com	11809 Autumn Creek Dr	Riverview	FL	33569	Sodding	474774375	BBE	African American
15	Fresh Start Development, Inc.	813-758-5345	813-333-5949	freshstartdevelop@yahoo.com	5508 N 50th St	Tampa	FL	33610	Sodding	203857845	BBE	African American
15	Lawn Conquerors LLC	813-444-0466	813-000-0000	lawnconquerors@gmail.com	2409 E Annie St	Tampa	FL	33612	Sodding	352605386	BBE	African American
15	T.C.C Enterprise Inc	813-606-9148	813-237-0396	tcc_inc@live.com	3902 E POWHATAN AVE	TAMPA	FL	33610	Sodding	463223645	BBE	African American
15	Trimen Precision Lawn Care, LLC	813-863-9328		account@trimenlandscapes.com	450 S Taylor Rd	Seffner	FL	33584	Sodding	474625126	BBE	African American
15	Walkers landscape and lawncare services	813-553-0549		bwalker1lcs@gmail.com	9821 e fowler ave	Thonotosass	FL	33592	Sodding	343912131	BBE	African American
15	Williams Landscape Management Co., Inc.	813-628-8048	813-628-8041	tonywilliams@wimslandscape.com	5710 N 50th St	Tampa	FL	33610	Sodding	993516370	BBE	African American
15	Works of Nature, LLC	813-531-2324		Trj@workofnature.info	1016 E.33rd Ave.	Tampa	FL	33603	Sodding	314965789	BBE	African American
15	WC Boxes, Inc.	813-478-1102	813-864-4386	wcindustries2003@gmail.com	17620 Lake Key Drive	Odessa	FL	33556	Sodding	472682190	BBE	African American
16	ME Jackson Group Inc.	863-651-9628		gjackson@weldst.com	2743 SEQUOYAH DRIVE	HAINE CITY	FL	33844	Metal Work	473994473	BBE	African American
17	SASInc, LLC	973-393-3677		asinc1c@gmail.com	1201 W AMESBURY CIR	Wellington	FL	33414	Electrical Instrumentation &	334698305	BBE	African American
17	All-in-One Electric, Inc.	813-849-6331	813-514-0473	ereed@alolectric.com	1201 W WATERS AVENUE	TAMPA	FL	33604	Electrical Instrumentation &	343689273	BBE	African American
17	MDH Enterprises, Inc.	386-789-2672	866-681-5026	matize@my-es.com	281 East C Street	Orange City	FL	32763	Electrical Instrumentation &	350849332	BBE	African American
17	VoltAir Constructors, LLC	813-867-4899	813-867-4566	williams@voltairinc.com	6005 Benjamin Rd	Tampa	FL	33634	Electrical Instrumentation &	472756788	BBE	African American
18	Cornerstone Barricades Inc.	352-373-8001	352-377-8976	seyi.falade@cornerstonebarricades.com	3201 SW 42nd Street	Gainesville	FL	32608	Traffic Control	310763816	BBE	African American

African American/Black Business Enterprises (BBE) shall count toward the subcontract goal. Refer to MBD Form 70 - Procurement Guidelines.







Virginia Avenue Pump Station Rehabilitation  
FY22 Project 21-C-00027

Non-UWMBE/SLBE Availability Contact List

This Certified Contact List is the minimum contacts available and may require further searches for certified firms to meet Good Faith Efforts.												
#'s	Business Name	Phone	Fax	Email	Address 1	City	State	Zip	Business Description	FEIN	Cert. Type	Ethnicity
2	Carl Hankins, Inc.	813-977-7270	813-977-5419	terrihc@chisesinc.com	14512 N. Nebraska Ave.	Tampa	FL	33613	Wastewater Gravity Line & Force Main	891400178	WBE	Caucasian
2	F. R. Aleman & Associates, Inc.	305-591-8777	305-599-8749	marketing@fr-aleman.com	8000 S. Orange Avenue	Orlando	FL	32809	Wastewater Gravity Line & Force Main	892751524	MBE	Hispanic American
2	Flevo A. Williams III Dozer Service, Inc.	727-856-3765	727-856-6298	williams@flavilliamsdozerservice.com	14771 Hays Road	Spring Hill	FL	34610	Wastewater Gravity Line & Force Main	893225884	WBE	Caucasian
2	H.B. Underground Inc	813-595-5815		hub07266@gmail.com	11500 Dale Mabry Hwy	Tampa	FL	33618	Wastewater Gravity Line & Force Main	8422208449	MBE	Hispanic American
2	L & S Diversified, LLC	407-681-3836		sherry.manor@lssurveyor.com	405 Lake Howell Rd	Maitland	FL	32751	Wastewater Gravity Line & Force Main	872336599	MBE	Asian American
2	Sunrise Utility Construction, Inc.	813-949-3749	813-949-0408	lminboss@aol.com	P. O. Box 272293	Tampa	FL	33688	Wastewater Gravity Line & Force Main	893034012	WBE	Caucasian
2	UITT LLC	786-519-4534		uittllc@aol.com	10675 SW 190th St	Miami	FL	33157	Wastewater Gravity Line & Force Main	8721227262	MBE	Hispanic American
5	Corcel Corp	305-636-1880	305-636-1897	Ray@corcelcorp.com	2461 NW 23rd Street	Miami	FL	33142	Pipe Supply	850246259	MBE	Hispanic American
5	Florida Industrial Products, Inc.	813-247-5356	813-247-6854	david@fiponline.com	1602 N. 39th Street	Tampa	FL	33605	Pipe Supply	892394733	WBE	Caucasian
5	GRANDVIEW PIPE & SUPPLY CO INC	407-383-9883	321-363-1066	jc@grandviewwp.com	271 Specialty Point	Sanford	FL	32771	Pipe Supply	893109483	WBE	Caucasian
5	IMBE Supply of Florida, Inc.	813-781-6583		mbeuppfloridat@gmail.com	4306 W. Osborne Avenue	Tampa	FL	33613	Pipe Supply	863284565	WBE	Caucasian
5	TLD LLC	813-927-7554	813-977-5419	td2013@verizon.net	14512 N. Nebraska Avenue	Tampa	FL	33613	Pipe Supply	811724437	WBE	Caucasian
6	A Business Forms & Pegboard Systems, Inc.	813-933-2788		social@amediamarketing.com	3104 North Armenia Avenue, Ste 2	Tampa	FL	33607	Video Services	891559977	WBE	Caucasian
6	Diamond Development LLC	352-551-3194		diamonddevelopmentllc@gmail.com	905 Spring Valley Rd	Altamonte Sp	FL	32714	Video Services	813746486	WBE	Caucasian
6	JML Advertising, Inc.	407-353-6782		kathykhan@aol.com	550 Birdsong Court	Longwood	FL	32779	Video Services	893556752	WBE	Caucasian
6	LP Video Productions, Inc.	407-896-9727	866-702-5438	laurie@lp-video.com	181 Elsa Street	Orlando	FL	32806	Video Services	893556752	WBE	Caucasian
7	Advanced Painting Of Tampa, Inc.	813-931-4491	813-931-3436	advpgo263@aol.com	9263 Lazy Ln	Tampa	FL	33614	Painting Services	833638290	MBE	Hispanic American
7	AGL&O Services, Inc.	813-415-5783	813-324-9530	oscar3198@gmail.com	317 Amara Ave	Brandon	FL	33510	Painting Services	842175251	MBE	Hispanic American
7	Bussey Construction Services, Inc.	813-857-3844		kbussey@busseyconstruction.com	32234 Summerglade Dr	Wesley Chapel	FL	33545	Painting Services	864648333	WBE	Caucasian
7	C&C Painting Contractors Inc.	813-886-7100		carlos@ccpainting.com	8372 Standish Bend Dr.	Tampa	FL	33615	Painting Services	893617521	MBE	Hispanic American
7	Colors Painting Contractors LLC	813-598-0105	813-886-7102	jimmyg@colorspaintingcontractors.com	12096 ABBWOOD LANE	TAMPA	FL	33626	Painting Services	862331210	MBE	Hispanic American
7	Federico's Painting Corp	813-908-1404	813-908-1404	adelapav50@hotmail.com	6615 Winding Oak Dr.	Tampa	FL	33625	Painting Services	203279278	MBE	Hispanic American
7	Five12 Painting & Remodeling LLC	551-221-9062		info@five12painting.com	1436 Kurume Court	Orlando	FL	32818	Painting Services	825232409	MBE	Hispanic American
7	Green Earth Commercial Contracting Company	813-323-3406		info@gec-3.com	3903 Northdale Blvd, Suite 130W	Tampa	FL	33634	Painting Services	850914893	MBE	Hispanic American
7	Gunther General Contracting Services, Inc.	407-957-9929	407-957-3054	janice@gunthergcs.com	1420 Park Commerce Court	St. Cloud	FL	34769	Painting Services	821615800	WBE	Caucasian
7	Illusion Painting LLC	407-692-3414	407-692-3414	illusionpainting@gmail.com	3501 W Vine St, Suite 518	Kissimmee	FL	34741	Painting Services	8422658504	MBE	Hispanic American
7	J. MORI PAINTING, INC.	305-825-7144	305-825-7145	jmori@jmoripainting.com	2561 West 80th Street	Hialeah	FL	33016	Painting Services	850167126	MBE	Hispanic American
7	JCPAINTING&RENOVATIONS INC	813-732-8322		sandrafranco72@msn.com	5608 Pinnacle Heights Circle	Tampa	FL	33624	Painting Services	853966370	MBE	Hispanic American
7	P&H STUCCO & CONSTRUCTION INC	727-934-9049	727-934-9049	olgaangel7@msn.com	1705 Sunset Drive	TARPON SPRING	FL	34689	Painting Services	893220391	WBE	Caucasian
7	Xtreme Painting Services, Inc.	813-875-1155	813-874-1155	amalia@xtremepaintingsservices.com	7910 N ARMEMIA AVE	TAMPA	FL	33604	Painting Services	893691369	MBE	Hispanic American
8	ABSOLUTE EROSION CONTROL LLC	407-729-5881		KORTIZ@ABSOLUTEEROSION.COM	270 ARBOR DRIVE WEST	PALM HARBOR	FL	34683	Erosion Control	204394426	MBE	Hispanic American
8	Concept Carma, Inc.	888-346-7779	888-346-7153	kathryn@kcnw.com	4445 Edgewater Dr	Orlando	FL	32804	Erosion Control	871222102	WBE	Caucasian
9	Best Made Enterprises, Inc.	813-248-5266	813-248-1299	info@BestMadeFence.com	4133 Causeway Blvd.	Tampa	FL	33619	Fencing	893498525	MBE	Hispanic American
9	KMG Fence, LLC	407-654-7600	407-654-4700	kmg@kmgfence.com	505 John St rd	Apopka	FL	32703	Fencing	8342262721	WBE	Caucasian
9	Specialist Fence/Concrete LLC	813-677-3555	813-671-4172	info@specialistfence.org	12719 US Highway 41	Gibsonton	FL	33534	Fencing	812219552	WBE	Caucasian
10	4M Market Solutions, LLC	813-924-1057		justin@4mtrbce.com	402 havenwood way	Valrico	FL	33594	Earthwork	873334414	MBE	Native American
10	CMS Crawford Maintenance Services LLC.	727-216-6469	727-216-6524	marina@crawfordmain.com	14028 Palm Way	Largo	FL	33771	Earthwork	862249991	MBE	Hispanic American
10	H.B. Underground Inc	813-455-5815		hub07266@gmail.com	11500 N Dale Mabry Hwy	Tampa	FL	33618	Earthwork	842208449	MBE	Hispanic American
10	Sunrise Utility Construction, Inc.	813-949-3749	813-949-0408	luz@alcenterprize.com	P. O. Box 272293	Tampa	FL	33688	Earthwork	893034012	WBE	Caucasian
12	AIO ENTERPRISE, LLC	407-466-3689	813-436-5640	luz@alcenterprize.com	13011 Perdue PL	Temple Terrace	FL	33617	Concrete Driveways	264346308	MBE	Hispanic American
12	Central Florida Contractors Inc	727-596-0708		sidewalks@aol.com	13345 Pine Bark Ct	Largo	FL	33774	Concrete Driveways	893119568	MBE	Hispanic American
12	Professional Concrete, Inc.	941-921-3660	941-921-5371	david@professionalconcrete.com	5220 McIntosh Road, Suite 1	Sarasota	FL	34233	Concrete Driveways	850715612	MBE	Hispanic American
12	Quick Construction Solutions, LLC	813-377-9997	813-374-5849	quickcs@outlook.com	4501 N. Saint Vincent St.	Tampa	FL	33614	Concrete Driveways	800972890	MBE	Hispanic American



**Virginia Avenue Pump Station Rehabilitation  
FY22 Project 21-C-00027  
Non-UWMBE/SLBE Availability Contact List**

#/s	Business Name	Phone	Fax	Email	Address 1	City	State	Zip	Business Description	FEIN	Cert. Type	Ethnicity
12	Sunrise Utility Construction, Inc.	813-949-3749	813-949-0408	LWINBOSS@AOL.COM	P.O. Box 272293	Tampa	FL	33688	Concrete Driveways	893034012	WBE	Caucasian
13	Alreko Energy Solutions US, LLC	407-706-2800		hivetrax@aireko.com	2415 W Sand Lake Rd., Ste. E	Olando	FL	32809	Concrete Curbs, Sidewalks, Retaining Wall	872826327	WBE	Hispanic American
13	Central Florida Contractors Inc	727-596-0708		sidewalks@aol.com	13345 Pine Bark Ct.	Largo	FL	33774	Curbs and Sidewalks	893119568	WBE	Hispanic American
13	Professional Concrete, Inc.	941-921-3660	941-921-5371	david@professionalconcrete.com	5220 McIntosh Road, Suite 1	Sarasota	FL	84233	Concrete Curbs, Sidewalks, Retaining Wall	850715612	WBE	Hispanic American
13	Triple Crown Construction, LLC	407-470-8021		clint@triplecrownllc.us	6419 Lakeville Road	Olando	FL	32818	Concrete Construction, Grading and Excav	861710906	WBE	Asian American
14	4M Market Solutions, LLC	813-924-1057		justin@4mtribe.com	402 havenwood way	Vaifco	FL	33594	Concrete	273334414	WBE	Native American
14	AIO ENTERPRISE, LLC	407-466-3689	813-436-5640	luz@aiointerprise.com	13011 Perdue PL	Temple Terrace	FL	33617	Concrete	264346308	WBE	Hispanic American
14	Aireko Energy Solutions US, LLC	407-706-2800		hivetrax@aireko.com	2415 W Sand Lake Rd., Ste. E	Olando	FL	32809	Concrete	872826327	WBE	Hispanic American
14	Beato Group, Inc.	813-252-0196		info@beatogroup.com	8961 Turnstone Haven Place	Tampa	FL	33619	Concrete	854003966	WBE	Hispanic American
14	CARIA CONSTRUCTION, INC	813-304-7158		Carly@pulesconcrete.com	2010 Chickwood Ct.	Tampa	FL	33618	Concrete	863665283	WBE	Caucasian
14	Central Florida Contractors Inc	727-596-0708		sidewalks@aol.com	13345 Pine Bark Ct.	Largo	FL	33774	Concrete	893119568	WBE	Hispanic American
14	CMS Crawford Maintenance Services LLC.	727-216-6469	727-216-6524	marina@crawfordmain.com	14028 Palm Way	Largo	FL	83771	Concrete	262249991	WBE	Hispanic American
14	Construction Supply of Southwest Florida, Inc.	941-366-2322	941-366-7435	laura@mystucco.com	2223 12TH STREET	SARASOTA	FL	84237	Concrete	260001316	WBE	Caucasian
14	Cornerstone Construction Services, Inc.	407-299-3299	407-299-3294	astone@csorlando.com	4205 Edgewater Drive Suite A	Olando	FL	32804	Concrete	892864526	WBE	Hispanic American
14	Diamond Development LLC	352-551-3194		diamonddevelopmentllc@gmail.com	905 Spring Valley Rd	Altamonte Spl	FL	32714	Concrete	813746486	WBE	Caucasian
14	H.B. Underground Inc	813-455-5815		hug0726b@gmail.com	11500 N Dale Mabry Hwy	Tampa	FL	33618	Concrete	842208449	WBE	Hispanic American
14	KAT Materials inc.	727-834-8655	727-834-8670	orders@katinc.us	6541 Industrial Ave	Port Richey	FL	84668	Concrete	831019704	WBE	Caucasian
14	Professional Concrete, Inc.	941-921-3660	941-921-5371	david@professionalconcrete.com	5220 McIntosh Road, Suite 1	Sarasota	FL	84233	Concrete	850715612	WBE	Hispanic American
14	Quick Construction Solutions, LLC	813-377-9997	813-374-5849	quicks@outlook.com	4501 N. Saint Vincent St.	Tampa	FL	33614	Concrete	800972890	WBE	Hispanic American
14	Sunrise Utility Construction, Inc.	813-949-3749	813-949-0408	LWINBOSS@AOL.COM	P.O. Box 272293	Tampa	FL	33688	Concrete	893034012	WBE	Caucasian
14	Triple Crown Construction, LLC	407-470-8021		clint@triplecrownllc.us	6419 Lakeville Road	Olando	FL	32818	Concrete	861710906	WBE	Asian American
15	AGRO-TURF CORP.	813-741-9253		beatriz@agro-turf.com	11810 Bullfrog Creek Rd	Gibsonton	FL	33534	Sodding	205501762	WBE	Hispanic American
15	Always Green Landscaping Inc.	813-516-0823		alwaysgreenlandscapinginc@gmail.com	6501 Sawyer Court	Tampa	FL	33634	Sodding	820580963	WBE	Hispanic American
15	Baron's Landscaping Services, Inc.	813-404-1509	813-443-4919	baronslawncare@aol.com	2415 East Sligh Avenue	Tampa	FL	33610	Sodding	850837654	WBE	Hispanic American
15	Bay to Bay Environmental LLC	813-343-3803	813-343-3803	ciel@baytobayenvironmental.com	9605 N. Harbts Dr.	Tampa	FL	33617	Sodding	893798117	WBE	Hispanic American
15	D & J LAWN SERVICES OF LAKELAND LLC	863-859-3525		DANDILA@WNSERVICES@HOTMAIL.COM	575 Old Polk City Road	Lakeland	FL	33809	Sodding	273279070	WBE	Hispanic American
15	Diamond Development LLC	352-551-3194		diamonddevelopmentllc@gmail.com	905 Spring Valley Rd	Altamonte Spl	FL	32714	Sodding	813746486	WBE	Caucasian
15	Florida Natives Nursery, Inc.	813-754-1900	813-754-4001	office@floridatnativesnursery.com	4115 NATIVE GARDEN DR	PLANT CITY	FL	33565	Sodding	893561539	WBE	Caucasian
15	JTCM Inc.	813-935-7724		office@lawnsculptures.net	817 S MacDill Ave	Tampa	FL	33609	Sodding	862418914	WBE	Caucasian
15	Landscape Maintenance Professionals, Inc.	813-757-6500	813-757-6501	Kelly.vickers@lmprio.com	13050 E US Highway 92	Dover	FL	33527	Sodding	893613665	WBE	Hispanic American
15	Nelson's Tree Farm and Nursery, Inc.	813-842-4663	813-350-9139	kimberly.marinez33@gmail.com	5027 N Lois Ave	Tampa	FL	33614	Sodding	893404710	WBE	Hispanic American
15	Pine Lake Nursery & Landscape, Inc.	813-948-4736	813-948-4914	lanet@pinelakenurseryinc.com	2122 Henley Rd	Lutz	FL	33558	Sodding	893499734	WBE	Hispanic American
15	Sumbell Sod & Grading Company	813-641-9855	813-434-9038	lesley@sumbellsod.com	819 - 9th St. N.E.	Ruskin	FL	33570	Sodding	334250933	WBE	Caucasian
17	Benro Enterprises, Inc	813-628-5584	813-749-9470	rrocha@rochacontrols.com	5025 W. Rio Vista Ave	Tampa	FL	33634	Electrical Instrumentation & Control	893425954	WBE	Hispanic American
17	Brite Ideas Electric, LLC	813-498-2339	813-498-2724	pivush@briteidealelectric.com	15432 N Nebraska Ave	Tampa	FL	33549	Electrical Instrumentation & Control	825090837	WBE	Asian American
17	Brown & Brown Electric, Inc.	954-938-8986	954-938-9272	Hermine.Brown@brownandbrownelectric.com	1150 SW 30th Avenue	Pompano Bea	FL	33069	Electrical Instrumentation & Control	892283934	WBE	African American
17	Electric World Corp	813-785-5265	866-593-5921	Electricworldcorp@gmail.com	5708 N 58th St	Tampa	FL	33610	Electrical Instrumentation & Control	831112415	WBE	Hispanic American
17	Erwin Electric, Inc	813-931-8853	813-931-8852	padilla.melissa@gmail.com	3817 W. Humphrey St. #203	TAMPA	FL	33614	Electrical Instrumentation & Control	893241383	WBE	Hispanic American
17	Green Earth Commercial Contracting Company	813-323-3406		info@gec-3.com	13817 MONROE BUSINESS PARK	TAMPA	FL	33634	Electrical Instrumentation & Control	893490070	WBE	Caucasian
17	Gunther General Contracting Services, Inc.	407-957-9929	407-957-3054	Janice@gunthergcs.com	3903 Northdale Blvd. Suite 130W	Tampa	FL	33634	Electrical Instrumentation & Control	850914893	WBE	Hispanic American
17	Infinity Industrial Controls Inc	407-957-9929		Finance@iicontrols.com	1420 Park Commerce Court	St. Cloud	FL	84769	Electrical Instrumentation & Control	8721615800	WBE	Caucasian
17	MCS of Tampa, Inc.	727-216-6416		twimore@mcssoftampa.com	8510 Sunstate Street	Tampa	FL	33634	Electrical Instrumentation & Control	732305660	WBE	Caucasian
17	TAMCO Electric, Inc.	813-918-8489	813-986-5979	atrjull@tampabayrr.com	4022 W South Avenue	Tampa	FL	33614	Electrical Instrumentation & Control	891396650	WBE	Hispanic American
18	Beato Group, Inc.	813-252-0196		Info@BeatoGroup.com	8961 Turnstone Haven Place	Tampa	FL	33619	Traffic Control	854003966	WBE	Hispanic American
18	Bussey Construction Services, Inc.	813-857-3844		kbussey@busseyconstruction.com	32234 Summerglade Dr	Wesley Chapel	FL	33545	Traffic Control	864643333	WBE	Caucasian
18	Traffic Control Products of Florida Inc.	813-621-8484	813-621-4611	kw@trafficcontrolproducts.org	5514 CARMAK RD	TAMPA	FL	33610	Traffic Control	892582822	WBE	Caucasian
18	USA Protek LLC	863-944-1422		dstenge@usaprotek.com	2404 Crews Lake Hills Ln	Lakeland	FL	33813	Traffic Control	872299161	WBE	Caucasian

Instructions Regarding Use of the WMBE/SLBE Availability Contact List

**Bidders must solicit a subcontracting bid from ALL of the firms listed on the WMBE/SLBEs list provided within the Specifications,** and provide documentation of emails, faxes, phone calls, letters, or other communication with the firms as a first step in demonstrating Good-Faith Efforts to achieve the goal set for WMBE/SLBE participation on this contract.

The list is formatted to facilitate e-mailing of a solicitation to the listed firms by copying and pasting the email addresses.

The WMBE/SLBE participation Goal is based upon the availability of the certified firms indicated on the contact list. The Goal and Requirements of the City's Equal Business Opportunity Program are stated in the Bid/Contract Document, Specifications.

PROPOSAL

To the Mayor and City Council of the City of Tampa, Florida:

Legal Name of Bidder: \_\_\_\_\_

Bidder's Fictitious Name, if applicable: \_\_\_\_\_

Bidder is a/an:  Individual  Partnership\*  Joint Venture\*  LLC  Corp.  Other:

Bidder is organized under the laws of:  State of Florida  Other:

Bidder Mailing Address: \_\_\_\_\_

Bidder's Federal Employee Identification No. (FEI/EIN): \_\_\_\_\_

Bidder's License No.: \_\_\_\_\_ Bidder's FDOS (SUNBIZ) Doc. No.: \_\_\_\_\_  
*(See Ch. 489. FS; use entity's, individual's only if applicable)*

Bidder Contact Name\*\*: \_\_\_\_\_ Email: \_\_\_\_\_ Phone: (\_\_\_\_) \_\_\_\_\_

Bidder's own initial application for employment has criminal history screening practices similar in nature to the practices contained in Chapter 12, Article VI, City of Tampa Code (*Responses, whether "Yes" or "No", are for informational purposes only and will not be used as a basis of award or denial, nor as a basis for any protest*):  Yes  No

The below named person, appearing before the undersigned authority and after being first duly sworn, for him/herself and on behalf of the entity submitting this Proposal does hereby affirm and declare as follows:

- (1) He/She is of lawful age and is authorized to act on behalf of Bidder (the individual, partnership, corporation, entity, etc. submitting this Proposal) and that all statements made in this document are true and correct to the best of my knowledge.
- (2) If Bidder is operating under a fictitious name, Bidder has currently complied with any and all laws and procedures governing the operation of businesses under fictitious names in the State of Florida
- (3) No person or entity other than Bidder has any interest in this Proposal or in the Contract proposed to be entered into.
- (4) This Proposal is made without any understanding, agreement, or connection with any person or entity making Proposal for the same purposes, and is in all respects fair and without collusion or fraud.
- (5) Bidder is not in arrears to the City of Tampa, upon debt or contract, and is not a defaulter, as surety or otherwise, upon any obligation to the City of Tampa.
- (6) That no officer or employee or person whose salary is payable in whole or in part from the City Treasury is, shall be or become interested, directly or indirectly, as a contracting party, partner, stockholder, surety or otherwise, in this Proposal, or in the performance of the Contract, or in the supplies, materials, or equipment and work or labor to which it relates, or in any portion of the profits thereof.
- (7) Bidder has carefully examined and fully understands the Solicitation and has full knowledge of the scope, nature, and quality of the work to be performed; furthermore, Bidder has carefully examined the site of the work and that, from his own investigations, he has satisfied himself as to the nature and location of the work, the character, quality, and quantity of materials and the kinds and extent of equipment and other facilities needed for the performance of the work, the general and local conditions and all difficulties to be encountered, and all other items which may, in any way, affect the work or its performance.
- (8) Bidder (including its principals)  has |  has NOT been debarred or suspended from contracting with a public entity.
- (9) Bidder  has |  has NOT implemented a drug-free workplace program that meets the requirements of Section 287.087, Florida Statutes.
- (10) Bidder has carefully examined and fully understands all the component parts of the Contract Documents and agrees Bidder will execute the Contract, provide the required Public Construction Bond, and will fully perform the work in strict accordance with the terms of the Contract and Contract Documents therein referred to for the following prices, to wit:

\* If a Partnership or Joint Venture, attach Partnership or Joint Venture Agreement.

\*\* Someone the City may contact with questions/correspondence regarding this Solicitation and/or permits.

Contract Item No.	Unit	Estimated Quantity	Description and Price in Words	Computed Total Price for Item in Figures
ITEM 1	LS		<p>Construction of wastewater improvements including 8-inch sanitary sewer and one new manhole (Manhole B), 4-inch force main, 8-inch sewer from Manhole D to Manhole E, 2-inch water main, pump station rehabilitation including demolition and replacement of existing pump bases, discharge pipe, submersible pumps, guide rails and brackets, float holders and appurtenances, top slab, valve vault, discharge piping, valves and brick wet well, construction of an aluminum platform, electrical improvements including control panels, conduit, conductors, new electrical service, CIPP lining, manhole rehabilitation, curbing, brick road restoration, black vinyl-coated chain link site fencing with double gate, and all appurtenant work.</p> <p>_____ dollars and _____ cents</p>	
ITEM 1	LS			\$ _____
Contingency				\$ <u>70,000.00</u>
SUBTOTAL ITEM 1				\$ _____

Contract Item No.	Unit	Estimated Quantity	Description and Price in Words	Computed Total Price for Item in Figures
ITEM 2	LS		Construction of stormwater improvements including two Type 2 curb inlets, ERCP, concrete collar, outfall pipe, muck removal and select fill, sodding, Type-D curbing, bollards, rip-rap, GeoCell stabilization, erosion control, brick road restoration, and all appurtenant work.	
			_____ dollars	
			and _____ cents	
ITEM 2	LS			\$ _____
			Contingency	\$ <u>30,000.00</u>
			SUBTOTAL ITEM 2	\$ _____

TOTAL ITEM 1 AND ITEM 2

\_\_\_\_\_ dollars

and \_\_\_\_\_ cents

TOTAL \$ \_\_\_\_\_

Computed Total Price in Words: \_\_\_\_\_  
 \_\_\_\_\_ dollars and \_\_\_\_\_ cents.

Computed Total Price in Figures: \$ \_\_\_\_\_

Bidder acknowledges that the following addenda have been received and that the changes covered by the addendum(s) have been taken into account in this proposal: #1 \_\_\_\_ #2 \_\_\_\_ #3 \_\_\_\_ #4 \_\_\_\_ #5 \_\_\_\_ #6 \_\_\_\_ #7 \_\_\_\_ #8 \_\_\_\_.

Bidder acknowledges the requirements of the City of Tampa's Equal Business Opportunity Program.

Bidder acknowledges that it is aware of Florida's Trench Safety Act (Sections 553.60-553.64, Florida Statutes), and agrees that Bidder together with any involved subcontractors will comply with all applicable trench safety standards. Bidder further acknowledges that included in the various items of this Proposal and the total bid price (as applicable) are costs for complying with the Trench Safety Act. Bidder further identifies the costs and methods summarized below:

	<b>Trench Safety Measure (Description)</b>	<b>Unit of Measure (LF, SY)</b>	<b>Unit Quantity</b>	<b>Unit Cost</b>	<b>Extended Cost</b>
A.	_____	_____	_____	_____	_____
B.	_____	_____	_____	_____	_____
C.	_____	_____	_____	_____	_____
<b>Total Cost: \$</b>					_____

Accompanying this Proposal is a certified check, cashier's check or Tampa Bid Bond (form included herein must be used) for at least five percent (5%) of the total amount of the Proposal which check shall become the property of the City, or which bond shall become forthwith due and payable to the City, if this Proposal shall be accepted by the City and the Bidder shall fail to enter into a legally binding contract with and to furnish the required Public Construction Bond to the City within twenty (20) days after the date of its receipt of written Notice of Award by the City so to do.

**FAILURE TO COMPLETE THE ABOVE MAY RESULT IN THE PROPOSAL BEING DECLARED NON-RESPONSIVE.**

[SEAL] Name of Bidder: \_\_\_\_\_  
 Authorized Signature: \_\_\_\_\_  
 Signer's Printed Name: \_\_\_\_\_  
 Signer's Title: \_\_\_\_\_

STATE OF \_\_\_\_\_  
 COUNTY OF \_\_\_\_\_

For an entity: The forgoing instrument was Sworn to (or affirmed) and subscribed before me by means of  physical presence or  online notarization, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by \_\_\_\_\_ as \_\_\_\_\_ of \_\_\_\_\_, a/n  Partnership  Joint Venture  LLC  Corp  Other: \_\_\_\_\_, on behalf of such entity. Such individual is Personally Known OR Produced Identification. Type of Identification Produced: \_\_\_\_\_

For an individual: The forgoing instrument was Sworn to (or affirmed) and subscribed before me by means of  physical presence or  online notarization, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, By \_\_\_\_\_, Such individual is Personally Known OR Produced Identification. Type of Identification Produced: \_\_\_\_\_.

[NOTARY SEAL] \_\_\_\_\_  
 Notary Public, State of \_\_\_\_\_  
 Notary Printed Name: \_\_\_\_\_  
 Commission No.: \_\_\_\_\_  
 My Commission Expires: \_\_\_\_\_



# Good Faith Effort Compliance Plan Guidelines

for Women/Minority Business Enterprise/Small Local Business Enterprise Participation  
City of Tampa - Equal Business Opportunity Program  
(MBD Form 50 – detailed instructions on page 2 of 2)

Contract Name \_\_\_\_\_ Bid Date \_\_\_\_\_

Bidder/Proposer \_\_\_\_\_

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

Name \_\_\_\_\_ Title \_\_\_\_\_

The Compliance Plan with attachments is a true account of Good Faith Efforts (GFE) made to achieve the participation goals as specified for Women/Minority Business Enterprises/Small Local Business Enterprises (WMBE/SLBE) on the referenced contract:

The WMBE/SLBE participation **Goal is Met or Exceeded**. See DMI Forms 10 and 20 which accurately report all subcontractors solicited and all subcontractors to-be-utilized.

The WMBE/SLBE participation Goal is **Not Achieved**. The following list is an overview of the baseline GFE action steps already performed. Furthermore, it is understood that these GFE requirements are weighted in the compliance evaluation based on the veracity and demonstrable degree of documentation provided with the bid/proposal:

(Check applicable boxes below. Must enclose supporting documents accordingly with remarks)

- (1) Solicited through reasonable and available means the interest of WMBE/SLBEs that have the capability to perform the work of the contract. The Bidder or Proposer must solicit this interest within sufficient time to allow the WMBE/SLBEs to respond. The Bidder or Proposer must take appropriate steps to follow up initial solicitations with interested WMBE/SLBEs.  See DMI report forms for subcontractors solicited.  See enclosed supplemental data on solicitation efforts.  Qualifying Remarks:
- (2) Provided interested WMBE/SLBEs with adequate, specific scope information about the plans, specifications, and requirements of the contract, including addenda, in a timely manner to assist them in responding to the requested-scope identified by bidder/proposer for the solicitation.  See enclosed actual solicitations used.  Qualifying Remarks:
- (3) Negotiated in good faith with interested WMBE/SLBEs that have submitted bids (e.g. adjusted quantities or scale). Documentation of negotiation must include the names, addresses, and telephone numbers of WMBE/SLBEs that were solicited; the date of each such solicitation; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why agreements could not be reached with WMBE/SLBEs to perform the work. Additional costs involved in soliciting and using subcontractors is not a sufficient reason for a bidder/proposer's failure to meet goals or achieve participation, as long as such costs are reasonable. Bidders are not required to accept excessive quotes in order to meet the goal.  DMI Utilized Forms for sub-(contractor/consultant) reflect genuine negotiations  This project is an RFO/RFP in nature and negotiations are limited to clarifications of scope/specifications and qualifications.  See enclosed documentation.  Qualifying Remarks:
- (4) Not rejecting WMBE/SLBEs as being unqualified without justification based on a thorough investigation of their capabilities. The WMBE/SLBEs standing within its industry, membership in specific groups, organizations / associations and political or social affiliations are not legitimate causes for rejecting or not soliciting bids to meet the goals.  Not applicable.  See attached justification for rejection of a subcontractor's bid or proposal.  Qualifying Remarks:
- (5) Made scope(s) of work available to WMBE/SLBE subcontractors and suppliers; and, segmented portions of the work or material consistent with the available WMBE/SLBE subcontractors and suppliers, so as to facilitate meeting the goal.  Sub-Contractors were allowed to bid on their own choice of work or trade without restriction to a pre-determined portion.  See enclosed comments.  Qualifying Remarks:
- (6) Made good faith efforts, despite the ability or desire of Bidder/Proposer to perform the work of a contract with its own forces/organization. A Bidder/Proposer who desires to self-perform the work of a contract must demonstrate good faith efforts if the goal has not been met.  Sub-Contractors were not prohibited from submitting bids/proposals and were solicited on work typically self-performed by the prime.  Qualifying Remarks:
- (7) Segmented portions of the work to be performed by WMBE/SLBEs in order to increase the likelihood that the goals will be met. This includes, where appropriate, breaking out contract work items into economically feasible units (quantities/scale) to facilitate WMBE/SLBE participation, even when the Bidder/Proposer might otherwise prefer to perform these work items with its own forces.  Sub-Contractors were allowed to bid on their own choice of work or trade without restriction to a pre-determined portion.  Sub-Contractors were not prohibited from submitting bids/proposals and were solicited on work typically self-performed by the prime.  See enclosed comments.  Qualifying Remarks:
- (8) Made efforts to assist interested WMBE/SLBEs in obtaining bonding, lines of credit, or insurance as required by the city or contractor.  See enclosed documentation on initiatives undertaken and methods to accomplish.  Qualifying Remarks:
- (9) Made efforts to assist interested WMBE/SLBEs in obtaining necessary equipment, supplies, materials, or related assistance or services, including participation in an acceptable mentor-protégé program.  See enclosed documentation of initiatives and/or agreements.  Qualifying Remarks:
- (10) Effectively used the services of the City and other organizations that provide assistance in the recruitment and placement of WMBE/SLBEs.  See enclosed documentation.  The following services were used:

Note: Provide any unsolicited information that will support the Bid/RFP Compliance Evaluation.  Named Documents Are:



**Participation Plan: Guidance for Complying with Good Faith Efforts Outreach**  
**(page 2 of 2)**

1. All firms on the WMBE/SLBE Goal Setting List must be solicited and documentation provided for email, fax, letters, phone calls, and other methods of outreach/communication with the listed firms. The DMI Solicited and DMI-Utilized forms must be completed for all firms solicited or utilized. Other opportunities for subcontracting may be explored by consulting the City of Tampa MBD Office and/or researching the on-line Diversity Management Business System Directory for Tampa certified WMBE/SLBE firms.
2. Solicitation of WMBE/SLBEs, via written or electronic notification, should provide specific information on the services needed, where plans can be reviewed and assistance offered in obtaining these, if required. Solicitations should be sent a minimum of a week (i.e. 5 business days or more) before the bid/proposal date. Actual copies of the bidder's solicitation containing their scope specific instructions should be provided.
3. With any quotes received, a follow-up should be made when needed to confirm detail scope of work. For any WMBE/SLBE low quotes rejected, an explanation shall be provided detailing negotiation efforts.
4. If a low bid WMBE/SLBE is rejected or deemed unqualified the contractor must provide an explanation and supporting documentation for this decision.
5. Prime shall break down portions of work into economical feasible opportunities for subcontracting. The WMBE/SLBE directory may be useful in identifying additional subcontracting opportunities and firms not listed in the "WMBE/SLBE Goal Setting Firms List."
6. Contractor shall not preclude WMBE/SLBEs from bidding on any part of work, even if the Contractor may desire to self-perform the work.
7. Contractor shall avoid relying solely on subcontracting out work-scope where WMBE/SLBE availability is not sufficient to attain the pre-determined subcontract goal set for the Bid or when targeted sub-consultant participation is stated within the RFP/RFQ.
8. In its solicitations, the Bidder should offer assistance to WMBE/SLBEs in obtaining bonding, insurance, et cetera, if required of subcontractors by the City or Prime Contractor.
9. In its solicitation, the Bidder should offer assistance in obtaining equipment for a specific job to WMBE/SLBEs, if needed.
10. Contractor should use the services offered by such agencies as the City of Tampa Minority and Small Business Development Office, Hillsborough County Entrepreneur Collaborative Center, Hillsborough County Economic Development Department's MBE/SBE Program and the NAACP Empowerment Center to name a few for the recruitment and placement of WMBEs/SLBEs.





**Failure to Complete, Sign and Submit Both Forms 10 & 20 SHALL render the Bid or Proposal Non-Responsive**

**Page 1 of 4 – DMI Solicited/Utilized Schedules  
 City of Tampa – Schedule of **All Solicited** Sub-(Contractors/Consultants/Suppliers)  
 (FORM MBD-10)**

Contract No.: \_\_\_\_\_ Contract Name: \_\_\_\_\_  
 Company Name: \_\_\_\_\_ Address: \_\_\_\_\_  
 Federal ID: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Check applicable box(es). Detailed Instructions for completing this form are on page 2 of 4.

- No Firms were contacted or solicited for this contract.
- No Firms were contacted because: \_\_\_\_\_
- See attached list of additional Firms solicited and all supplemental information (List must comply to this form)  
Note: Form MBD-10 must list ALL subcontractors solicited including Non-minority/small businesses

NIGP Code Categories: Buildings = 909, General = 912, Heavy = 913, Trades = 914, Architects = 906, Engineers & Surveyors = 925, Supplier = 912-77

S = SLBE W=WMBE O = Neither	Company Name Address Phone, Fax, Email	Type of Ownership (F=Female M=Male) BF BM = African Am. HF HM = Hispanic AF AM = Asian Am. NF NM = Native Am. CF CM = Caucasian	Trade or Services  NIGP Code (listed above)	Contact Method L=Letter F=Fax E=Email P=Phone	Quote or Response Received Y/N

Failure to Complete, Sign and Submit  
 this form with your Bid or Proposal  
 Shall render the Bid N -

It is hereby certified that the information provided is an accurate and true account of contacts and solicitations for sub-contracting opportunities on this contract.

Signed: \_\_\_\_\_ Name/Title: \_\_\_\_\_ Date: \_\_\_\_\_

**Failure to Complete, Sign and Submit Both Forms 10 & 20 SHALL render the Bid or Proposal Non-Responsive**  
**Forms must be included with Bid / Proposal**



## Instructions for completing The Sub-(Contractors/Consultants/ Suppliers) Solicited Form (Form MBD-10)

**This form must be submitted with all bids or proposals.** All subcontractors (regardless of ownership or size) solicited and subcontractors from whom unsolicited quotations were received must be included on this form. The instructions that follow correspond to the headings on the form required to be completed. Note: Ability or desire to self-perform all work shall not exempt the prime from Good Faith Efforts to achieve participation.

- **Contract No.** This is the number assigned by the City of Tampa for the bid or proposal.
- **Contract Name.** This is the name of the contract assigned by the City of Tampa for the bid or proposal.
- **Contractor Name.** The name of your business and/or doing business as (dba) if applicable.
- **Address.** The physical address of your business.
- **Federal ID. FIN.** A number assigned to your business for tax reporting purposes.
- **Phone.** Telephone number to contact business.
- **Fax.** Fax number for business.
- **Email.** Provide email address for electronic correspondence.
- **No Firms were contacted or solicited for this contract.** Checking the box indicates that a pre-determined Subcontract Goal or Participation Plan Requirement was not set by the City resulting in your business not using subcontractors and will self-perform all work. If during the performance of the contract you employ subcontractors, the City must pre-approve subcontractors. Use of the “Sub-(Contractors/Consultants/Suppliers) Payments” form (MBD Form-30) must be submitted with every pay application and invoice. Note: Certified **SLBE or WMBE firms** bidding as Primes **are not exempt** from outreach and solicitation of subcontractors.
- **No Firms were contacted because.** Provide brief explanation why no firms were contacted or solicited.
- **See attached documents.** Check box, if after you have completed the DMI Form in its entirety, you need more space to list additional firms and/or if you have supplemental information/documentation relating to the form. All DMI data not submitted on the MBD Form-10 must be in the same format and have all requested data from MBD Form-10 included.

The following instructions are for information of any and all subcontractors solicited.

- **“S” = SLBE, “W” = WMBE.** Enter “S” for firms Certified by the City as Small Local Business Enterprises and/or “W” for firms Certified by the City as either Women/Minority Business Enterprise; **“O” = Non-certified others.**
- **Federal ID. FIN.** A number assigned to a business for tax reporting purposes. This information is critical in proper identification and payment of the contractor/subcontractor.
- **Company Name, Address, Phone & Fax.** Provide company information for verification of payments.
- **Type of Ownership.** Indicate the Ethnicity and Gender of the owner of the subcontracting business.
- **Trade, Services, or Materials** indicate the trade, service, or materials provided by the subcontractor. NIGP codes aka “National Institute of Governmental Purchasing” are listed at top section of document.
- **Contact Method L=letter, F=fax, E=Email, P=Phone.** Indicate with letter the method(s) of soliciting for bid.
- **Quote or Resp. (response) Rec’d (received) Y/N.** Indicate “Y” Yes if you received a quotation or if you received a response to your solicitation. Indicate “N” No if you received no response to your solicitation from the subcontractor. Must keep records: log, ledger, documentation, etc. that can validate/verify.

If additional information is required or you have questions, please contact the Equal Business Opportunity Program - Minority and Small Business Development Office at (813) 274-5522.



**Failure to Complete, Sign and Submit Both Forms 10 & 20 SHALL render the Bid or Proposal Non-Responsive**

**Page 3 of 4 – DMI Solicited/Utilized Schedules**  
**City of Tampa – Schedule of All To-Be-Utilized Sub-(Contractors/Consultants/Suppliers)**  
**(FORM MBD-20)**

Contract No.: \_\_\_\_\_ Contract Name: \_\_\_\_\_  
Company Name: \_\_\_\_\_ Address: \_\_\_\_\_  
Federal ID: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

Check applicable box(es). Detailed Instructions for completing this form are on page 4 of 4.

See attached list of additional Firms Utilized and all supplemental information (List must comply to this form)

Note: Form MBD-20 must list ALL subcontractors To-Be-Utilized including Non-minority/small businesses

No Subcontracting/consulting (of any kind) will be performed on this contract.

No Firms are listed to be utilized because: \_\_\_\_\_

NIGP Code General Categories: Buildings = 909, General = 912, Heavy = 913, Trades = 914, Architects = 906, Engineers & Surveyors = 925, Supplier = 912-77

Enter "S" for firms Certified as Small Local Business Enterprises, "W" for firms Certified as Women/Minority Business Enterprise, "O" for Other Non-Certified

S = SLBE W=WMBE O =Neither	Company Name Address Phone, Fax, Email	Type of Ownership (F=Female M=Male) BF BM = African Am. HF HM = Hispanic Am. AF AM = Asian Am. NF NM = Native Am. CF CM = Caucasian	Trade, Services, or Materials  NIGP Code Listed above	\$ Amount of Quote. Letter of Intent (LOI) if available	Percent of Scope or Contract %

Failure to Complete, Sign and Submit  
this form with your Bid or Proposal  
Shall render the Bid N -

Total ALL Subcontract / Supplier Utilization \$ \_\_\_\_\_  
Total SLBE Utilization \$ \_\_\_\_\_  
Total WMBE Utilization \$ \_\_\_\_\_  
Percent SLBE Utilization of Total Bid/Proposal Amt. \_\_\_\_\_% Percent WMBE Utilization of Total Bid/Proposal Amt. \_\_\_\_\_%

It is hereby certified that the following information is a true and accurate account of utilization for sub-contracting opportunities on this Contract.

Signed: \_\_\_\_\_ Name/Title: \_\_\_\_\_ Date: \_\_\_\_\_

**Failure to Complete, Sign and Submit Both Forms 10 & 20 SHALL render the Bid or Proposal Non-Responsive**  
**Forms must be included with Bid / Proposal**



## Page 4 of 4 DMI – Solicited/**Utilized**

### Instructions for completing **The Sub-(Contractors/Consultants/ Suppliers) to be Utilized Form (Form MBD-20)**

**This form must be submitted with all bids or proposals. All subcontractors (regardless of ownership or size) projected to be utilized must be included on this form.** Note: Ability or desire to self-perform all work shall not exempt the prime from Good Faith Efforts to achieve participation.

**Contract No.** This is the number assigned by the City of Tampa for the bid or proposal.

- **Contract Name.** This is the name of the contract assigned by the City of Tampa for the bid or proposal.
- **Contractor Name.** The name of your business and/or doing business as (dba) if applicable.
- **Address.** The physical address of your business.
- **Federal ID. FIN.** A number assigned to your business for tax reporting purposes.
- **Phone.** Telephone number to contact business.
- **Fax.** Fax number for business.
- **Email.** Provide email address for electronic correspondence.
- **No Subcontracting/consulting (of any kind) will be performed on this contract.** Checking box indicates your business will not use subcontractors when no Subcontract Goal or Participation Plan Requirement was set by the City, but will self-perform all work. When subcontractors are utilized during the performance of the contract, the “Sub-(Contractors/Consultants/Suppliers) Payments” form (MBD Form-30) must be submitted with every pay application and invoice. Note: certified **SLBE or WMBE firms** bidding as Primes **are not exempt** from outreach and solicitation of subcontractors, including completion and submitting Form-10 and Form-20.
- **No Firms listed To-Be-Utilized.** Check box; provide brief explanation why no firms were retained when a goal or participation plan requirement was set on the contract. Note: mandatory compliance with Good Faith Effort outreach (GFECF) requirements applies (MBD Form-50) and supporting documentation must accompany the bid.
- **See attached documents.** Check box, if after completing the DMI Form in its entirety, you need more space to list additional firms and/or if you have supplemental information/documentation relating to the scope/value/percent utilization of subcontractors. Reproduce copies of MBD-20 and attach. All data not submitted on duplicate forms must be in the same format and content as specified in these instructions.

The following instructions are for information of Any and All subcontractors To Be Utilized.

- **Federal ID. FIN.** A number assigned to a business for tax reporting purposes. This information is critical in proper identification of the subcontractor.
- **“S” = SLBE, “W” = WMBE.** Enter “S” for firms Certified by the City as Small Local Business Enterprises and/or “W” for firms Certified by the City as Women/Minority Business Enterprise; **“O” = Non-certified others.**
- **Company Name, Address, Phone & Fax.** Provide company information for verification of payments.
- **Type of Ownership.** Indicate the Ethnicity and Gender of the owner of the subcontracting business.
- **Trade, Services, or Materials (NIGP code if Known)** Indicate the trade, service, or material provided by the subcontractor. Abbreviated list of NIGP is available at <http://www.tampagov.net/mbd> “Information Resources”.
- **Amount of Quote, Letters of Intent** (required for both SLBEs and WMBEs).
- **Percent of Work/Contract.** Indicate the percent of the total contract price the subcontract(s) represent. For CCNA only (i.e. Consultant A/E Services) you must indicate subcontracts as percent of total scope/contract.
- **Total Subcontract/Supplier Utilization.** – Provide total dollar amount of all subcontractors/suppliers projected to be used for the contract. (Dollar amounts may be optional in CCNA depending on solicitation format).
- **Total SLBE Utilization.** Provide total dollar amount for all projected SLBE subcontractors/Suppliers used for this contract. (Dollar amounts may be optional in CCNA proposals depending on the solicitation format).
- **Total WMBE Utilization.** Provide total dollar amount for all projected WMBE subcontractors/Suppliers used for this contract. (Dollar amounts may be optional in CCNA proposals depending on the solicitation format).
- **Percent SLBE Utilization.** Total amount allocated to SLBEs divided by the total bid/proposal amount.
- **Percent WMBE Utilization.** Total amount allocated to WMBEs divided by the total bid/proposal amount.

If additional information is required or you have questions, please contact the Equal Business Opportunity Program - Minority and Small Business Development Office at (813) 274-5522.

TAMPA BID BOND  
Contract 21-C-00027; Virginia Pump Station Rehabilitation

KNOW ALL MEN BY THESE PRESENTS, that we, \_\_\_\_\_

\_\_\_\_\_  
(hereinafter called the Principal) and \_\_\_\_\_

(hereinafter called the Surety) a Corporation chartered and existing under the laws of the State of \_\_\_\_\_, with its principal offices in the City of \_\_\_\_\_, and authorized to do business in the State of Florida, are held and firmly bound unto the City of Tampa, a Municipal Corporation of Hillsborough County, Florida, in the full and just sum of 5% of the amount of the (Bid) (Proposal) good and lawful money of the United States of America, to be paid upon demand of the City of Tampa, Florida, to which payment will and truly to be made we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally and firmly these presents.

WHEREAS, the Principal is about to submit, or has submitted to the City of Tampa, Florida, a Proposal for the construction of certain facilities for the City designated Contract 21-C-00027, Virginia Pump Station Rehabilitation.

WHEREAS, the Principal desires to file this Bond in accordance with law, in lieu of a certified Bidder's check otherwise required to accompany this Proposal.

NOW, THEREFORE: The conditions of this obligation are such that if the Proposal be accepted, the Principal shall, within twenty (20) days after the date of receipt of written Notice of Award, execute a contract in accordance with the Proposal and upon the terms, conditions and price set forth therein, in the form and manner required by the City of Tampa, Florida and execute a sufficient and satisfactory Public Construction Bond payable to the City of Tampa, Florida in an amount of one hundred percent (100%) of the total contract price, in form and with security satisfactory to said City, then this Bid Bond obligation is to be void; otherwise to be and remain in full force and virtue in law, and the Surety shall, upon failure of the Principal to comply with any or all of the foregoing requirements within the time specified above, immediately pay to the aforesaid City, upon demand, the amount thereof, in good and lawful money of the United States of America, not as a penalty, but as liquidated damages.

IN TESTIMONY THEREOF, the Principal and Surety have caused these presents to be duly signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Principal

\_\_\_\_\_

BY \_\_\_\_\_

TITLE \_\_\_\_\_

BY \_\_\_\_\_

TITLE \_\_\_\_\_

(SEAL)

\_\_\_\_\_  
Producing Agent

\_\_\_\_\_  
Producing Agent's Address

\_\_\_\_\_  
Name of Agency

\_\_\_\_\_  
The addition of such phrases as "not to exceed" or like import shall render the (Bid) (Proposal) non-responsive.

AGREEMENT

For furnishing all labor, materials and equipment, together with all work incidental thereto, necessary and required for the performance of the work for the construction of Contract 21-C-00027 in accordance with your Proposal dated \_\_\_\_\_, amounting to a total of \$ \_\_\_\_\_ as completed in accordance with subsections I-2.09 and I-2.10 of the Instruction to Bidders.

This AGREEMENT, made and entered into in triplicate, between the City of Tampa, Florida, hereinafter called the City, and \_\_\_\_\_ hereinafter called the Contractor, as of the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_ when the City Council of the City of Tampa, Florida adopted a Resolution authorizing, among other things, the Mayor's execution of this Agreement.

WITNESSETH that, in consideration of the mutual stipulations, agreements, and covenants herein contained, the parties hereto have agreed and hereby agree with each other, the Party of the First Part for itself, its successors and assigns, and the Party of the Second Part for itself, or himself, or themselves, and its successors and assigns, or his or their executors, administrators and assigns, as follows:

Contract 21-C-00027; Virginia Pump Station Rehabilitation, shall include, but not be limited to, furnishing all labor, materials, and equipment to remove and replace pumps, pump bases, risers, motors, concrete pedestals, valves and appurtenances, construction of a new submersible pump station including, but not limited to, two (2) 3hp NP3085 Flygt submersible pumps with mixed flush valves and bases, bypass pumping, riser pipes, discharge piping and valves, partial reconstruction of wet well, installing structural coating in wet well, electrical upgrades, installation of new discharge force main, removal and installation of wastewater gravity sewer pipes, removal of existing pavement, ditch and curbs, regrading of existing roadway, installation of brick pavement, installation of storm pipes, inlets, storm structures, outfall structure, rip rap, removal and installation of new water main and services with all associated work required for a complete project in accordance with the Contract Documents.

Contract Documents referred to in Article 1.01 of this Agreement also includes this volume, applicable standard drawings, the plans and any provisions referred to whether actually attached or not.

# TAMPA AGREEMENT

## SECTION 1 GENERAL

### ARTICLE 1.01 THE CONTRACT

Except for titles, subtitles, headings, running headlines, and tables of contents (all of which are printed herein merely for convenience), the following, except for such portions thereof as may be specifically excluded, constitute the Contract:

The Notice to Bidders;  
The Instructions to Bidders, including Special Instructions and General Instructions;  
The Proposal;  
The Bid Bond;  
The Certification of Nonsegregated Facilities;  
The Notice of Award;  
The Agreement;  
The Performance Bond;  
The Notice To Proceed;  
The Specifications, including the General Provisions, the Workmanship and Materials, the Specific Provisions or the Contract Items  
The Plans;  
All Supplementary Drawings Issued after award of the Contract;  
All Addenda issued by the City prior to the receipt of proposals;  
All provisions required by law to be inserted in this Contract, whether actually inserted or not.

### ARTICLE 1.02 DEFINITIONS

The following words and terms, or pronouns used in their stead, shall, wherever they appear in this Contract, be construed as follows, unless different meaning is clear from the context:

(a)"City" shall mean the City of Tampa, Florida, represented by its Mayor and City Council, Party of the First Part, or such other City official as shall be duly empowered to act for the City on matters relating to this Contract.

(b)"Contractor" shall mean the Party of the Second Part hereto, whether corporation, firm or individual, or any combination thereof, and its, their, or his successors, personal representatives, executors, administrators, and assigns, and any person, firm or corporation who or which shall at any time be substituted in the place of the Party of the Second Part under this Contract.

(c)"Engineer" shall mean the Director of the Department or his duly authorized representative.

(d)"Consultant" shall mean the engineering or architectural firm or individual employed by the City to consult with and advise the City in the construction of the project.

(e)"Surety" shall mean any person, firm or corporation that has executed as Surety the Contractor's Performance Bond securing the performance of this Contract.

(f)"The Work" shall mean everything expressly or implied required to be furnished and done by the Contractor under the Contract, and shall include both Contract Work

and Extra Work.

(g)"Contract Work" shall mean everything expressly or implied required to be furnished and done by the Contractor by any one or more of the Contract parts referred to in Article 1.01 hereof, except Extra Work, as hereinafter defined; it being understood that, in case of any inconsistency in or between any part or parts of this Contract, the Engineer shall determine which shall prevail.

(h)"Contract" or "Contract Documents" shall mean each of the various part of the Contract referred to in Article 1.01 hereof, both as a whole and severally.

(i)"Extra Work" shall mean work other than that required either expressly or implied by the contract in its present form.

(j)"Plans" shall mean only those drawings specifically referred to as such in these documents, or in any Addendum. Drawings issued after the execution of the Contract to explain further, or to illustrate, or to show changes in the work, will be known as "Supplementary Drawings" and shall be binding upon the Contractor with the same force as the Plans.

(k)"Specifications" shall mean all of the directions, requirements, and standards of performance applying to the work, as hereinafter detailed and designated as such, or which may be issued in an addendum.

(l)"Addendum or Addenda" shall mean the additional contract provisions issued in writing prior to the receipt of bids.

(m)"Notice" shall mean written notice. Notice shall be served upon the Contractor, either personally or by leaving the said notice at his residence or with any employee found on the work, or addressed to the Contractor at the residence or place of business given in his proposal and deposited in a postpaid wrapper in any post office box regularly maintained by the United States Post Office.

(n)"Project" shall mean the entire improvement package or related work. The "project" may consist of several different, but related, contracts.

(o)"Site" shall mean, and be limited to, the area upon or in which the Contractor's operations are carried on and such other appropriate areas as may be designed as such by the Engineer.

(p)"Subcontractor" shall mean any person, firm, or corporation, other than employees of the Contractor, who or which contracts with the Contractor to furnish, or actually furnishes labor, or labor and materials, or labor and equipment or labor, materials, and equipment at the site.

(q)Whenever in the Contract the words "directed", "required", "permitted", "ordered", "designated", "prescribed", and words of like import are used, they shall imply the direction, requirement, permission, order, designation, or prescription of the Engineer; and "approved", "acceptable", "satisfactory", "in the judgement of", and words of like import shall mean approved by, or acceptable to, or satisfactory to, or in the judgment of the Engineer.

(r)Whenever in the Contract the word "day" is used, it shall mean calendar day.

(s)"Final Acceptance" shall mean acceptance of the

work as evidenced by an official resolution of the City. Such acceptance shall be deemed to have taken place only if and when an approving resolution has been adopted by the City Council. The final acceptance shall be signed only after the City has assured itself by tests, inspection, or otherwise, that all of the provisions of the Contract have been carried out to its satisfaction.

(t)"Eastern Standard Time" shall be construed as the time being observed in the City on the day proposals are received or other documents issued or signed.

## **SECTION 2 POWERS OF THE CITY'S REPRESENTATIVES**

### **ARTICLE 2.01 THE ENGINEER**

It is covenanted and agreed that the Engineer, in addition to those matters elsewhere herein expressly made subject to his determination, direction, or approval, shall have the power, subject to such express provisions and limitations herein contained as are not in conflict herewith, and subject to review by the Mayor and City Council:

(a)To monitor the performance of the work.

(b)To determine the amount, kind, quality, sequence, and location of the work to be paid for hereunder and, when completed, to measure such work for payment.

(c)To determine all questions of an engineering character in relation to the work, to interpret the Plans, Specifications and Addenda.

(d)To determine how the work of this Contract shall be coordinated with the work of other contractors engaged simultaneously on this project.

(e)To make minor changes in the work as he deems necessary, provided such changes do not result in a net increase in the cost to the City or to the Contractor of the work to be done under the Contract.

(f)To amplify the Plans, add explanatory information and furnish additional Specifications and Drawings consistent with the intent of the Contract Documents.

The power of the Engineer shall not be limited to the foregoing enumeration, for it is the intent of this Contract that all of the work shall be subject to his determinations and approval, except where the determination or approval of someone other than the Engineer is expressly called for herein and except as subject to review by the Mayor and City Council. All orders of the Engineer requiring the Contractor to perform work as Contract work shall be promptly obeyed by the Contractor.

The Engineer shall not, however, have the power to issue an extra work order, and the performance of such work on the order of the Engineer without previously obtaining written confirmation thereof from the Mayor in accordance with Article 7.02 hereof may constitute a waiver of any right to extra compensation therefor. The Contractor is warned that the Engineer has no power to change the terms and provisions of this Contract, except minor changes where such change results in no net increase in the Contract Price.

### **ARTICLE 2.02 DIRECTOR**

The Director of the Department in addition to those matters

expressly made subject to his determination, direction or approval in his capacity as "Engineer", shall also have the power:

(a)To review any and all questions in relation to this Contract and its performance, except as herein otherwise specifically provided, and his determination upon such review shall be final and conclusive upon the Contractor.

(b)With the approval of the Mayor and City Council to authorize modifications or changes in the Contract so as to require: (1) the performance of extra work, or (2) the omission of Contract work whenever he deems it in the interest of the City to do so, or both.

(c)To suspend the whole or any part of the work whenever, in his judgment, such suspension is required: (1) in the interest of the City generally, or (2) to coordinate the work of the various Contractors engaged on this project, or (3) to expedite the completion of the entire project, even though the completion of this particular Contract may be thereby delayed, without compensation to the Contractor for such suspension other than extending the time for the completion of the work, as much as it may have been, in the opinion of the City, delayed by such a suspension.

(d)If, before the final acceptance of all the work contemplated herein, it shall be deemed necessary to take over, use, occupy, or operate any part of the completed or partly completed work, the Engineer shall have the right to do so and the Contractor will not, in any way, interfere with or object to the use, occupation, or operation of such work by the City after receipt of notice in writing from the Engineer that such work or part thereof will be used by the City on and after the date specified in such notice. Such taking over, use, occupancy or operation of any part of the completed or partially completed work shall not constitute final acceptance or approval of any such part of the work.

### **ARTICLE 2.03 NO ESTOPPEL**

The City shall not, nor shall any department, officer, agent, or employee thereof, be bound, precluded, or estopped by any determination, decision, acceptance, return, certificate, or payment made or given under or in connection with this Contract by any officer, agent or employee of the City at any time either before or after final completion and acceptance of the work and payment therefor: (a) from showing the true and correct classification, amount, quality, or character of the work done, or that any determination, decision, acceptance, return certificate or payment is untrue, incorrect or improperly made in any particular, or that the work or any part thereof does not in fact conform to the requirements of the Contract Documents, and (b) from demanding and recovering from the Contractor any overpayments made to him or such damages as it may sustain by reason his failure to comply with the requirements of the Contract of Documents, or both.

### **ARTICLE 2.04 NO WAIVER OF RIGHTS**

Neither the inspection, nor any order, measurements or certificate of the City or its employees, officers, or agents, nor by any order of the City for payment of money, nor any money, nor payments for or acceptance of the whole or any part of the work by the City, nor any extension of time, nor any changes in the Contract, Specifications or Plans, nor any possession by the City or its employees shall operate as a



waiver of any provisions of this Contract, nor any power herein provided nor shall any waiver of any breach of this Contract be held as a waiver of any other subsequent breach.

Any remedy provided in this Contract shall be taken and construed as cumulative, namely, in addition to each and every other suit, action, or legal proceeding. The City shall be entitled as of right to an injunction against any breach of the provisions of this Contract.

### **SECTION 3 PERFORMANCE OF WORK**

#### **ARTICLE 3.01 CONTRACTOR'S RESPONSIBILITY**

The Contractor shall do all the work and furnish, at his own cost and expense, all labor, materials, equipment, and other facilities, except as herein otherwise provided, as may be necessary and proper for performing and completing the work under this Contract. The Contractor shall be responsible for the entire work until completed and finally accepted by the City.

The work shall be performed in accordance with the true intent and meaning of the Contract Documents. Unless otherwise expressly provided, the work must be performed in accordance with the best modern practice, with materials as specified and workmanship of the highest quality, all as determined by and entirely to the satisfaction of the Engineer.

Unless otherwise expressly provided, the means and methods of construction shall be such as the Contractor may choose, subject, however, to the approval of the Engineer. Only adequate and safe procedure, methods, structures and equipment shall be used. The Engineer's approval or the Engineer's failure to exercise his right thereon shall not relieve the Contractor of obligations to accomplish the result intended by the Contract, nor shall such create a cause of action for damages.

#### **ARTICLE 3.02 COMPLIANCE WITH LAWS**

The Contractor must comply with all local, State and Federal laws, rules, ordinances and regulations applicable to this Contract and to the work done hereunder, and must obtain, at his own expense, all permits, licenses or other authorization necessary for the prosecution of the work.

No work shall be performed under this Contract on Sundays, legal holidays or after regular working hours without the express permission of the Engineer. Where such permission is granted, the Engineer may require that such work be performed without additional expense to the City.

#### **ARTICLE 3.03 INSPECTION**

During the progress of the work and up to the date of final acceptance, the Contractor shall, at all times, afford the representatives of the City, the Florida Department of Environmental Regulation, and if applicable, the Federal Environmental Protection Agency and the Federal Department of Labor every reasonable, safe and proper facility for inspecting the work done or being done at the

site. The inspection of any work shall not relieve the Contractor of any of his obligations to perform proper and satisfactory work as herein specified. Finished or unfinished work found not to be in strict accordance with the Contract shall be replaced as directed by the Engineer, even though such work may have been previously approved and payment made therefor.

The City shall have the right to reject materials and workmanship which are defective or require their correction. Rejected work and materials must be promptly removed from the site, which must at all times be kept in a reasonably clean and neat condition.

Failure or neglect on the part of the City to condemn or reject bad or inferior work or materials shall not be construed to imply an acceptance of such work or materials, if it becomes evident at any time prior to the final acceptance of the work by the City. Neither shall it be construed as barring the City at any subsequent time from the recovery of damages of such a sum of money as may be needed to build anew all portions of the work in which inferior work or improper materials were used, wherever found.

Should it be considered necessary or advisable by the City at any time before final acceptance of the entire work to make examinations of work already completed, by removing or tearing out all or portions of such work, the Contractor shall, on request, promptly furnish all necessary facilities, labor, and material for that purpose. If such work is found to be defective in any material respect, due to the fault of the Contractor or his subcontractors, he shall defray all expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the cost of examination and restoration of the work shall be considered an item of extra work to be paid for in accordance with the provisions of Article 7.02 hereof.

#### **ARTICLE 3.04 PROTECTION**

During performance and until final acceptance, the Contractor shall be under an absolute obligation to protect the finished and unfinished work against any damage, loss, or injury. The Contractor shall take proper precaution to protect the finished work from loss or damage, pending completion and the final acceptance of all the work included in the entire Contract, provided that such precaution shall not relieve the Contractor from any and all liability and responsibility for loss or damage to the work occurring before final acceptance by the City. Such loss or damage shall be at the risk of and borne by the Contractor, whether arising from acts or omissions of the Contractor or others. In the event of any such loss or damage, the Contractor shall forthwith repair, replace, and make good the work without extension of time therefor, except as may be otherwise provided herein.

The provisions of this Article shall not be deemed to create any new right of action in favor of third parties against the Contractor or the City.

#### **ARTICLE 3.05 PRESERVATION OF PROPERTY**

The Contractor shall preserve from damage all property along the line of the work, or which is in the vicinity of or is in anywise affected by the work, the removal or destruction of which is not called for by the Plans. This applies, but is not limited, to the public utilities, trees, lawn areas, building monuments, fences, pipe and underground structures, public streets (except natural wear and tear of streets resulting from legitimate use thereof by the Contractor), and wherever such property is damaged due to the activities of the Contractor, it shall be immediately restored to its original condition by the Contractor and at his own expense.

In case of failure on the part of the Contractor to restore such property, or make good such damage or injury, the City may, upon forty-eight (48) hour written notice, proceed to repair, rebuild, or otherwise restore such property as may be deemed necessary, and the cost thereof will be deducted from any monies due or which may become due the Contractor under this Contract. Nothing in this clause shall prevent the Contractor from receiving proper compensation for the removal, damage, or replacement of any public or private property not shown on the Plans, when this is made necessary by alteration of grade or alignment authorized by the Engineer, provided that such property has not been damaged through fault of the Contractor, his employees or agents.

**ARTICLE 3.06 BOUNDARIES**

The Contractor shall confine his equipment, apparatus, the storage of materials, supplies and apparatus of his workmen to the limits indicated on the plans, by law, ordinances, permits or direction of the Engineer.

**ARTICLE 3.07 SAFETY AND HEALTH REGULATIONS**

The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91- 596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL91-54).

**ARTICLE 3.08 TAXES**

All taxes of any kind and character payable on account of the work done and materials furnished under this Contract shall be paid by the Contractor and shall be deemed to have been included in his bid. The laws of the State of Florida provide that sales and use taxes are payable by the Contractor upon the tangible personal property incorporated in the work and such taxes shall be paid by the Contractor and shall be deemed to have been included in his bid.

**ARTICLE 3.09 ENVIRONMENTAL CONSIDERATIONS**

The Contractor, in the performance of the work under this Contract, shall comply with all Local, State and Federal laws, statutes, ordinances, rules and regulations applicable to protection of the environment; and, in the event he violates any of the provisions of same, he shall be answerable to the Local, State and Federal agencies designated by law to protect the environment. In the event the City receives, from any of the environmental agencies, a citation which is occasioned by an act or omission of the Contractor or his

subcontractor or any officers, employees or agents of either, it is understood and agreed that the Contractor shall automatically become a party-respondent under said citation; and the City immediately shall notify the Contractor and provide him with a copy of said citation.

The Contractor shall comply with the requirements of the citation and correct the offending condition(s) within the time stated in said citation and further shall be held fully responsible for all fines and/or penalties.

**SECTION 4  
TIME PROVISIONS**

**ARTICLE 4.01 TIME OF START AND COMPLETION**

The Contractor must commence work within thirty (30) days subsequent to the date of the receipt of the "Notice to Proceed" by the City unless otherwise provided in the Specific Provisions and Special Instructions. Time being of the essence of this Contract, the Contractor shall thereafter prosecute the work diligently, using such means and methods of construction as well as secure its full completion in accordance with the requirements of the Contract Documents no later than the date specified therefor, or on the date to which the time for completion may be extended.

The Contractor must complete the work covered by this Contract in the number of consecutive calendar days set forth in the Instructions to Bidders, unless the date of completion is extended pursuant to the provisions of Article 4.05 hereof.

The period for performance shall start from the date of signing of this Agreement by the City.

The actual date of completion will be established after a final inspection as provided in Article 4.07 hereof.

**ARTICLE 4.02 PROGRESS SCHEDULE**

To enable the work to be laid out and prosecuted in an orderly and expeditious manner, the Contractor shall submit to the Engineer a proposed progress schedule within fifteen (15) days after the award of this Contract.

The schedule shall state the Contract starting date, time for completion and date of completion and shall show the anticipated time of starting and completion of each of the various operations to be performed under this Contract, together with all necessary and appropriate information regarding sequence and correlation of work and an estimated time required for the delivery of all materials and equipment required for the work. The proposed schedule shall be revised as directed by the Engineer until finally approved by him, and, after such approval, shall be strictly adhered to by the Contractor. The approved progress schedule may be changed only with the written permission of the Engineer.

If the Contractor shall fail to adhere to the approved progress schedule or the schedule as revised, he shall promptly adopt such other or additional means and methods of construction as will make up for the time lost, and will assure completion in accordance with the contract time.

**ARTICLE 4.03 APPROVAL REQUESTS**

From time to time, as the work progresses and in the sequence indicated by the approved schedule, the Contractor must submit to the Engineer a specific request, in writing, for each item of information or approval required of him by the Contract. These requests must be submitted sufficiently in advance of the date upon which the information or approval is actually required by the Contractor to allow for the time the Engineer may take to act upon such submissions or resubmissions. The Contractor shall not have any right to an extension of time on account of delays due to his failure to submit his requests for the required information or the required approval in accordance with these requirements.

**ARTICLE 4.04 COORDINATION WITH OTHER CONTRACTORS**

During progress of the work, other Contractors may be engaged in performing other work on this project or on other projects on the site. In that event, the Contractor shall coordinate the work to be done hereunder with the work of such other Contractors in such manner as the Engineer may direct.

**ARTICLE 4.05 EXTENSION OF TIME**

If such an application is made, the Contractor shall be entitled to an extension of time for delay in completion of the work should the Contractor be obstructed or delayed in the commencement, prosecution or completion of any part of said work by any act or delay of the City, or by acts or omissions of other Contractors on this project, or by a riot, insurrection, war, pestilence, acts of public authorities, fire, lightning, hurricanes, earthquakes, tornadoes, floods, extremely abnormal and excessive inclement weather as indicated by the records of the local weather bureau for a five-year period preceding the date of the Contract, or by strikes, or other causes, which causes of delay mentioned in this Article, in the opinion of the City, are entirely beyond the expectation and control of the Contractor.

The Contractor shall, however, be entitled to an extension of time for such causes only for the number of days of delay which the City may determine to be due solely to such causes and only to the extent that such occurrences actually delay the completion of the project and then only if the Contractor shall have strictly complied with all of the requirements of Articles 4.01, 4.02, 4.03 and 4.04 hereof. It is hereby understood that the determination by the Engineer as to the order and sequence of the work shall not in itself constitute a basis for extension of time.

The determination made by the City on an application for an extension of time shall be binding and conclusive on the Contractor.

Delays caused by failure of the Contractor's materialmen, manufacturers, and dealers to furnish approved working drawings, materials, fixtures, equipment, appliances, or other fittings on time or failure of subcontractors to perform their work shall not constitute a basis of extension of time.

The Contractor agrees to make no claim for damages for delay in the performance of this Contract occasioned by any

act or omission to act of the City or any of its representatives or because of any injunction which may be brought against the City or its representatives and agrees that any such claim shall be fully compensated for by an extension of time to complete performance of the work as provided herein.

**ARTICLE 4.06 LIQUIDATED DAMAGES**

It is mutually agreed between the parties that time is the essence of this Contract and that there will be on the part of the City considerable monetary damage in the event the Contractor should fail to complete the work within the time fixed for completion in the Contract or within the time to which such completion may have been extended.

The amount per day set forth in the Instructions to Bidders is hereby agreed upon as the liquidated damages for each and every calendar day that the time consumed in completing the work under this Contract exceeds the time allowed.

This amount shall, in no event, be considered as a penalty or otherwise than as the liquidated and adjusted damages to the City because of the delay and the Contractor and his Surety agree that the stated sum per day for each such day of delay shall be deducted and retained out of the monies which may become due hereunder and if not so deductible, the Contractor and his Surety shall be liable therefor.

**ARTICLE 4.07 FINAL INSPECTION**

When the work has been completed in accordance with the requirements of the Contract and final cleaning up performed, a date for final inspection of the work by the Engineer shall be set by the Contractor in a written request therefor, which date shall be not less than ten (10) days after the date of such request. The work will be deemed complete as of the date so set by the Contractor if, upon such inspection, the Engineer determines that no further work remains to be done at the site.

If such inspection reveals interms of work still to be performed, however, the Contractor shall promptly perform them and then request a reinspection. If, upon such inspection, the Engineer determines that the work is complete, the date of final completion shall be deemed to be the last day of such reinspection.

**SECTION 5  
SUBCONTRACTS AND ASSIGNMENTS**

**ARTICLE 5.01 LIMITATIONS AND CONSENT**

The Contractor shall not assign, transfer, convey, sublet or otherwise dispose of this Contract or of his right, title, or interest therein, or his power to execute such Contract, or to assign any monies due or to become due thereunder to any other person, firm or corporation unless the previous written consent of the City shall first be obtained thereto and the giving of any such consent to a particular subcontract or assignment shall not dispense with the necessity of such consent to any further or other assignment.

Before making any subcontract, the Contractor must submit a

written statement to the Engineer, giving the name and address of the proposed contractor, the portion of the work and materials which he is to perform and furnish and any other information tending to prove that the proposed subcontractor has the necessary facilities, skill, integrity, past experience and financial resources to perform the work in accordance with the terms and conditions of this Contract.

If the City finds that the proposed subcontractor is qualified, the Contractor will be notified in writing. The City may revoke approval of any subcontractor when such subcontractor evidences an unwillingness or inability to perform his work in strict accordance with these Contract Documents. Notice of such revocation of approval will be given in writing to the Contractor.

The Contractor will promptly, upon request, file with the City a conformed copy of the subcontract. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of these Contract Documents, insofar as applicable to the work of subcontractors, and to give the Contractor the same power as regards terminating any subcontracts that the City may exercise over the Contractor under provisions of these Contract Documents.

The Contractor shall be required to perform with his own forces at least twenty-five (25) percent of the work, unless written consent to subcontract a greater percentage of the work is first obtained from the City.

**ARTICLE 5.02 RESPONSIBILITY**

The approval by the City of a subcontractor shall not relieve the Contractor of any of his responsibilities, duties, and liabilities hereunder. The Contractor shall be solely responsible to the City for the acts or defaults or omissions of his subcontractor and of such subcontractor's officers, agents, and employees, each of whom shall for all purposes be deemed to be the agent or employee of the Contractor. Nothing contained in the Contract Documents shall create any contractual relationship between any subcontractor and the City.

**SECTION 6  
SECURITY AND GUARANTY**

**ARTICLE 6.01 CONTRACT SECURITY**

The Contractor shall execute and deliver to the City a Performance Bond on the form as provided herein, in an amount at least equal to one hundred (100) percent of the full Contract price, such Bond to be executed by a surety company acceptable to the City. The surety on such Performance Bond shall be a surety company duly authorized to do business in the State of Florida, and the Bond shall be issued or countersigned by a local resident producing agent of such surety company who is a resident of the State of Florida, regularly commissioned and licensed in said State, and satisfactory evidence of the authority of the person or persons executing such Bond shall be submitted with the Bond. The Performance Bond shall serve as security for the faithful performance of this Contract, including

maintenance and guaranty provisions, and for the payment of all persons performing labor and furnishing materials in connection with the Contract. The premiums on the Performance Bond shall be paid by the Contractor.

If, at any time, the City shall become dissatisfied with any surety or sureties then upon the Performance Bond, or if for any other reason such bond shall cease to be adequate security for the City, the Contractor shall, within five days after notice so to do, substitute an acceptable Bond in such form and sum and signed by such other sureties as may be satisfactory to the City. The premiums on such Bond shall be paid by the Contractor. No further partial payments shall be deemed due or shall be made until the new sureties have qualified.

**ARTICLE 6.02 CONTRACTORS INSURANCE**

Insurance required shall be as indicated on Special Instructions pages beginning with "INS-1"

**ARTICLE 6.03 AGAINST CLAIMS AND LIENS**

The City may withhold from the Contractor as much as any approved payments to him as may, in the opinion of the City, be necessary to secure (a) just claims of any persons supplying labor or materials to the Contractor or any of his subcontractors for the work then due and unpaid; (b) loss due to defective work not remedied, or (c) liability, damage, or loss due to injury to persons or damages to the work or property of other contractors, subcontractors, or others, caused by the act or neglect of the Contractor or of any of his subcontractors. The City shall have the right, as agent for the Contractor, to apply any such amounts so withheld in such manner as the City may deem proper to satisfy such claims or to secure such protection. Such application of such money shall be deemed payments for the account of the Contractor.

**ARTICLE 6.04 MAINTENANCE AND GUARANTY**

The Contractor hereby guarantees all the work furnished under this Contract against any defects in workmanship and materials for a period of one year following the date of final acceptance of the work by the City. Under this guarantee, the Contractor hereby agrees to make good, without delay, at his own expense, any failure of any part of the work due to faulty materials or manufacture, construction, or installation, or the failure of any equipment to perform satisfactorily all the work put upon it within the limits of the Contract Documents, and further, shall make good any damage to any part of the work caused by such failure. It is hereby agreed that the Performance Bond shall fully cover all guarantees contained in this Article.

It is also agreed that all warranties, expressed or implied, inure to the benefit of the City and are enforceable by the City.

**SECTION 7  
CHANGES**

**ARTICLE 7.01 MINOR CHANGES**

The City reserves the right to make such additions, deductions, or changes to this Contract from time to time as

it deems necessary and in a manner not materially affecting the substance thereof or materially changing the price to be paid in order to carry out and complete more fully and perfectly the work herein agreed to be done and performed. This Contract shall in no way be invalidated by any such additions, deductions, or changes, and no claim by the Contractor shall be made for any loss of anticipated profits thereby.

Construction conditions may require that minor changes be made in the location and installation of the work and equipment to be furnished and other work to be performed hereunder, and the Contractor when ordered by the Engineer, shall make such adjustments and changes in said locations and work as may be necessary, without additional cost to the City, provided such adjustments and changes do not alter the character, quantity or cost of the work as a whole, and provided further that Plans and Specifications showing such adjustments and changes are furnished to the Contractor by the City within a reasonable time before any work involving such adjustment and changes is begun. The Engineer shall be the sole judge of what constitutes a minor change for which no additional compensation shall be allowed.

#### **ARTICLE 7.02 EXTRA WORK**

The City may at any time by a written order and without notice to the sureties require the performance of such extra work as it may find necessary or desirable. An order for extra work shall be valid only if issued in writing and signed by the Mayor and the work so ordered must be performed by the Contractor.

The amount of compensation to be paid to the Contractor for any extra work as so ordered shall be determined as follows:

(a) By such applicable unit prices, if any, as are set forth in the Proposal; or

(b) If no such unit prices are set forth then by a lump sum or other unit prices mutually agreed upon by the City and the Contractor; or

(c) If no such unit prices are set forth in the Proposal and if the parties cannot agree upon a lump sum or other unit prices then by the actual net cost in money to the Contractor of the extra work performed, which cost shall be determined as follows:

(1) For all labor and foreman in direct charge of the authorized operations, the Contractor shall receive the current local rate of wages to be agreed upon, in writing, before starting such work for each hour that said labor and foremen are actually engaged thereon, to which shall be added an amount equal to 25 percent of the sum thereof which shall be considered and accepted as full compensation for general supervision, FICA taxes, contributions under the Florida Unemployment Compensation Act, insurance, bond, subcontractor's profit and overhead, the furnishing of small tools and miscellaneous equipment used, such as picks, shovels, hand pumps, and similar items.

(2) For all materials used, the Contractor shall receive the actual cost of such materials delivered at the site or previously approved delivery point as established by original receipted bills. No percentage shall be added to this cost.

(3) For special equipment and machinery such as power-driven pumps, concrete mixers, trucks, and tractors, or other equipment, required for the economical performance of the authorized work, the Contractor shall receive payment based on the average local area rental price for each item of equipment and the actual time of its use on the work. No percentage shall be added to this sum.

(4) Records of extra work done under this procedure shall be reviewed at the end of each day by the Contractor or his representative and the Engineer. Duplicate copies of accepted records shall be made and signed by both Contractor or his representative and the Engineer, and one copy retained by each.

Request for payment for approved and duly authorized extra work shall be submitted in the same form as Contract work or in the case of work performed under paragraph (c) (1) above upon a certified statement supported by receipted bills. Such statement shall be submitted for the current Contract payment for the month in which the work was done.

#### **ARTICLE 7.03 DISPUTED WORK**

If the Contractor is of the opinion that any work required, necessitated, or ordered violates the terms and provisions of this Contract, he must promptly notify the Engineer, in writing, of his contentions with respect thereto and request a final determination thereof. If the Engineer determines that the work in question is Contract work and not extra work or that the order complained of is proper, he will direct the Contractor to proceed and the Contractor shall promptly comply. In order, however, to reserve his right to claim compensation for such work or damages resulting from such compliance, the Contractor must, within five (5) days after receiving notice of the Engineer's determination and direction, notify the City in writing that the work is being performed or that the determination and direction is being complied with under protest. Failure of the Contractor to notify shall be deemed as a waiver of claim for extra compensation or damages therefor.

Before final acceptance by the City, all matters of dispute must be adjusted to the mutual satisfaction of the parties thereto. Final determinations and decisions, in case any questions shall arise, shall constitute a condition precedent to the right of the Contractor to receive the money therefor until the matter in question has been adjusted.

#### **ARTICLE 7.04 OMITTED WORK**

The City may at any time by a written order and without notice to the sureties require the omission of such Contract work as it may find necessary or desirable.

An order for omission of work shall be valid only if signed by the Mayor and the work so ordered must be omitted by the Contractor. The amount by which the Contract price shall be reduced shall be determined as follows:

(a) By such applicable unit prices, if any, as are set forth in the Contract; or

(b) By the appropriate lump sum price set forth in the Contract; or

(c) By the fair and reasonable estimated cost to the City

of such omitted work as determined by the Engineer and approved by the City.

## **SECTION 8 CONTRACTOR'S EMPLOYEES**

### **ARTICLE 8.01 CHARACTER AND COMPETENCY**

The Contractor and his subcontractors shall employ upon all parts of the work herein contracted for only competent, skillful, and trustworthy workers. Should the Engineer at any time give notice, in writing, to the Contractor or his duly authorized representative on the work that any employee in his opinion is incompetent, unfaithful, disorderly, careless, unobservant of instructions, or in any way a detriment to the satisfactory progress of the work, such employee shall immediately be dismissed and not again allowed upon the site.

### **ARTICLE 8.02 SUPERINTENDENCE**

The Contractor shall give his personal supervision to the faithful prosecution of the work and in case of his absence shall have a competent, experienced, and reliable supervisor or superintendent, acceptable to the Engineer on the site who shall follow without delay all instructions of the Engineer in the prosecution and completion of the work and every part thereof, in full authority to supply workers, material, and equipment immediately. He shall keep on hand at all times copies of the Contract Documents.

### **ARTICLE 8.03 EMPLOYMENT OPPORTUNITIES**

The Contractor shall, in the performance of the work required to be done under this Contract, employ all workers without discrimination regarding race, creed, color, sex or national origin and must not maintain or provide facilities that are segregated on the basis of race, color, creed or national origin.

### **ARTICLE 8.04 RATES OF WAGES**

On federally assisted projects, the rates of wages to be paid under this Contract shall not be less than the rates of wages set forth in Section 12 of this Agreement.

On other projects, no wage rate determination is included. Florida's Prevailing Wage Law (Section 215.19, Florida Statutes) was repealed effective April 25, 1979.

### **ARTICLE 8.05 PAYROLL REPORTS**

The Contractor and each subcontractor shall, if requested to do so, furnish to the Engineer a duly certified copy of his payroll and also any other information required by the Engineer to satisfy him that the provisions of the law as to the hours of employment and rate of wages are being observed.

Payrolls shall be prepared in accordance with instructions furnished by the City and on approved forms. The Contractor shall not carry on his payroll any persons not employed by him. Subcontractor's employees shall be carried only on the payrolls of the employing subcontractor.

## **SECTION 9 CONTRACTOR'S DEFAULT**

### **ARTICLE 9.01 CITY'S RIGHT AND NOTICE**

It is mutually agreed that: (a) if the Contractor fails to begin work when required to do so, or (b) if at any time during the progress of the work it shall appear to the Engineer that the Contractor is not prosecuting the work with reasonable speed, or is delaying the work unreasonably and unnecessarily, or (c) if the force of workmen or quality or quantity of material furnished are not sufficient to insure completion of the work within the specified time and in accordance with the Specifications hereto attached, or (d) if the Contractor shall fail to make prompt payments for materials or labor or to subcontractors for work performed under the Contract, or (e) if legal proceedings have been instituted by others than the City in such manner as to interfere with the progress of the work and may subject the City to peril of litigation or outside claims of (f) if the Contractor shall be adjudged a bankrupt or make an assignment for the benefit of creditors, or (g) if in any proceeding instituted by or against the Contractor an order shall be made or entered granting an extension of time of payment, composition, adjustment, modification, settlement or satisfaction of his debts or liabilities, or (h) if a receiver or trustee shall be appointed for the Contractor or the Contractor's property, or (i) if the Contract or any part thereof shall be sublet without the consent of the City being first obtained in writing, or (j) if this Contract or any right, monies, or claim thereunder shall be assigned by the Contractor, otherwise than as herein specified, or (k) if the Contractor shall fail in any manner of substance to observe the provisions of this Contract, or (l) if any of the work, machinery, or equipment shall be defective, and shall not be replaced as herein provided, or (m) if the work to be done under this Contract shall be abandoned, then such fact or conditions shall be certified by the Engineer and thereupon the City without prejudice to any other rights or remedies of the City, shall have the right to declare the Contractor in default and so notify the Contractor by a written notice, setting forth the ground or grounds upon which such default is declared and the Contractor must discontinue the work, either as a portion of the work or the whole thereof, as directed.

### **ARTICLE 9.02 CONTRACTOR'S DUTY UPON DEFAULT**

Upon receipt of notice that his Contract is in default, the Contractor shall immediately discontinue all further operations on the work or such part thereof, and shall immediately quit the site or such part thereof, leaving untouched all plant, materials, equipment, tools, and supplies.

### **ARTICLE 9.03 COMPLETION OF DEFAULTED WORK**

The City, after declaring the Contractor in default, may then have the work completed or the defective equipment or machinery replaced or anything else done to complete the work in strict accordance with the Contract Documents by such means and in such manner, by Contract with or without public letting, or otherwise, as it may deem advisable,

utilizing for such purpose without additional cost to the City such of the Contractor's plant, materials, equipment, tools, and supplies remaining on the site, and also such subcontractors as it may deem advisable.

The City shall reimburse all parties, including itself, for the expense of such completion, including liquidated damages, if any, and the cost of reletting. The City shall deduct this expense from monies due or to become due to the Contractor under this Contract, or any part thereof, and in case such expense is more than the sum remaining unpaid of the original contract price, the Contractor and his sureties shall pay the amount of such deficiency to the City.

#### **ARTICLE 9.04 PARTIAL DEFAULT**

In case the City shall declare the Contractor in default as to a part of the work only, the Contractor shall discontinue such part, shall continue performing the remainder of the work in strict conformity with the terms of the Contract, and shall in no way hinder or interfere with any other contractor or person whom the City may engage to complete the work as to which the Contractor was declared in default.

### **SECTION 10 PAYMENTS**

#### **ARTICLE 10.01 PRICES**

For the Contractor's complete performance of the work, the City will pay and the Contractor agrees to accept, subject to the terms and conditions hereof, the lump sum prices or unit prices in the Contractor's Proposal and the award made therein, plus the amount required to be paid for any extra work ordered under Article 7.02 hereof, less credit for any work omitted pursuant to Article 7.04 hereof. Under unit price items, the number of units actually required to complete the work under the Contract may be more than stated in the Proposal. The Contractor agrees that no claim will be made for any damages or for loss of profits because of a difference between the quantities of the various classes of work assumed and stated in the Proposal Form as a basis for comparing Proposals and the quantities of work actually performed.

The sum as awarded for any lump sum Contract or lump sum Contract Item shall represent payment in full for all of the various classes of work, including materials, equipment, and labor necessary or required to complete, in conformity with the Contract Document, the entire work shown, indicated or specified under the lump sum Contract or lump sum Contract Item.

The amount as awarded as a unit price for any unit price Contract Item shall represent payment in full for all the materials, equipment, and labor necessary to complete, in conformity with the Contract Documents, each unit of work shown, specified, or required under the said unit price Contract Item.

No payment other than the amount as awarded will be made for any class of work included in a lump sum Contract Item or a unit price Contract Item, unless specific provision is

made therefor in the Contract Documents.

#### **ARTICLE 10.02 SUBMISSION OF BID BREAKDOWN**

Within fifteen (15) days after the execution of this Contract, the Contractor must submit to the Engineer in duplicate an acceptable breakdown of the lump sums and unit prices bid for items of the Contract, showing the various operations to be performed under the Contract, as described in the progress schedule required under Article 4.02 hereof, and the value of each of such operations, the total of such items to equal the total price bid. The Contractor shall also submit such other information relating to the bid prices as may be required and shall revise the bid breakdown as directed. Thereafter, the breakdown may be used for checking the Contractor's applications for partial payments hereunder but shall not be binding upon the City or the Engineer for any purpose whatsoever.

#### **ARTICLE 10.03 REPORTS, RECORDS AND DATA**

The Contractor shall furnish to the Engineer such schedules of quantities and costs, progress schedules, reports, invoices, delivery tickets, estimates, records, and other data as the Engineer may request concerning work performed or to be performed and the materials furnished under the Contract.

#### **ARTICLE 10.04 PAYMENTS BY CONTRACTOR**

The Contractor shall pay (a) for all transportation and utility services not later than the 20th day of the calendar month following that in which such services are rendered, (b) for all materials, tools, and equipment delivered at the site of the project, and the balance of the cost thereof not later than the 30th day following the completion of that part of the work in or on which such materials, tools, and equipment are incorporated or used, and (c) to each of his subcontractors, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his subcontractors, to the extent of each subcontractor's interest therein; and proof of such payments or releases therefor shall be submitted to the Engineer upon request.

#### **ARTICLE 10.05 PARTIAL PAYMENTS**

On or about the first of each month, the Contractor shall make and certify an estimate, on forms prescribed by the City, of the amount and fair value of the work done, and may apply for partial payment therefor. The Contractor shall revise the estimate as the Engineer may direct. When satisfactory progress has been made, and shows that the value of the work completed since the last payment exceeds one percent (1%) of the total Contract price in amount, the Engineer will issue a certificate that such work has been completed and the value thereof. The City will then issue a voucher to the Contractor in accordance with the following schedule:

#### **FOR CONTRACT AMOUNTS UNDER \$250,000**

(A) In the amount of ninety percent (90%) of the value of the work completed as certified until construction is one hundred percent (100%) complete (operational or beneficial occupancy), the withheld amount may be reduced below ten percent (10%), at the Engineer's option, to only that amount necessary to assure completion.

**FOR CONTRACT AMOUNTS OVER \$250,000**

(A) In the amount of ninety percent (90%) of the value of the work completed as certified until construction is fifty percent (50%) complete.

(B) When the dollar value, as determined by the Engineer, of satisfactorily completed work in place is greater than fifty percent (50%) of the original contract price, vouchers for partial payment will be issued by the City to the Contractor in the amount of one hundred percent (100%) of the value of the work, above 50%, completed as certified for that payment period.

(C) If the Contractor has performed satisfactorily and the work is substantially complete (operational or beneficial occupancy) the withheld amount may be reduced, at the Engineer's option, to only that amount necessary to assure completion.

In addition to the Conditions set forth in (A), (B), and (C) above, payments will always be less any sums that may be retained or deducted by the City under the terms of any of the contract documents and less any sums that may be retained to cover monetary guarantees for equipment, materials or progress performance.

Payment on estimates made on or about the first of the month may be expected on or about the 20th of the month.

Unless specified otherwise in the Contract Items, the delivered cost of equipment and nonperishable materials suitably stored at the site of the work and tested for adequacy may be included in the Contractor's application for partial payment provided, however, that the Contractor shall furnish evidence satisfactory to the City that the Contractor is the unconditional owner and in possession of such materials or equipment. The amount to be paid will be 90 percent of the invoice cost to the Contractor which cost shall be supported by receipted bills within 30 days of the date of payment by the City to the Contractor. Such payment shall not relieve the Contractor from full responsibility for completion of the work and for protection of such materials and equipment until incorporated in the work in a permanent manner as required by the Contract Documents.

Before any payment will be made under this Contract, the Contractor and every subcontractor, if required, shall deliver to the Engineer a written, verified statement, in satisfactory form, showing in detail all amounts then due and unpaid by such Contractor or subcontractor to all laborers, workmen, and mechanics, employed by him under the Contract for the performance of the work at the site thereof, for daily or weekly wages, or to other persons for materials, equipment, or supplies delivered at the site of the work during the period covered by the payment under consideration.

**ARTICLE 10.06 FINAL PAYMENT**

Under determination of satisfactory completion of the work under this Contract as provided in Article 4.07 hereof, the Engineer will prepare the final estimate showing the value of the completed work. This estimate will be prepared within 30 days after the date of completion or as soon thereafter as the necessary measurements and computations can be made.

All prior certificates and estimates, being approximate only, are subject to correction in the final estimate and payment.

When the final estimate has been prepared and certified by Engineer, he will submit to the Mayor and City Council the final certificate stating that the work has been completed and the amount based on the final estimate remaining due to the Contractor. The City will then accept the work as fully completed and will, not later than 30 days after the final acceptance, as defined in Article 1.02, of the work done under this Contract, pay the Contractor the entire amount so found due thereunder after deduction of all previous payments and all percentages and amounts to be kept and retained under provisions of this Contract; provided, however, and it is understood and agreed that, as a precedent to receiving final payment, the Contractor shall submit to the City a sworn affidavit that all bills for labor, service, materials, and subcontractors have been paid and that there are no suits pending in connection with this work. The City, at its option, may permit the Contractor to execute a separate surety bond in a form satisfactory to the City. The surety bond shall be in the full amount of the suit or suits.

Neither the final payment nor any part of the retained percentage shall be paid until the Contractor, if required, shall furnish the City with a complete release from any should remain unsatisfied after all payments are made, the Contractor shall refund to the City all monies which the City may be compelled to pay in discharging such claim, including incidental costs and attorney's fees.

**ARTICLE 10.07 ACCEPTANCE OF FINAL PAYMENT**

The acceptance by the Contractor, or by anyone claiming by or through him, of the final payment shall operate as and shall be a release to the City and every officer and agent thereof from any and all claims and liability to the Contractor for anything done or furnished in connection with the work or project and for any act or neglect of the Contractor or of any others relating to or affecting the work. No payment, however, final or otherwise, shall operate to release the Contractor or his sureties from any obligations under this Contract or the Performance Bond.

**SECTION 11 MISCELLANEOUS PROVISIONS**

**ARTICLE 11.01 CONTRACTOR'S WARRANTIES**

In consideration of, and to induce the award of this contract to him, the Contractor represents and warrants:

- (a) That he is not in arrears to the City upon debt or contract, and he is not a defaulter, as surety, contractor, or otherwise.
- (b) That he is financially solvent and sufficiently experienced and competent to perform the work.
- (c) That the work can be performed as called for by the Contract Documents.
- (d) That the facts stated in his proposal and the information given by him are true and correct in all respects.
- (e) That he is fully informed regarding all the conditions affecting the work to be done and labor and materials to be



furnished for the completion of this Contract, and that his information was secured by personal investigation and research.

#### **ARTICLE 11.02 PATENTED DEVICES, MATERIAL AND PROCESSES**

It is mutually understood and agreed that Contract prices include all royalties and costs arising from patents, trademarks, and copyrights in any way involved in the work. Whenever the Contractor is required or desires to use any design, device, material, or process covered by letters of patent or copyright, the Contractor shall indemnify and save harmless the City, its officers, agents and employees from any and all claims for infringement by reason of the use of any such patented design, device, tool, material, equipment, or process, to be performed under the Contract, and shall indemnify the said City, its officers, agents, and employees for any costs, expenses, and damages which may be incurred by reason of such infringement at any time during the prosecution or after completion of the work.

#### **ARTICLE 11.03 SUITS AT LAW**

In case any action at law or suit in equity may or shall be brought against the City or any of its officers, agents, or employees for or on account of the failure, omission, or neglect of the Contractor or his subcontractors, employees, or agents, to do or perform any of the covenants, acts, matters, or things by this Contract undertaken to be done or performed by the Contractor or his subcontractors, employees, or agents, or from any injuries done to property or persons and caused by the negligence or alleged negligence of the Contractor or his subcontractors, employees, or agents, or in any other manner arising out of the performance of this Contract, then the Contractor shall immediately assume and take charge of the defense of such actions or suits in like manner and to all intents and purposes as if said actions or suits have been brought directly against the Contractor, and the Contractor shall also indemnify and save harmless the City, its officers, agents, and employees from any and all loss, cost or damage whatever arising out of such actions or suits, in like manner and to all intents and purposes as if said actions or suits have been brought directly against the Contractor.

The Contractor shall and does hereby assume all liability for and agrees to indemnify the City or its Engineer against any or all loss, costs, damages, and liability for any or by reason of any lien, claims or demands, either for materials purchased or for work performed by laborers, mechanics, and others and from any damages, costs, actions, or causes of action and judgement arising from injuries sustained by mechanics, laborers, or other persons by reason of accidents or otherwise, whether caused by the carelessness or inefficiency or neglect of said Contractor, his subcontractors, agents, employees, workmen or otherwise.

#### **ARTICLE 11.04 CLAIMS FOR DAMAGES**

If the Contractor shall claim compensation for any damage sustained, other than for extra or disputed work covered by Article 7.02 and 7.03 hereof, by reason of any act or omission of the City, its agents, or any persons, he shall, within five days after sustaining such damage, make and

deliver to the Engineer a written statement of the nature of the damage sustained and of the basis of the claim against the City. On or before the 15th of the month succeeding that in which any damage shall have been sustained, the Contractor shall make and deliver to the Engineer an itemized statement of the details and amounts of such damage, duly verified by the Contractor. Unless such statements shall be made delivered within the times aforesaid, it is stipulated that and all claims for such compensation shall be forfeited and invalidated, and the Contractor shall not be entitled to payment on account of such claims.

#### **ARTICLE 11.05 NO CLAIMS AGAINST INDIVIDUALS**

No claim whatsoever shall be made by the Contractor against any officer, agent, employee of the City for, or on account of, anything done or omitted to be done in connection with this Contract.

#### **ARTICLE 11.06 LIABILITY UNAFFECTED**

Nothing herein contained shall in any manner create any liability against the City on behalf of any claim for labor, services, or materials, or of subcontractors, and nothing herein contained shall affect the liability of the Contractor or his sureties to the City or to any workmen or materialsmen upon bond given in connection with this Contract.

#### **ARTICLE 11.07 INDEMNIFICATION PROVISIONS**

Whenever there appears in this Agreement, or in the other Contract Documents made a part hereof, an indemnification provision within the purview of Chapter 725.06, Laws of Florida, the monetary limitation on the extent of the indemnification under each such provision shall be One Million Dollars or a sum equal to the total Contract price, whichever shall be the greater.

#### **ARTICLE 11.08 UNLAWFUL PROVISIONS DEEMED STRICKEN**

If this contract contains any unlawful provisions not an essential part of the Contract and which shall not appear to have a controlling or material inducement to the making thereof, such provisions shall be deemed of no effect and shall, upon notice by either party, be deemed stricken from the Contract without affecting the binding force of the remainder.

#### **ARTICLE 11.09 LEGAL PROVISIONS DEEMED INCLUDED**

Each and every provision of any law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein and if, through mistake or otherwise, any such provision is not inserted or is not correctly inserted, then upon application of either party the Contract shall forthwith be physically amended to make such insertion.

#### **ARTICLE 11.10 DEATH OR INCOMPETENCY OF CONTRACTOR**

In the event of death or legal incompetency of a Contractor who shall be an individual or surviving member of a contracting firm, such death or adjudication of incompetency

shall not terminate the Contract, but shall act as default hereunder to the effect provided in Article 9.01 hereof and the estate of the Contractor and his surety shall remain liable hereunder to the same extent as though the Contractor had lived. Notice of default, as provided in Article 9.01 hereof, shall not be required to be given in the event of such death or adjudication of incompetency.

**ARTICLE 11.11 NUMBER AND GENDER OF WORDS**

Whenever the context so admits or requires, all references herein in one number shall be deemed extended to and including the other number, whether singular or plural, and the use of any gender shall be applicable to all genders.

**ARTICLE 11.12 ACCESS TO RECORDS**

Representatives of Federal Agencies, if applicable, and the State of Florida shall have access to the work whenever it is in preparation of progress. On federally assisted projects the Federal Agency, the Comptroller General of the United States, or any authorized representative shall have access to any books, documents, papers, and records of the Contractor which are pertinent to the project for the purpose of making audit, examination, excerpts, and transcription thereof.

**SECTION 12  
LABOR STANDARDS**

**ARTICLE 12.01 LABOR STANDARDS**

The Contractor shall comply with all of the regulations set forth in "Labor Standards Provisions for Federally Assisted Construction Contracts", which may be attached, and any applicable Florida Statutes.

**ARTICLE 12.02 NOTICE TO LABOR UNIONS**

If required, the Contractor shall provide Labor Unions and other organizations of workers, and shall post, in a conspicuous place available to employees or applicants for employment, a completed copy of the form entitled "Notice to Labor Unions or Other Organizations of Workers" attached to and made a part of this Agreement.

**ARTICLE 12.03 SAFETY AND HEALTH REGULATIONS**

The Contractor shall comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91- 596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54). Nothing in these Acts shall be construed to supersede or in any manner affect any worker's compensation law or statutory rights, duties, or liabilities of employers and employees under any law with respect to injuries, diseases, or death of employees arising out of, or in the course of, employment.

**ARTICLE 12.04 EEO AFFIRMATIVE ACTION REQUIREMENTS**

The Contractor understands and agrees to be bound by the equal opportunity requirements of Federal regulations which shall be applicable throughout the performance of work under this Contract. The Contractor also agrees to similarly

bind contractually each subcontractor. In policies, the Contractor agrees to engage in Affirmative Action directed at promoting and ensuring equal employment opportunity in the work force used under the Contract (and the Contractor agrees to require contractually the same effort of all subcontractors whose subcontractors exceed \$100,000). The Contractor understands and agrees that "Affirmative Action" as used herein shall constitute a good faith effort to achieve and maintain minority employment in each trade in the on-site work force used on the Contract.

**ARTICLE 12.05 PREVAILING RATES OF WAGES**

Florida's prevailing wage law was repealed effective April 25, 1979.

For Federally assisted projects, appropriate prevailing wage rate determinations are indicated on pages beginning with WR-1.

\* \* \* \* \*

IN WITNESS THEREOF, the parties have hereunto set their hands and seals, and such of them as are corporation have caused these present to be signed by their duly authorized officers.

CITY OF TAMPA, FLORIDA

\_\_\_\_\_  
Jane Castor, Mayor  
(SEAL)

ATTEST:

\_\_\_\_\_  
City Clerk

Approved as to Form:  
The execution of this document was authorized  
by Resolution No. \_\_\_\_\_

\_\_\_\_\_  
e/s  
Marcella T. Hamilton, Assistant City Attorney

Contractor

By: \_\_\_\_\_  
(SEAL)

Title:

ATTEST:

\_\_\_\_\_  
Witness

TAMPA AGREEMENT (ACKNOWLEDGMENT OF PRINCIPAL)

STATE OF \_\_\_\_\_ )  
 ) SS:  
COUNTY OF \_\_\_\_\_ )

For a Corporation:

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_

The forgoing instrument was Sworn to (or affirmed) and subscribed before me by means of  physical presence or  online notarization, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by \_\_\_\_\_ as \_\_\_\_\_ of \_\_\_\_\_, a/n

Partnership  Joint Venture  LLC  Corp  Other: \_\_\_\_\_, on behalf of such entity. Such individual is Personally Known OR Produced Identification. Type of Identification Produced \_\_\_\_\_.

[NOTARY SEAL]

\_\_\_\_\_  
Notary Public, State of \_\_\_\_\_  
Notary Printed Name: \_\_\_\_\_  
Commission No.: \_\_\_\_\_  
My Commission Expires: \_\_\_\_\_

For a Firm:

STATE OF \_\_\_\_\_  
COUNTY OF \_\_\_\_\_

The forgoing instrument was Sworn to (or affirmed) and subscribed before me by means of  physical presence or  online notarization, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by \_\_\_\_\_ as \_\_\_\_\_ of \_\_\_\_\_, a/n

Partnership  Joint Venture  LLC  Corp  Other: \_\_\_\_\_, on behalf of such entity. Such individual is Personally Known OR Produced Identification. Type of Identification Produced \_\_\_\_\_.

[NOTARY SEAL]

\_\_\_\_\_  
Notary Public, State of \_\_\_\_\_  
Notary Printed Name: \_\_\_\_\_  
Commission No.: \_\_\_\_\_  
My Commission Expires: \_\_\_\_\_

**PUBLIC CONSTRUCTION BOND**

Bond No. (enter bond number) \_\_\_\_\_

Name of Contractor: \_\_\_\_\_

Principal Business Address of Contractor: \_\_\_\_\_

Telephone Number of Contractor: \_\_\_\_\_

Name of Surety (if more than one list each): \_\_\_\_\_

Principal Business Address of Surety: \_\_\_\_\_

Telephone Number of Surety: \_\_\_\_\_

Owner is The City of Tampa, Florida

Principal Business Address of Owner: \_\_\_\_\_ 306 E Jackson St, Tampa, FL 33602

\_\_\_\_\_ Contract Administration Department (280A4N)

Telephone Number of Owner: \_\_\_\_\_ 813/274-8456

Contract Number Assigned by City to contract which is the subject of this bond: \_\_\_\_\_

Legal Description or Address of Property Improved or Contract Number is: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

General Description of Work and Services: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS That we, \_\_\_\_\_

\_\_\_\_\_  
(Name of Contractor)

as Principal, hereinafter called CONTRACTOR, of the State of \_\_\_\_\_, and

\_\_\_\_\_  
(Name of Surety)

a corporation organized and existing under and by virtue of the laws of the State of \_\_\_\_\_, and regularly authorized to do business in the State of Florida, as SURETY, are held and firmly bound unto the City of Tampa, a municipal corporation organized and existing under the laws of the State of Florida, hereinafter called Owner, in the penal sum of \_\_\_\_\_ Dollars and \_\_\_\_\_ Cents (\$ \_\_\_\_\_), lawful money of the United States of America, for the payment whereof well and truly to be made, we bind ourselves, our heirs, executors, and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS BOND is that if Principal:

1. Performs the contract dated \_\_\_\_\_, \_\_\_\_\_, 20\_\_\_\_, between Principal and Owner for construction of \_\_\_\_\_, the contract being made a part of this bond by reference, in the time and in the manner prescribed in the contract; and
2. Promptly makes payments to all claimants, as defined in Section 255.05(1) (Section 713.01), Florida Statutes, supplying Principal with labor, materials, or supplies, used directly or indirectly by Principal in the prosecution of the work provided for in the contract; and
3. Pays Owner all losses, damages, expenses, costs, and attorney's fees, including appellate proceedings, that Owner sustains because of a default by Principal under the contract; and
4. Performs the guarantee of all work and materials furnished under the contract for the time specified in the contract, then this bond is void; otherwise it remains in full force.
5. Contractor and Surety acknowledge that the Work for which this bond has been issued may be one of several such contract documents for a group of projects. This bond does not secure covenants to pay for or to perform design services survey or program management services. The Owner/Obligee is expected to reasonably account for damages that are caused to Owner with respect to Principal's (Contractor's) default in performance of the scope of the Work incorporated by reference into the bond, and notwithstanding any contractual or common law remedy permitted to Owner as against Contractor, the obligation of Surety for any damages under this bond shall be determined by the cost of completion of the Work less the contract balance unpaid upon default of Contractor for the Work plus liquidated damages at the rate of \$500.00 per day for delays by the Contractor and/or Surety in reaching substantial completion.
6. The notice requirements for claimants and conditions for entitlement to payment set forth in Section 255.05, Fla. Stat. and the limitations period to actions upon Section 255.05, Fla. Stat. bonds apply to claimants seeking payment from surety under this bond. Any action instituted by a claimant under this bond for payment must be in accordance with the notice and time limitation provisions in Section 255.05, Florida Statutes.
7. The Surety, for value received, hereby stipulates and agrees that no changes, extensions of time, alterations or additions to the terms of the contract documents or other Work to be performed hereunder, or the specifications referred to therein shall in any way affect its obligations under this bond, and it does hereby waive notice of any such changes, extensions of time, alterations or additions to the terms of the Contract or to Work or to the specifications.

8. The above SURETY states that it has read all of the Contract Documents made by the CONTRACTOR with the CITY, hereto attached, and the terms and conditions of the contract and work, and is familiar therewith and in particular those portions of the Agreement concerning the guaranty of such CONTRACTOR for a period of one year following the date of the final acceptance of the completed work under the Contract by the CITY, all of which this BOND includes.

DATED ON \_\_\_\_\_, 20\_\_

\_\_\_\_\_  
(Name of Principal)

\_\_\_\_\_  
(Name of Surety)

\_\_\_\_\_  
(Principal Business Address)

\_\_\_\_\_  
(Surety Address)

By \_\_\_\_\_

By \_\_\_\_\_  
(As Attorney in Fact)\*

Title \_\_\_\_\_

\_\_\_\_\_  
Telephone Number of Surety

\_\_\_\_\_  
Telephone Number of Principal

Approved as to legal sufficiency:

**Countersignature:**

By \_\_\_\_\_ e/s

Marcella T. Hamilton, Assistant City Attorney

\_\_\_\_\_  
(Name of Local Agency)

\_\_\_\_\_  
(Address of Resident Agent)

By \_\_\_\_\_

Title \_\_\_\_\_

\_\_\_\_\_  
Telephone Number of Local Agency

\*(As Attorney in Fact) attach Power of Attorney and Current Certificate with Original Signature

# SPECIFICATIONS GENERAL PROVISIONS

## SECTION 1 SCOPE AND INTENT

### **G-1.01 DESCRIPTION**

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.

### **G-1.02 WORK INCLUDED**

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 obtain and pay for all required permits. 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 Engineer, and in strict accordance with the Contract Documents. The Contractor shall clean up the work and maintain it during and after construction, until accepted, and shall do all work and pay all costs incidental thereto. He shall repair or restore all structures and property that may be damaged or disturbed during performance of the work.

The cost of incidental work described in these General Provisions, for which there are no specific Contract Items, shall be considered as part of the overhead cost of doing the work and shall be included in the prices for the various Contract Items. No additional payment will be made therefor.

The Contractor shall provide and maintain such modern plant, tools, and equipment as may be necessary, in the opinion of the Engineer, to perform in a satisfactory and acceptable manner all the work required by this Contract. Only equipment of established reputation and proven efficiency shall be used. The Contractor shall be solely responsible for the adequacy of his plant and equipment, prior approval of the Engineer notwithstanding.

### **G-1.03 PUBLIC UTILITY INSTALLATIONS AND STRUCTURES**

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 City, other governmental bodies or privately owned by individuals, firms, or corporations, and 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.

The Contract Documents contain data relative to existing public utility installations and structures above and below the ground surface. These data are not guaranteed as to their completeness or accuracy and it is the responsibility of the Contractor to make his own investigations to inform himself

fully of the character, condition and extent of all such installations and structures as may be encountered and as may affect the construction operations.

The Contractor shall protect all public utility installations and structures from damage during the work. Access across any buried public utility installation or structure shall be made only in such locations and by means approved by the Engineer. The Contractor shall so arrange his operations as to avoid any damage to these facilities. All required protective devices and construction shall be provided by the Contractor at his expense. All existing public utilities damaged by the Contractor which are shown on the Plans or have been located in the field by the utility shall be repaired by the Contractor, at his expense, as directed by the Engineer. No separate payment shall be made for such protection or repairs to public utility installations or structures.

Public utility installations or structures owned or controlled by the City 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.

Where public utility installations or structures owned or controlled by the City 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, in the opinion of the Engineer, removal, relocation, replacement or rebuilding is necessary to complete the work under this Contract, such work shall be accomplished by the utility having jurisdiction or such work may be ordered, in writing by the Engineer, for the Contractor to accomplish. If such work is accomplished by the utility having jurisdiction it will be carried out expeditiously and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement or rebuilding as required. If such work is accomplished by the Contractor, it will be paid for as extra work as provided for in Article 7.02 of the Agreement.

The Contractor shall, at all times in performance of the work, employ approved methods and exercise reasonable care and skill so as to avoid unnecessary delay, injury, damage or destruction of public utility installations and structures; and shall, at all times in the performance of the work, avoid unnecessary interference with, or interruption of, public utility services, and shall cooperate fully with the owners thereof to that end.

All City and other governmental utility departments and other owners of public utilities, which may be affected by the work, will be informed in writing by the Engineer within two weeks after the execution of the Contract or Contracts covering the work. Such notice will set out, in general, and direct attention to, the responsibilities of the City and other governmental



utility departments and other owners of public utilities for such installations and structures as may be affected by the work and will be accompanied by one set of Plans and Specifications covering the work under such Contract or Contracts.

In addition to the general notice given by the Engineer, the Contractor shall give written notice to all City and other governmental utility departments and other owners of public utilities of the location 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 Candy)".

The maintenance, repair, removal, relocation, or rebuilding of public utility installations and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the Engineer.

## **SECTION 2 PLANS AND SPECIFICATIONS**

### **G-2.01 PLANS**

The Plans referred to in the Contract Documents bear the general project name and number as shown in the Notice To Bidders.

When obtaining data and information from the Plans, figures shall be used in preference to scaled dimensions, and large scale drawings in preference to small scale drawings.

### **G-2.02 COPIES FURNISHED TO CONTRACTOR**

After the Contract has been executed, the Contractor will be furnished with five sets of paper prints, the same size as the original drawings, of each sheet of the Plans and five copies of the Specifications. Additional copies of the Plans and Specifications, when requested, may be furnished to the Contractor at cost of reproduction.

The Contractor shall furnish each of the subcontractors, manufacturers, and material suppliers such copies of the Contract Documents as may be required for his work.

### **G-2.03 SUPPLEMENTARY DRAWINGS**

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

The Supplementary Drawings shall be binding upon the Contractor with the same force as the Plans. Where such Supplementary Drawings require either less or more than the estimated quantities of work, credit to the City or compensation therefor to the Contractor shall be subject to the terms of the Agreement.

### **G-2.04 CONTRACTOR TO CHECK PLANS AND DATA**

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

### **G-2.05 SPECIFICATIONS**

The specifications consist of four parts, the General Provisions, the Technical Specifications, the Special Provisions and the Contract Items. The General Provisions and Technical Specifications contain general requirements which govern the work. The Special Provisions and the Contract Items modify and supplement these by detailed requirements for the work and shall always govern, whenever there appears to be conflict.

### **G-2.06 INTENT**

All work called for in the Specifications applicable to this Contract, but not shown on the Plans in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified in either the Plans or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the work, is required and shall be performed by the Contractor as though it were specifically delineated or described.

The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications shall be made upon that basis.

## **SECTION 3 WORKING DRAWINGS**

### **G-3.01 SCOPE**

The Contractor shall promptly prepare and submit layout, detail and shop drawings to insure proper construction, assembly, and installation of the work using those materials and methods as hereafter specified under the Technical Specifications, Special Provisions and Contract Items.

These drawings shall accurately and distinctly present the following:

- a. All working and erection dimensions.
- b. Arrangements and sectional views.
- c. Necessary details, including complete information for making connections between work under this Contract and work under other Contracts.
- d. Kinds of materials and finishes.
- e. Parts listed and description thereof.

Drawings for mechanical equipment shall present, where applicable, such data as dimensions, weight and performance characteristics. These data shall show conformance with the performance characteristics and other criteria incorporated in the Plans and Specifications.

Each drawing shall be dated and shall contain the name of the project, Division number and description, the technical specifications section number, names of equipment or materials and the location at which the equipment or materials are to be installed. Location shall mean both physical location and location relative to other connected or attached material. The Engineer will return unchecked any submittal which does not contain complete data on the work and full information on related matters.

Stock or standard drawings will not be accepted for review unless full identification and supplementary information is shown thereon in ink or typewritten form.

The Contractor shall review all working drawing submittals before transmitting them to the Engineer to determine that they comply with requirements of the Specifications. Drawings which are incomplete or are not in compliance with the Contract Documents shall not be submitted for processing by the Engineer. The Contractor shall place his stamp of approval on all working drawings submitted to the Engineer to indicate compliance with the above.

#### **G-3.02 APPROVAL**

If the working drawings show departures from the Contract requirements, the Contractor shall make specific mention thereof in his letter of submittal; otherwise approval of such submittals shall not constitute approval of the departure. Approval of the drawings shall constitute approval of the subject matter thereof only and not of any structure, material, equipment, or apparatus shown or indicated.

The approval of drawings will be general and shall not relieve the Contractor of responsibility for the accuracy of such drawings, nor for the proper fitting and construction of the work, nor for the furnishing of materials or work required by the Contract and not indicated on the drawings. No work called for by working drawings shall be done until such drawings have been approved by the Engineer.

The procedure in seeking approval of the working drawings shall be as follows:

1. The Contractor shall submit four complete sets of drawings

and other descriptive data together with one copy of a letter of transmittal to the Engineer for approval. The letter of transmittal shall contain the name of the project, contract number, technical specifications section number, the name of the Contractor, a list of drawings with numbers and titles, and any other pertinent information.

2. Drawings or descriptive data will be stamped "Approved", "Approved Subject to Corrections Marked", or "Examined and Returned for Correction" and one copy with a letter of transmittal will be returned to the Contractor.

3. If a drawing or other data is stamped "Approved", the Contractor shall insert the date of approval on five additional copies of the document and transmit the five copies to the Engineer together with one copy of a letter of transmittal containing substantially the same information as described in Instruction 1. above.

4. If a drawing or other data is stamped "Approved Subject to Corrections Marked", the Contractor shall make the corrections indicated and proceed as in Instruction 3., above.

5. If a drawing or data is stamped "Examined and Returned for Correction", the Contractor shall make the necessary corrections and resubmit the documents as set forth in Instruction 1., above. The letter of transmittal shall indicate that this is a resubmittal.

The Contractor shall revise and resubmit the working drawings as required by the Engineer, until approval thereof is obtained.

## **SECTION 4 MATERIALS AND EQUIPMENT**

### **G-4.01 GENERAL REQUIREMENTS**

All materials, appliances, and types or methods of construction shall be in accordance with the Specifications and shall, in no event, be less than that necessary to conform to the requirements of any applicable laws, ordinances, and codes.

All materials and equipment shall be new, unused, and correctly designed. They shall be of standard first grade quality, produced by expert personnel, and intended for the use for which they are offered. Materials or equipment which, in the opinion of the Engineer, are inferior or of a lower grade than indicated, specified, or required will not be accepted.

The quality of Workmanship and Materials entering into the work under this Contract shall conform to the requirements of the pertinent sections, clauses, paragraphs, and sentences, both directly and indirectly applicable thereto, of that part of the Technical Specifications, whether or not direct reference to such occurs in the Contract Items.

Equipment and appurtenances shall be designed in conformity with ANSI, ASME, IEEE, NEMA and other

generally accepted standards and shall be of rugged construction and of sufficient strength to withstand all stresses which may occur during fabrication, testing, transportation, installation, and all conditions of operation. All bearings and moving parts shall be adequately protected against wear by bushings or other approved means and shall be fully lubricated by readily accessible devices. Details shall be designed for appearance as well as utility. Protruding members, joints, corners, gear covers, and the like, shall be finished in appearance. All exposed welds shall be ground smooth and the corners of structural shapes shall be mitered.

Equipment shall be of the approximate dimensions as indicated on the Plans or as specified, shall fit the spaces shown on the Plans with adequate clearances, and shall be capable of being handled through openings provided in the structure for this purpose. The equipment shall be of such design that piping and electrical connections, ductwork, and auxiliary equipment can be assembled and installed without causing major revisions to the location or arrangement of any of the facilities.

Machinery parts shall conform exactly to the dimensions shown on the working drawings. There shall be no more fitting or adjusting in setting up a machine than is necessary in assembling high grade apparatus of standard design. The equivalent parts of identical machines shall be made interchangeable. All grease lubricating fittings on equipment shall be of a uniform type. All machinery and equipment shall be safeguarded in accordance with the safety codes of the ANSI and applicable state and local codes.

#### **G-4.02 MANUFACTURER**

The names of proposed manufacturers, suppliers, material, and dealers who are to furnish materials, fixtures, equipment, appliances or other fittings shall be submitted to the Engineer for approval, as early as possible, to afford proper investigation and checking. Such approval must be obtained before shop drawings will be checked. No manufacturer will be approved for any materials to be furnished under this Contract unless he shall be of good reputation and have a plant of ample capacity. He shall, upon the request of the Engineer, be required to submit evidence that he has manufactured a similar product to the one specified and that it has been previously used for a like purpose for a sufficient length of time to demonstrate its satisfactory performance.

All transactions with the manufacturers or subcontractors shall be through the Contractor, unless the Contractor shall request, in writing to the Engineer, that the manufacturer or subcontractor deal directly with the Engineer. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.

Any two or more pieces of material or equipment of the same kind, type or classification, and being used for identical types of service, shall be made by the same manufacturer.

#### **G-4.03 REFERENCE TO STANDARDS**

Whenever reference is made to the furnishing of materials or

testing thereof to conform to the standards of any technical society, organization or body, it shall be construed to mean the latest standard, code, specification or tentative specification adopted and published at the date of advertisement for proposals, even though reference has been made to an earlier standard, and such standards are made a part hereof to the extent which is indicated or intended.

Reference to a technical society, organization or body may be made in the Specifications by abbreviations, in accordance with the following list:

AASHTO for American Association of State Highway and Transportation Officials (formerly AASHO)  
ACI for American Concrete Institute  
AGMA for American Gear Manufacturer's Association  
AFBMA for Anti-Friction Bearing Manufacturer's Association  
AISC for American Institute of Steel Construction  
AISI for American Iron and Steel Institute  
ANSI for American National Standards Institute  
ASCE for American Society of Civil Engineers  
ASTM for American Society for Testing and Materials  
ASME for American Society of Mechanical Engineers  
AWS for American Welding Society  
AWWA for American Water Works Association  
AWPA for American Wood Preservers Association  
CEMA for Conveyor Equipment Manufacturers Association  
CIPRA for Cast Iron Pipe Research Association  
IEEE for Institute of Electrical and Electronic Engineers  
IPCEA for Insulated Power Cable Engineers Association  
NEC for National Electrical Code  
NEMA for National Electrical Manufacturers Association  
SAE for Society of Automotive Engineers  
SHBI for Steel Heating Boiler Institute  
Fed.Spec. for Federal Specifications  
Navy Spec. for Navy Department Specifications  
U.L.,Inc. for Underwriters' Laboratories, Inc.

When no reference is made to a code, standard or specification, the Standard Specifications of the ANSI, the ASME, the ASTM, the IEEE, or the NEMA shall govern.

#### **G-4.04 SAMPLES**

The Contractor shall, when required, submit to the Engineer for approval typical samples of materials and equipment. The samples shall be properly identified by tags and shall be submitted sufficiently in advance of the time when they are to be incorporated into the work, so that rejections thereof will not cause delay. A letter of transmittal, in duplicate, from the Contractor requesting approval must accompany all such samples.

#### **G-4.05 EQUIVALENT QUALITY**

Whenever, in the Contract Documents, an article, material, apparatus, equipment, or process is called for by trade name or by the name of a patentee, manufacturer, or dealer or by reference to catalogs of a manufacturer or dealer, it shall be understood as intending to mean and specify the article, material, apparatus, equipment or process designated, or any

equal thereto in quality, finish, design, efficiency, and durability and equally serviceable for the purposes for which it is intended.

Whenever material or equipment is submitted for approval as being equal to that specified, the decision as to whether or not such material or equipment is equal to that specified shall be made by the Engineer.

Upon rejection of any material or equipment submitted as the equivalent of that specifically named in the Contract, the Contractor shall immediately proceed to furnish the designated material or equipment.

Neither the approval by the Engineer of alternate material or equipment as being equivalent to that specified nor the furnishing of the material or equipment specified, shall in any way relieve the Contractor of responsibility for failure of the material or equipment, due to faulty design, material, or workmanship, to perform the functions required of them by the Specifications.

#### **G-4.06 DELIVERY**

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 a delay in, or impediment of, the progress of the work of any related Contractor.

#### **G-4.07 CARE AND PROTECTION**

The Contractor shall be solely responsible for properly storing and protecting all materials, equipment, and work furnished under the Contract from the time such materials and equipment are delivered at the site of the work until final acceptance thereof. He shall, at all times, take necessary precautions to prevent injury or damage by water, freezing, or by inclemencies of the weather to such materials, equipment and work. All injury or damage to materials, equipment, or work resulting from any cause whatsoever shall be made good by the Contractor.

The Engineer shall, in all cases, determine the portion of the site to be used by the Contractor for storage, plant or for other purposes. If, however, it becomes necessary to remove and restack materials to avoid impeding the progress of any part of the work or interference with the work to be done by any other Contractor, the Contractor shall remove and restack such materials at his own expense.

#### **G-4.08 TOOLS AND ACCESSORIES**

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.

Spare parts shall be furnished as specified.

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.

#### **G-4.09 INSTALLATION OF EQUIPMENT**

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.

Equipment shall be erected in a neat and workmanlike manner on the foundations at the locations and elevations shown on the Plans, unless directed otherwise by the Engineer during installation. 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.

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. Anchor bolts shall be as approved by the Engineer and made of ample size and strength for the purpose intended. Substantial templates and working drawings for installation shall be furnished.

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.

#### **G-4.10 OPERATING INSTRUCTIONS**

The Contractor, through qualified individuals, shall adequately instruct designated employees of the City in the operation and care of all equipment installed hereunder, except for equipment that may be furnished by the City.

The Contractor shall also furnish and deliver to the Engineer three complete sets for permanent files, identified in accordance with Subsection G-3.01 hereof, of instructions, technical bulletins and any other printed matter, such as diagrams, prints or drawings, containing full information required for the proper operation, maintenance, and repair, of the equipment installed and the ordering of spare parts, except for equipment that may be furnished by the City.

In addition to the above three copies, the Contractor shall furnish any additional copies that may be required for use during construction and start-up operations.

#### **G-4.11 SERVICE OF MANUFACTURER'S ENGINEER**

The Contract prices for equipment shall include the cost of furnishing a competent and experienced engineer or superintendent who shall represent the manufacturer and shall assist the Contractor, when required, to install, adjust, test and place in operation the equipment in conformity with the Contract Documents. After the equipment is placed in

permanent operation by the City, such engineer or superintendent shall make all adjustments and tests required by the Engineer to provide that such equipment is in proper and satisfactory operating condition, and shall instruct such personnel as may be designated by the City in the proper operation and maintenance of such equipment.

## **SECTION 5 INSPECTION AND TESTING**

### **G-5.01 GENERAL**

The Contractor's attention is hereby directed to Article 3.03 of the Agreement.

Inspection and testing of materials will be performed by the City unless otherwise specified.

For tests specified to be made by the Contractor, the testing personnel shall make the necessary inspections and tests and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Five copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Engineer as a prerequisite for the acceptance of any material or equipment.

If, in the making of any test of any material or equipment, it is ascertained by the Engineer that the material or equipment does not comply with the Contract, the Contractor will be notified thereof and he will be directed to refrain from delivering said material and equipment, or to remove it promptly from the site or from the work and replace it with acceptable material, without cost to the City.

Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with recognized test codes of the ANSI, ASME, or the IEEE, except as may otherwise be stated herein.

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 City formally takes over the operation thereof.

### **G-5.02 COSTS**

All inspection and testing of materials furnished under this Contract will be performed by the City or duly authorized inspection engineers or inspection bureaus without cost to the Contractor, unless otherwise expressly specified.

The cost of shop and field tests of equipment and of certain other tests specifically called for in the Contract Documents shall be borne by the Contractor and such costs shall be deemed to be included in the contract price.

Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the City for compliance. The Contractor shall reimburse the City for the expenditures incurred in making

such tests on materials and equipment which are rejected for noncompliance.

### **G-5.03 INSPECTIONS OF MATERIALS**

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

### **G-5.04 CERTIFICATE OF MANUFACTURE**

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

### **G-5.05 SHOP TESTS OF OPERATING EQUIPMENT**

Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function, or special requirements are specified shall be tested in the shop of the maker in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents. No such equipment shall be shipped to the work until the Engineer notifies the Contractor, in writing, that the results of such tests are acceptable.

Five copies of the manufacturer's actual test data and interpreted results thereof, accompanied by a certificate of authenticity sworn to by a responsible official of the manufacturing company, shall be forwarded to the Engineer for approval.

The cost of the shop tests and of furnishing manufacturer's preliminary and shop test data of operating equipment shall be borne by the Contractor.

### **G-5.06 PRELIMINARY FIELD TESTS**

As soon as conditions permit, the Contractor shall furnish all labor, materials, and instruments and shall make preliminary field tests of equipment. If the preliminary field tests disclose any equipment furnished under this Contract which does not comply with the requirements of the Contract Documents, the Contractor shall, prior to the acceptance tests, make all changes, adjustments, and replacements required.

## TEMPORARY STRUCTURES

### G-5.07 FINAL FIELD TESTS

Upon completion of the work and prior to final payment, all equipment and appliances installed under this Contract shall be subjected to acceptance tests as specified or required to prove compliance with the Contract Documents.

The Contractor shall furnish labor, fuel, energy, water and all other materials, equipment, and instruments necessary for all acceptance tests, at no additional cost to the City.

### G-5.08 FAILURE OF TESTS

Any defects in the materials and equipment or their failure to meet the tests, guarantees or requirements of the Contract Documents shall be promptly corrected by the Contractor by replacements or otherwise. The decision of the Engineer as to whether or not the Contractor has fulfilled his obligations under the Contract shall be final and conclusive. If the Contractor fails to make those corrections or if the improved materials and equipment, when tested, shall again fail to meet the guarantees or specified requirements, the City, notwithstanding its partial payment for work, and materials and equipment, may reject the materials and equipment and may order the Contractor to remove them from the site at his own expense.

In case the City rejects any materials and equipment, then the Contractor shall replace the rejected materials and equipment within a reasonable time. If he fails to do so, the City may, after the expiration of a period of thirty calendar days after giving him notice in writing, proceed to replace such rejected materials and equipment, and the cost thereof shall be deducted from any compensation due or which may become due the Contractor under this Contract.

The City agrees to obtain other equipment within a reasonable time and the Contractor agrees that the City may use the equipment furnished by him without rental or other charges until the new equipment is obtained.

Materials or work in place that fails to pass acceptability tests shall be retested at the direction of the construction engineer all such retests shall be at the Contractor's expense. The rates charged shall be in accordance with the Department of Public Works current annual inspection contract which is available for inspection at the offices of the Department of Public Works.

### G-5.09 FINAL INSPECTION

The procedures for final inspection shall be in accordance with the provisions of Article 4.07 of the Agreement. During such final inspections, the work shall be clean and free from water. In no case will the final estimate be prepared until the Contractor has complied with all the requirements set forth and the Engineer has made his final inspection of the entire work and is satisfied that the entire work is properly and satisfactorily constructed in accordance with the requirements of the Contract Documents.

## SECTION 6

### G-6.01 GENERAL

All false work, scaffolding, ladders, hoistways, braces, pumping plants, shields, trestles, roadways, sheeting, centering forms, barricades, drains, flumes, and the like, any of which may be needed in the construction of any part of the work and which are not herein described or specified in detail, must be furnished, maintained and removed by the Contractor, and he shall be responsible for the safety and efficiency of such works and for any damages that may result from their failure or from their improper construction, maintenance, or operation.

### G-6.02 PUBLIC ACCESS

At all points in the work where public access to any building, house, place of business, public road, or sidewalk would be obstructed by any action of the Contractor in executing the work required by this Contract, the Contractor shall provide such temporary structure, bridges or roadway as may be necessary to maintain public access at all times. At least one lane for vehicular traffic shall be maintained in streets in which the Contractor is working. Street closure permits are required from the Department of Public Works.

The Contractor shall provide suitable temporary bridges, as directed by the Engineer, at street intersections when necessary for the maintenance of vehicular and pedestrian traffic.

Prior to temporarily cutting of access to driveways and garages, the Contractor shall give twelve (12) hours notice to affected property owners. Interruptions to use of private driveways shall be kept to a minimum.

### G-6.03 CONTRACTOR'S FIELD OFFICE

The Contractor shall erect, furnish and maintain a field office with a telephone at the site during the entire period of construction. He or an authorized agent shall be present at this office at all times while his work is in progress. Readily accessible copies of both the Contract Documents and the latest approved working drawings shall be kept at this field office.

### G-6.04 TEMPORARY FENCE

If, during the course of the work, it is necessary to remove or disturb any fence or part thereof, the Contractor shall, at his own expense, if so ordered by the Engineer, provide a suitable temporary fence which shall be maintained until the permanent fence is replaced. The Engineer shall be solely responsible for the determination of the necessity for providing a temporary fence and the type of temporary fence to be used.

### G-6.05 RESPONSIBILITY FOR TEMPORARY STRUCTURES

In accepting the Contract, the Contractor assumes full responsibility for the sufficiency and safety of all temporary structures or work and for any damage which may result from their failure or their improper construction, maintenance, or operation and will indemnify and save harmless the City from

all claims, suits or actions and damages or costs of every description arising by reason of failure to comply with the above provisions.

## **SECTION 7 TEMPORARY SERVICES**

### **G-7.01 WATER**

The Contractor shall provide the necessary water supply at his own expense. He shall, if necessary, provide and lay necessary waterlines from existing mains to the place of using, shall secure all necessary permits and pay for all taps to water mains or hydrants and for all water used at the established rates.

### **G-7.02 LIGHT AND POWER**

The Contractor shall provide, at his own expense, temporary lighting and power facilities required for the proper prosecution and inspection of the work. If, in the opinion of the Engineer, these facilities are inadequate, the Contractor will not be permitted to proceed with any portion of the work affected thereby.

### **G-7.03 SANITARY REGULATIONS**

The Contractor shall prohibit and prevent the committing of nuisances on the site of the work or on adjoining property and shall discharge any employee who violates this rule.

Ample washrooms and toilet facilities and a drinking water supply shall be furnished and maintained in strict conformity with the law by the Contractor for use by his employees.

### **G-7.04 ACCIDENT PREVENTION**

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

### **G-7.05 FIRST AID**

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 men are employed on the work.

### **G-7.06 HEATING**

The Contractor shall provide temporary heat, at his own expense, whenever required on account of work being carried on during cold weather and to prevent freezing of water pipes and other damage to the work.

## **SECTION 8**

## **LINES AND GRADES**

### **G-8.01 GENERAL**

All work done under this Contract shall be constructed in accordance with the lines and grades shown on the Plans, or as given by the Engineer. The full responsibility for keeping alignment and grade shall rest upon the Contractor.

The Engineer will establish bench marks and base line controlling points. Reference remarks for lines and grades as the work progresses will be located to cause as little inconvenience to the prosecution of the work as possible. The Contractor shall so place excavation and other materials as to cause no inconvenience in the use of the reference marks provided. He shall remove any obstructions placed by him contrary to this provision.

### **G-8.02 SURVEYS**

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

The Contractor shall keep the Engineer informed a reasonable time in advance as to his need for line and grade reference marks, in order that they may be furnished and all necessary measurements made for record and payment with the minimum of inconvenience to the Engineer or of delay to the Contractor.

It is the intention not to delay the work for the establishment of reference marks but, when necessary, working operations shall be suspended for such reasonable time as the Engineer may require for this purpose.

### **G-8.03 SAFEGUARDING MARKS**

The Contractor shall safeguard all points, stakes, grade marks, monuments and bench marks made or established on the work, bear the cost of reestablishing them if disturbed, and bear the entire expense of rectifying work improperly installed due to not maintaining or protecting or to removing without authorization such established points, stakes and marks.

The Contractor shall safeguard all existing and known property corners, monuments and marks adjacent to but not related to the work and, if required, shall bear the cost of reestablishing them if disturbed or destroyed.

### **G-8.04 DATUM PLANE**

All elevations indicated or specified refer to the Mean Sea Level Datum of the U.S.C. & G.S. (N.O.S.) which is 0.80 feet above the Mean Low Water Datum of the U. S. Army

Corps of Engineers.

## **SECTION 9 ADJACENT STRUCTURES AND LANDSCAPING**

### **G-9.01 RESPONSIBILITY**

The responsibility for removal, replacement, relocation, repair, rebuilding or protection of all public utility installations, including poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes, sewers, traffic control and fire alarm signal circuit installations and other appurtenances and facilities shall be in accordance with G-1.02 and G-1.03.

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 Plans, and the removal, relocation, and reconstruction of such items called for on the Plans or specified shall be included in the various Contract Items and no separate payment will be made therefor. Where such public and private property, structures of any kind and appurtenances thereto are not shown on the Plans and when, in the opinion of the Engineer, removal or relocation and reconstruction is necessary to avoid interference with the work, payment therefor will be made as provided for extra work in Article 7.02 of the Agreement.

### **G-9.02 PROTECTION OF TREES**

All trees and shrubs shall be adequately protected by the Contractor with boxes or otherwise and, within the City of Tampa, in accordance with ordinances governing the protection of trees. No excavated materials shall be placed so as to injure such trees or shrubs. Trees or shrubs destroyed by negligence of the Contractor or his employees shall be replaced by him with new stock of similar size and age, at the proper season, and at the sole expense of the Contractor.

Beneath trees or other surface structures, where possible, pipelines may be built in short tunnels, backfilled with excavated materials, except as otherwise specified, or the trees or structures carefully supported and protected from damage.

The City may order the Contractor, for the convenience of the City, to remove trees along the line of trench excavation. If so ordered, the City will obtain any permits required for removal of trees. Such tree removal ordered shall be paid for under the appropriate Contract Items.

### **G-9.03 LAWN AREAS**

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

manner described in the Technical Specifications section.

### **G-9.04 RESTORATION OF FENCES**

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

## **SECTION 10 PROTECTION OF WORK AND PUBLIC**

### **G-10.01 TRAFFIC REGULATIONS**

The Contractor shall arrange his work to comply with Article G-6.02. The work shall be done with the least possible inconvenience to the public and to that end the work may be confined by the Engineer to one block at a time.

### **G-10.02 BARRIERS AND LIGHTS**

During the prosecution of the work, the Contractor shall put up and maintain at all times such barriers, and lights, as will effectually prevent accidents. The Contractor shall provide suitable barricades, red lights, "danger" or "caution" or "street closed" signs and watchmen at all places where the work causes obstructions to the normal traffic or constitutes in any way a hazard to the public. Such barriers and signs shall be constructed to State of Florida Department of Transportation standards and placed as recommended by the Traffic Division of the City's Department of Public Works.

No open fires will be permitted.

### **G-10.03 SMOKE PREVENTIONS**

The Contractor shall use hard coal, coke, oil or gas as fuel for equipment generating steam. A strict compliance with ordinances regulating the production and emission of smoke will be required.

### **G-10.04 NOISE**

The Contractor shall eliminate noise to as great an extent as practicable at all times. Air compressing plants shall be equipped with silencers and the exhaust of all gasoline motors or other power equipment shall be provided with mufflers. In the vicinity of hospitals and schools, special care shall be used to avoid noise or other nuisances. The Contractor shall strictly observe all local regulations and ordinances covering noise control.

Except in the event of an emergency, no work shall be done between the hours of 7:00 p.m. and 7:00 a.m., or on Sundays.

If the proper and efficient prosecution of the work requires operations during the night, the written permission of the Engineer shall be obtained before starting such items of the work.



**SECTION 13  
CLEANING**

**G-10.05 ACCESS TO PUBLIC SERVICES**

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

**G-10.06 DUST PREVENTION**

The Contractor shall prevent dust nuisance from his operations or from traffic by keeping the streets sprinkled with water at all times.

**G-10.07 PRIVATE PROPERTY**

The Contractor shall so conduct the work that no equipment, material, or debris will be placed or allowed to fall upon private property in the vicinity of the work unless he shall have obtained the owner's written consent thereto and shall have shown this consent to the Engineer.

**SECTION 11  
SLEEVES AND INSERTS**

**G-11.01 COORDINATION**

When the Contract requires the placing of conduits, saddles, boxes, cabinets, sleeves, inserts, foundation bolts, anchors, and other like work in floors, roofs, or walls of buildings and structures, they shall be promptly installed in conformity with the construction program. The Contractor who erects the floors, roofs, and walls shall facilitate such work by fully cooperating with the Contractors responsible for installing such appurtenances. The Contractor responsible for installing such appurtenances shall arrange the work in strict conformity with the construction schedule and avoid interference with the work of other contractors.

**G-11.02 OPENINGS TO BE PROVIDED**

In the event timely delivery of sleeves and other materials cannot be made and to avoid delay, the affected Contractor may arrange to have boxes or other forms set at the locations where the appurtenances are to pass through or into the floors, roofs, walls, or other work. Upon the subsequent installation of these appurtenances, the Contractor erecting the structure shall fill around them with materials as required by the Contract. The necessary expenditures incurred for the boxing out and filling in shall be borne by the Contractor or Contractors required to furnish the sleeves and inserts. Formed openings and later installation of sleeves will not be permitted at locations subject to hydrostatic pressure.

**SECTION 12  
CUTTING AND PATCHING**

**G-12.01 GENERAL**

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

**G-13.01 DURING CONSTRUCTION**

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

The Contractor shall remove from the site all of his surplus materials and temporary structures when no further need therefor develops.

**G-13.02 FINAL CLEANING**

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.

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 appearing condition.

**SECTION 14  
MISCELLANEOUS**

**G-14.01 PROTECTION AGAINST SILTATION AND BANK EROSION**

The Contractor shall arrange his operations to minimize siltation and bank erosion on construction sites and on existing or proposed watercourses and drainage ditches.

**G-14.02 EXISTING FACILITIES**

The work shall be so conducted to maintain existing facilities in operation insofar as is possible. Work shall be scheduled to minimize bypassing during construction. Requirements and schedules of operations for maintaining existing facilities in service during construction shall be as described in the Special Provisions.

**G-14.03 USE OF CHEMICALS**

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

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## SPECIFIC PROVISIONS

### SP-1 Scope

The work included under these Contract Documents is as described in the Proposal.

All work shall be constructed, installed and maintained complete in place as specifically described in these Specifications, as shown on the Plans and as described and directed by the Engineer in accordance with the obvious or expressed intent of the Contract.

This work also includes general cleanup, start-up and testing of all installed equipment to ensure satisfactory operation of the pumping station and all other work required by the Contract Documents necessary to make the pumping station complete and functional.

### SP-2 Permits

The Contractor shall obtain all permits required to comply with SP-4.C Maintenance of Traffic, contained herein.

The Contractor shall have in his possession the proper license to perform the work before submittal of his bid and shall obtain any required City/County building permits and shall obtain and pay for all other licenses and authorizations required for the prosecution of the work, including the cost of all work performed in compliance with the terms and conditions of such permits, licenses and authorizations, whether by himself or others.

City/County building and Hillsborough County Department of Health permit fees will be paid by the City. The City will submit to Construction Services Division for building permit. Right-of-way and maintenance of traffic permit fees shall be paid by the Contractor.

The City has obtained the following permits. The Contractor shall comply with all permit conditions. Copies of the permits are provided with the Contract Documents:

- Tampa Port Authority Minor Works Permit
- SWFWMD Notice of Intent to Use a General Permit

The Contractor shall require all subcontractors to be currently licensed by the City to perform the proposed work in their respective fields and to obtain permits for the execution of said work. All work shall be performed in accordance with the licenses, permits and the requirements of the current Building and Construction Regulations Chapter of the City of Tampa Code.

The Contractor is responsible to schedule and coordinate with the City Construction Services Division of the Planning and Development Department all required inspections and tests for all phases of work to obtain final approval thereof.

The Contractor is encouraged to contact the City's Construction Services Division prior to commencement of work to ascertain their respective requirements.

### SP-4.C Maintenance of Traffic

The Contractor shall arrange his work so that there will be as little disruption of traffic as possible.

At least three weeks before starting any work in City streets, the Contractor shall obtain a City of Tampa Street Closure Permit for any traffic lane or street closure within the City. The permit will establish the requirements for closures related to the number of lanes and time of day lanes or streets may be closed. If the Contractor proposes a complete street closure, a detailed traffic maintenance plan shall be submitted to the City of Tampa Construction Service Division together with the

application for the Street Closure Permit. The traffic maintenance plan shall include proposed detour routes and locations and descriptions of direction signs for the construction area and detour routes. Two approved copies of all Street Closure Permits shall be submitted to the Engineer before starting any work in City streets. No changes to approved Street Closure Permits will be permitted without prior approval by the City.

The Contractor shall furnish and maintain all necessary signs, barricades, lights and flagmen necessary to control traffic and provide for safety to the public, all in compliance with the Florida Department of Transportation "Manual on Traffic Controls and Safe Practices for Street and Highway Construction, Maintenance and Utility Operations," with subsequent revisions and additions, and to the satisfaction of the Engineer.

The cost of maintaining traffic and of any additional earth excavation, selected fill, temporary wearing surface, temporary bridges, barricades, warning lights, flagmen, and like work required therefor shall be included under the various classified unit price Contract Items, or in the total Lump Sum Price, as applicable, and no additional payment will be made therefor.

For all proposed road and lane closures for this project, the Contractor shall prepare and submit a Maintenance of Traffic (M.O.T.) plan detailing all proposed detoured traffic flow, signage and barricades to the City's Wastewater Department, Transportation and Stormwater Services Department and Construction Services Division for approval. The route of the proposed bypass piping shall also be reflected on the MOT plans. It is recommended that the Contractor meet with Contract Administration Engineer before submitting the MOT. The Contractor shall be responsible for obtaining all road and lane closure permits from the City of Tampa, Construction Services Division. Where applicable, MOT(s) shall conform to appropriate FDOT Traffic Control Drawings contained in the FDOT Design Standards (600 Series Index Numbers), most current edition.

#### SP-5 Working Drawings

Prior to performing any work requiring working drawings, as specified on the Plans and in the Workmanship and Materials Sections, the Contractor shall submit the working drawings in accordance with the General Provisions section headed "Working Drawings."

#### SP-6 Environmental Protection

The Contractor will be held liable for the violation of any and all environmental regulations. Violation citations carry civil penalties and in the event of willful violation, criminal penalties. The fact that the permits are issued to the City does not relieve the Contractor in any way of his environmental obligations and responsibilities.

#### SP-8 Construction Start

Construction will not begin prior to receipt by the City of the required permits. If issuance of the Notice to Proceed is delayed due to permit acquisition, the contract time will be extended to suit,

but no extra payment will be made to the Contractor.

#### SP-9 Coordination and Cooperation

In performing work under this Contract, the Contractor shall coordinate his work with that of any adjacent contractors for the City, and others, and cooperate with them in every reasonable way, to the end that there shall be the minimum practicable interference with their operations.

#### SP-11 Construction Easements

In the event that, in the opinion of the Contractor, obtaining a temporary construction easement is necessary or desirable, it shall be the sole responsibility of the Contractor to obtain such easements from the Owner of the property. If such easements are obtained by the Contractor, they shall contain provisions to hold the City harmless from any operations of the Contractor within the easement limits. The Contractor shall not conduct construction operations on private property outside the limits of any easement obtained by the City or of any City-owned right-of-way unless a copy of the temporary construction easement agreement is filed with the Engineer.

#### SP-12 Releasing Facilities for Use

It is the intent of these Specifications that all newly constructed sewers and appurtenant facilities be placed in service as rapidly as an integrated portion of the facilities can be constructed, inspected and accepted by the Engineer. Acceptance or use by the City of any portion of the facilities prior to final acceptance shall not relieve the Contractor of any responsibilities, regarding such facilities, included in the Contract.

#### SP-13 Material and Equipment Approval

The Contractor shall not enter into any subcontracts, or place any order, for the furnishing of any material or equipment until he has received the Engineer's written approval of the manufacturers.

#### SP-14 Contractor Emergency Response Time

The Contractor must be available to service emergency calls seven (7) days a week, twenty-four (24) hours a day. The response time for emergency calls shall be within one (1) hour. A contact person and telephone number shall be provided to the Engineer for such purposes.

#### SP-15 Contractor's Field Office

Delete Article G-6.03 Contractor's Field Office from GENERAL PROVISIONS. The Contractor or an authorized agent shall be present at all times while his work is in progress. Readily accessible copies of both the contract documents and the latest approved working drawings shall be kept at the job site.

#### SP-16 Salvage

All existing pipe and appurtenances removed by the Contractor and which are not designated to

be salvaged shall become the property of the Contractor and shall be removed from the site of the work to the Contractor's own place of disposal.

Items which are shown on the Plans or specified to be salvaged shall be removed by the Contractor, delivered, and unloaded at a location within the Department's service area, as directed by the Engineer. The cost of removing, disposing, delivering, and unloading as salvage items of pipe and appurtenances shall be included in the various classified unit price Contract Items or in the total Lump Sum Price, as applicable, and no separate payment will be made therefor.

#### SP-17 Sequence of Operations

The Contractor shall develop with the Engineer a complete schedule of operations which, in the opinion of the Engineer, will permit use of the facility at the earliest possible date.

Taking over of parts of the work for operation before completion of the entire project shall not relieve the Contractor of any responsibility for proper integrated operations of all parts of the work, nor shall it act to relieve him of any responsibilities under Article A-6.04 of the Agreement, for guaranty of all parts of the work, for one year after the date of acceptance of all the work on the project.

#### SP-18 Dewatering

Dewatering is the responsibility of the Contractor. All costs associated with dewatering shall be included in the appropriate contract price for items to which dewatering is incidental, or in the total Lump Sum Price, as applicable, and no separate payment shall be made therefor.

Before commencing any excavation at the site of the work, the Contractor shall submit to the Engineer and obtain his approval of the methods and equipment and arrangement of facilities proposed for the removal and disposal of water at the site and of all water entering any excavation or other part of the work from any source whatsoever. Adequate standby facilities shall be provided to ensure that the excavation will be kept dry in the event of power failure or mechanical breakdown. Facilities for removal and disposal of water shall be of sufficient capacity to keep the excavation dry under all circumstances with one-half of the facilities out of service. If well points are used, provision shall be made for removing and resetting individual well points without taking the system of which they are a part out of service.

#### SP-19 Prevention, Control and Abatement of Erosion and Water Pollution

The Contractor shall be responsible for prevention, control and abatement of erosion, siltation and water pollution resulting from construction of the project until final acceptance of the project.

He shall provide, install, construct, and maintain any covering, mulching, sodding, sand bagging, berms, slope drains, sedimentation structures, or other devices necessary to meet City, County, State and Federal regulatory agency codes, rules and laws.

The Contractor shall take sufficient precautions to prevent pollution of streams, canals, lakes, reservoirs and other water impoundments with fuels, oils, bitumen, calcium chloride or other harmful materials. Also, he shall conduct and schedule his operations so as to avoid or otherwise minimize pollution or siltation of such streams, and the like, and to avoid interference with movement of migratory fish. No residue from dust collectors or washers shall be dumped into any live stream.

Storm drainage facilities, both open and closed conduit, serving the construction area shall be protected by the Contractor from pollutant and contaminants. If the Engineer determines that siltation of drainage facilities has resulted due to the project, the Engineer will advise the Contractor to remove and properly dispose of the deposited material. Should the Contractor fail to or elect not to remove the deposits, the City will provide maintenance cleaning as needed and will charge all costs of such service against the amount of money due or to become due the Contractor.

Except as necessary for construction, excavated materials shall not be deposited in rivers, streams, canals or impoundments, or in a position close enough thereto to be washed away by high water or runoff.

The Contractor shall not disturb lands or waters outside the limits of construction except as may be found necessary and authorized by the Engineer.

The location of and methods of operation in all detention areas, borrow pits, material supply pits and disposal areas furnished by the Contractor shall meet the approval of the Engineer as being such that erosion during and after completion of the work will not likely result in detrimental siltation or water pollution.

The Contractor shall comply with the applicable provisions of the Hillsborough County Land Development Code concerning grading, filling, excavation, soil removal, and the like, as amended.

The Contractor shall schedule his operations such that the area of unprotected erodible earth exposed at any one time is not larger than the minimum area necessary for efficient construction operations; and the duration of exposed, uncompleted construction to the elements shall be as short as practicable.

Clearing and grubbing shall be so scheduled and performed that grading operations can follow immediately thereafter and grading operations shall be so scheduled and performed that permanent erosion control features can follow immediately thereafter if conditions on the project permit.

The Engineer may limit the surface areas of unprotected erodible earth exposed by clearing and grubbing, excavation or filling operations and may direct the Contractor to provide immediate erosion or pollution control measures to prevent siltation or contamination of any river, stream, channel, tidal waters, reservoir, canal or other impoundment or to prevent damage to the project or property outside the project right of way.

#### SP-20 Project Sign

The Contractor shall furnish a project sign as shown on the detail included herein, and install it in the construction area as directed by the Engineer.

The cost of fabrication, erection, maintenance, removal, and proper disposal of the project sign at the completion of the project, including all labor and materials shall be deemed included in the prices bid for the various Contract Items of this Contract, or in the total Lump Sum Price, as applicable, and no separate payment will be made therefor.

No extra payment will be made for obliterating of certain names and offices and replacement thereof with others because of administrative changes during the course of the Contract.

#### SP-22 Construction Operations

In City streets, excavated materials shall, where practicable, be deposited upon streets, sidewalks, driveways, or other paved surfaces within the street right-of-way, except that interruptions to the use of driveways shall be kept to a minimum. The Contractor shall clean up areas from which soil has been removed at the end of each day by sweeping, washing, or other approved methods.

When the work is halted by rain, the Contractor shall clean up the working areas before leaving the site.

Trenches shall be protected at the close of each day's operations by lighted barricades, fences, and other methods to the satisfaction of the Engineer. Fences shall meet ASHA standards and be structurally stable as approved by the Engineer. No excavations shall be left open over a weekend.

In general, pipes shall be laid in open cut, except when another method, such as jacking, augering or tunneling is shown on the Plans, specified or ordered.

In City, State and County highways, excavated materials shall not be stored or cast upon the pavement, unless an advance approval of the governing agency is first obtained by the Contractor.

#### SP-23 Project Cleanup

Cleanup is extremely important and the Contractor will be responsible for keeping the construction site neat and clean with debris to be removed regularly as the work progresses.

#### SP-25 Work in Streets and Highways

All work within streets and highways shall be subject to the regulations and requirements of the appropriate agencies. Within the City of Tampa, streets and highways are under the jurisdiction of the City of Tampa, Transportation and Stormwater Services Department or State of Florida, Department of Transportation. Outside the City of Tampa, streets and highways are under the jurisdiction of the County of Hillsborough or the State Department of Transportation.

Methods and materials of construction used in restoration within such streets and highways, including pavement, sidewalk, curb, curb and gutter removal and replacement, replacement of storm sewerage facilities, excavation and backfilling, and the storage of plant, materials and equipment shall conform to the requirements of the City of Tampa and, where applicable, the County of Hillsborough or State Department of Transportation, and will be subject to the inspection and approval of the duly authorized representatives of the City, County and the State.

#### SP-26 Surface Restoration

Where construction activities are conducted in existing grassed areas, the grassed areas shall be restored as specified or directed by sodding or grassing. Such restoration of grassed areas shall conform to the requirements of the Workmanship and Materials section headed "Lawn Replacement."

The Contractor shall replace or repair all ground surfaces damaged during construction. Any bushes, flowers, gardens, patios, or other landscaping and irrigation systems disturbed by the construction project shall be repaired or replaced by the Contractor. The cost of such ground surface repair shall be included in the various classified unit price Contract Items, or in the total Lump Sum Price, as applicable, and no separate payment will be made therefor.

### SP-27 Existing Public Facilities

Existing public facilities that are removed by construction operations under this contract shall be replaced by the Contractor to City of Tampa specifications. These items shall include all public benches, playground light poles, shelters, roadway signs, and replacement of these items shall be considered incidental to the cost of construction, and no separate payment will be made therefor.

### SP-28 Work Adjacent to Utilities

Existing utilities including house services adjacent to or crossing the line of the work shall be protected as shown on the Plans, specified hereinbefore, and in accordance with the requirements of the General Provisions.

### SP-29 Utility Protection Considerations

The Contractor shall protect all utilities and other facilities within and adjacent to the construction as covered in Section G-1.03, unless a utility firm has conclusively indicated, or such is shown on the Plans, that the certain adjustment, removal, reconstruction, or protection of the utility's facility will be performed by that respective utility.

The Contractor shall furnish, install, and remove sheeting and shoring and other protective measures as may be necessary to satisfactorily accomplish the construction of this project. The cost of such sheeting and shoring and other protective measures shall be included in the unit prices as bid for the storm or sanitary sewer pipe items, and no separate payment shall be made therefor.

### SP-31 House Services

The various utilities, along the line of the work, which are shown on the Plans or located in the field during the course of the work may have house services connected to them. The Contractor is required to give all utility agencies 48 hours notice prior to start of work. The Contractor shall notify the various utility companies by calling the Sunshine State One Call of Florida, Inc. (1-800-432- 4770) or, if necessary, by contacting the utilities individually. When such notice is properly given, the utility having jurisdiction will locate house services along the line of work. The Contractor shall protect all existing house services which are shown on the Plans or located in the field during the course of the work. The Contractor shall arrange his operations to avoid any damage or disruption of water, gas, sewer, electric, telephone, and other house services.

Methods and techniques used by the Contractor to protect and maintain house services shall be subject to the prior approval of the Engineer.

Water and sewer services damaged or removed due to the work methods of the Contractor shall be replaced by the Contractor to such limits as directed by the Engineer. Materials used for such replacements shall be similar to those in the existing service or shall conform to the current standards of the utility as directed by the Engineer. All damaged water and sewer services shall be promptly repaired and shall be returned to service within 24 hours after the damage has occurred.

Other public utility house services which are damaged or removed due to the work methods of the Contractor will be repaired by the utility having jurisdiction and the cost of such repairs shall be borne by the Contractor.



Where the relocation or special maintenance of house services, as shown on the Plans, is required during construction of new pipelines the disruption of such services shall be kept to a minimum period of time as approved by the Engineer.

Unless otherwise specified in other Contract Items, or in the total Lump Sum Price, as applicable, the cost of protecting, replacing, repairing, relocating and maintaining house services shall be included in the various classified unit price Contract Items for pipelines, or in the total Lump Sum Price, as applicable, and no separate payment will be made therefor.

The maintenance and guaranty provisions of the Agreement shall also apply to all repairs and replacements of damaged or relocated services accomplished by the Contractor.

### SP-32 Short Tunnels

Sewers or force mains shall be constructed in short tunnels when determined necessary by the Engineer to protect trees, shrubs, and existing surface or subsurface utilities and structures. Short tunnels shall be constructed to the lengths specified and directed in writing by the Engineer. Separate payment for short tunnels will not be made but shall be included in the Contract Unit Price for which the short tunnel is incidental.

### SP-33 Protection of Trees and Shrubs

All trees and shrubs, except where otherwise shown or ordered, shall be adequately protected by boxes, fences, or otherwise carefully supported, as necessary, by the Contractor. Protective barricades shall be placed around all protected trees and grand trees and shall remain in place until all potentially damaging construction activities are completed (see attached barricade detail). The Parks Department must inspect the site after tree protection devices have been installed and prior to construction. A 48-hour notice must be given to Parks Department to schedule the inspection. No excavated or backfill material shall be placed in a manner which, in the opinion of the Engineer, may result in damage to trees or shrubs. Prior to mobilization, all exposed roots shall be covered with a two (2)-inch layer of mulch. The Contractor shall replace all trees or shrubs which are destroyed or damaged to such extent, in the opinion of the Engineer, to be considered destroyed. Replacement of destroyed trees or shrubs shall be made with new stock conforming to the requirements of the City's Tree Ordinance at the expense of the Contractor, and no separate payment will be made therefor.

Beneath trees within the limits of the excavation, and where possible, pipelines shall be built in short tunnels, except as otherwise shown or specified. When the tree is outside the limits of the excavation but, where the distance from the centerline of the new pipeline to the trunk of any tree is such that, in the opinion of the Engineer, the excavation would result in serious damage to the tree, the pipeline shall be constructed in short tunnel, as ordered in writing by the Engineer. The Contractor shall be responsible for all damage to trees and shrubs as a result of his operations, whether the pipeline is placed on trench, tunnel, or other excavation.

The Contractor shall provide the services of an approved licensed tree professional when it is necessary to trim or cut a branch from a tree.

The cost of protection of trees and shrubs, replacement or repair of trees or shrubs destroyed by the Contractor, short tunnels, and cutting or trimming of tree branches shall be included in the various classified unit price Contract Items for pipelines, or in the total Lump Sum Price, as applicable, and no separate payment will be made therefor.

### SP-35 Work in Private Property

Where portions of the work are constructed in easements through private properties, the limits of such City-owned easements are as shown on the Plans.

Upon completion of work in City-owned easements, the Contractor shall restore the property, including all fences or other structures disturbed by his operations, as nearly as possible to the condition in which he found it. No material shall be used or removed from private property without the approval of the Engineer.

The Contractor shall confine his operation in such private properties within the limits of the easements as shown or directed by the Engineer.

The Contractor shall further comply with all provisions of the grants of the City-owned easement and shall assume full responsibility as the agent of the City for all obligations of the City under such grants of easement in connection with the construction of pipelines.

The Contractor shall not enter upon or occupy any private land outside of the limits of the City-owned easement unless a copy of the written consent of the Owner is filed with the Engineer. The Contractor shall conduct his operations along easements through private property so as not to damage the property and to interfere with its ordinary use as little as possible.

### SP-36 Fences

Temporary fences, where required, shall be "wood and wire fence" or other suitable fencing as approved by the Engineer.

Permanent fences shall be restored by the Contractor and shall be finished and installed so that the restoration is equal to the original. Only those portions of original fencing, or materials therefrom, that the Engineer approved for reuse shall be used by the Contractor in fence restoration. All other materials, including lumber, paint, creosote, concrete and metal products, shall be furnished by the Contractor.

The cost of temporary fences and permanent fence restoration shall be included under the various classified unit price Contract Items, or in the total Lump Sum Price, as applicable, and no separate payment will be made therefor.

### SP-37 Data to be Submitted on Pipe

Within ten days after the date the Contractor is issued the Notice of Award and prior to his entering into any subcontract for the manufacture or purchase of any pipe, the Contractor shall submit to the Engineer, in an amount equal to four (4) sets to be retained by the City plus the number of sets desired by the Contractor, the following information:

1. The name and address of the pipe manufacturer and the location of the plant at which the pipe will be manufactured.
2. A general description of and specifications for the pipe and pipe joints proposed.
3. Notarized certificates of manufacture for VCP, PVC, HDPE, and DIP stating conformance to

applicable standards and specifications.

4. Any additional information that the Engineer may deem necessary in order to evaluate the qualifications of the manufacturer and to determine the suitability of the proposed pipe to meet the requirements of the Contract Documents.

The Contractor shall not enter into any subcontract for the furnishing of pipe until he has received the Engineer's approval, in writing, of the proposed manufacturer and pipe.

All pipe of specified classes and materials shall be of one kind and shall be produced by a single manufacturer.

#### SP-41 Compaction of Suitable Clay Fill Material

The Contractor shall have equipment available to properly compact any suitable clay fill material at no additional cost to the project.

#### SP-46 Filling Abandoned Sewers

The Contractor shall pump a lean mixture of grout into sewers as shown on the Plans and as directed by the Engineer.

The grout shall be a mixture of flyash and cement, the ratio of which shall be submitted to the Engineer for approval. The air-entraining admixture shall be permitted per FDOT Section 924. The grouting shall be carried out by pumps.

This work shall be carried out after the proposed sanitary sewer or storm sewer is functioning.

The Contractor shall take measures to ensure the pipe is completely filled with the grout. Such measures may consist of constructing temporary stand pipes, grout injection tubes, or other measures approved by the Engineer and as directed in the Workmanship and Materials section. The Contractor shall also construct approved plugs into the ends of the abandoned sewers. All costs to construct the plugs, stand pipes, grout injection tubes (or other approved measures), and any other necessary steps to provide for a complete item shall be included in the unit cost of the grout, and no additional payment shall be made therefor.

#### SP-47 Sanitary Sewer House Lateral Reconstruction

All sanitary sewer house laterals, in conflict, shall be reconstructed as indicated on the plans and as directed by the Engineer.

The laterals shall be constructed as indicated on the sanitary sewer standard sheet.

#### SP-48 Temporary Pavement Restoration

No portion of the work shall be left more than fourteen (14) days without temporary pavement surface; however, the Engineer may require that temporary pavement surface be installed sooner to ensure that no more than one-thousand (1,000) linear feet of road be open at one time. Payments on installed pipe of up to fifty percent (50%) of the unit price can be retained by the Engineer until a

crushed concrete or limerock base material along with a sand seal temporary pavement surface is provided. The Engineer can restrict further pipe laying if satisfactory and on-going street restoration is not performed by the Contractor. Temporary work shall be maintained in a suitable and safe condition for traffic until the permanent pavement is laid, or until final acceptance of the work.

#### SP-52 Street Pavement Base and Brick Surface Replacement

Permanent base material shall be installed and compacted to the required densities (98% modified proctor) in layers not exceeding six (6) inches.

The quantity of Permanent Pavement Base, in square yards, to be measured for payment will be as shown on the plans.

Payment limits for permanent pavement base and brick surface replacement along pipelines and valve box shall include removal and replacement of permanent pavement base incidental to construction as shown on the plans.

#### SP-56 Removal and Abandonment of Existing Sewer Systems within Pipeline Construction Payment Limits

The cost of removal or abandonment of existing sewer systems within pay limits including, but not limited to, pipe, inlets, manholes, manhole frames and covers, catch basins, and any other appurtenances as well as the cost to grout or sand-fill any pipe or manholes, where specified on the Plans, shall be included under the various classified unit price Contract Items for pipelines, or in the total Lump Sum Price, as applicable, and no separate payment will be made therefor.

Removal or abandonment of existing storm or sanitary sewer systems outside the sewer system pay limits, as shown on the Plans and directed by the Engineer, shall be paid for at the appropriate Contract Unit Price, or in the total Lump Sum Price, as applicable.

#### SP-59 Monthly Schedules

In addition to the Progress Schedule required in Article 4.02 of the Agreement, the Contractor shall submit a monthly schedule with each pay estimate. Pay estimates will not be processed unless accompanied by an updated monthly schedule.

#### SP-60 Contingency

The Contractor shall include a One Hundred Thousand Dollar (\$100,000) contingency sum, to be included as part of the total bid amount for this contract. The contingency is for the purpose of compensating the Contractor for any incidental work that may arise as construction operations proceed and was not addressed as part of the original work portrayed in the Plans and Specifications.

Contingency shall be split between lump sum items, \$70,000 contingency for Contract Item #1 (Wastewater) and \$30,000 contingency for Contract Item #2 (Stormwater).

The One Hundred Thousand Dollar (\$100,000) contingency sum is an upset limit. Any amount of the contingency shall be paid only after negotiation.

#### SP-62 Filling Low Areas Within City Limits

The Contractor, under Sec. 21-27 (Permit Requirements) of the City of Tampa Code, is prohibited from filling any area public or private (except where shown on the construction plans) within the project limits or anywhere within the City limits without a permit.

For filling and/or grading any area, the owner of such area shall obtain a permit from the Construction Services Division, City of Tampa. The owner shall submit existing and proposed contour plans of the area to be filled and the adjacent land for determination if a permit can be issued. Drainage patterns cannot be altered to the detriment of neighboring property owners or public rights-of-way.

The Contractor shall not deposit any fill material within the City limits without an approved permit. A copy of the permit shall be submitted to the Engineer by the Contractor prior to any filling or grading operation.

### SP-63 Existing Sewage Flows

The following flow data was calculated based on population data, 10 State Standards peaking factor pf 4.5 and information provided by the City and is believed to be reasonably accurate, but not guaranteed to be absolutely so, and is presented only as an approximation:

Virginia Avenue Pump Station:

Low Flow - 25 GPM  
Average Flow - 200 GPM  
Peak Flow - 250 GPM

### SP-64PS Bypass Pumping

The Contractor shall submit a detailed plan for bypass pumping to the Engineer for approval prior to proceeding with the work. All required agency approvals and permits, if required, shall be the responsibility of the Contractor. The hydraulic design of the bypass pumping arrangement shall be the sole responsibility of the Contractor. The plan, at a minimum, shall include the following information:

- Site plan showing location and arrangement of pumps and piping, including pipe sizes, fittings, valves, and connections
- Pump operation strategy and projected flow rates
- Pump curves for each size pump
- Detailed submittal information for all bypass pumping system equipment including pumps, generators, variable frequency drives, level sensors, auto-dialer, fuel tanks, etc.

The Contractor shall assume responsibility for fines and cleanup cost of upstream overflows due to insufficient or defective bypass pumping operation or untimely responses to high water alarms.

Bypass pumping system shall be capable of providing a minimum peak flow rate at a total dynamic head (T.D.H) as specified on the plans.

Pump suction pipes shall be installed in the manholes and structures and inflatable plugs shall be placed in pipes or structures to block the flow during construction. Suction pipes shall be arranged to avoid suction vortices in the structures. External mechanism, such as anti-vortex plates shall be provided if necessary. Temporary covers shall be installed to seal the annular spaces between the suction pipes and the openings in

the manholes or structures to prevent the gas from escaping during bypass pumping operations.

The bypass shall be watertight. Individual suction pipes for each bypass pump shall be required, and shall access the manholes or structures through the manhole openings. Manhole frames and tops can be removed in coordination with the City. Removal of structure tops and manhole chimney will need to be authorized in advance by the City. All manhole/structure modifications shall be restored to preconstruction condition or better upon completion of the bypass operation. Manifold suction arrangements will not be considered acceptable. As a minimum, the bypass discharge pipe shall have an air release valve at the highest point.

The bypass pumping system shall as a minimum consist of the pumps, valves, suction and discharge piping, level sensing equipment such as floats, and pump controls to automatically start and stop the pumps. The pumps shall be designed to handle the flow rates shown in the subsection heading "Existing Wastewater Flows". Each pump shall be equipped with a check valve on the discharge to prevent backflow through the pumps.

Bypass system will have a monitoring/alarm system equipped with an auto-dialer that automatically contacts the contractor and subcontractors if high water levels occur. Contractor shall be available on a 24-hour/7-day/week basis to respond within 1 hour to problems and to make any necessary adjustments and/or repairs needed to maintain continuous operation of the bypass system. The Contractor shall be solely responsible for maintaining the bypass system during the bypass operation. Personnel responding to auto-dialer notifications must be extremely knowledgeable with the bypass pumping system and capable of troubleshooting any problems in a timely manner.

The bypass pumping system shall be placed in operation and tested for a minimum 24 hour period. During the test period, all bypass pumping system components shall be tested including all pumps, pump controls and the auto-dialer. Should any problem(s) occur during the test period, the contractor shall rectify the problems and restart the 24 hour bypass pumping system test. Contractor will need to demonstrate a 24 hour trouble free operation of the bypass pumping system before performing any work that will prevent the pumping station to be placed back into service.

Contractor shall provide a perimeter fence around the bypass equipment, with a padlock so that unauthorized persons cannot operate the equipment. Multiple fences or locked panel may be required, dependent on the individual set up of the bypass pumping layout. A new fence will not be necessary if the bypass pumping system can be installed inside a gated/fenced area.

The bypass pumping shall continue in service until all work associated with this contract is substantially complete as determined and approved by the City.

Pumping equipment shall be of a type suitable for pumping raw unscreened wastewater over an indefinite period without clogging or requiring shutdown for routine maintenance. Bypass pumping shall be continuous during the entire length of time each portion of the work is being accomplished.

The bypass pumping system shall include back-up pumps. The back-up pumps shall be completely installed and shall automatically be placed into operation in the event one of the primary pumps fail. Back-up pumps shall be no smaller than the largest primary pumps they are replacing. The number of back-up pumps shall conform to the following chart:

Primary Bypass Pumps

Required Back-up Pumps

1-2

1

3-4	2
5-6	3

Contractor has the option to provide either electric or diesel bypass pumps or a combination of both for the bypass pumping system. If electric pumps are proposed, the contractor will be fully responsible in coordinating the temporary electric service from Tampa Electric Company (TEC) and all costs associated with the temporary service and electrical usage fees while the bypass system is in operation.

The Contractor has the option of providing a) electric primary and back-up pumps, b) electric primary pumps and back-up diesel pumps or c) diesel primary and back-up pumps. If the contractor elects to use all electric pumps as noted in the first option above, standby generator(s) will also be required that automatically start in the event of a power loss. The generator(s) shall be sized to run all the primary bypass pumps at peak flow. For the diesel pumps, there should be sufficient fuel storage at all times for a minimum of 48-hours of continuous operation at peak flow rate.

The bypass pumping system shall be properly secured to avoid damage, vandalism, or unauthorized shutdown. Pumps shall be baffled to comply with all noise abatement ordinances and regulations.

The costs of bypass pumping shall be included in the various Contract Unit Price Items or in the total Lump Sum Price, as applicable, and no separate payment shall be made therefor.

### SP-65 Pump Characteristics

Each pumping unit shall be designed for operating under the following conditions:

<u>Rating Data</u>	<u>Pump No.</u>
Number of Units	2
Rate of flow at rating point, gpm	213 gpm
Total pumping head at rating point, ft.	25.2 ft
Service and characteristics of electrical power	240 volt 3-phase 60 hertz 4 wire
Motor:	
Horsepower (minimum) hp - 3 phase	3 hp
Speed, rpm	1700 rpm

### Pump Construction:

1. All surfaces coming into contact with sewage shall be protected by a coat of factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.
2. The impeller of each pump shall be of non-clog design capable of passing a 3-inch spherical solid, fibrous material, and heavy sludge and shall be constructed with long throughlet without acute turns or Flygt N type hard iron multi-vane impeller.
3. Each pump shaft shall be of stainless steel conforming to ASTM A479 S43100-T.

4. The pump motors shall be housed in an air-filled watertight casing and shall have Class H moisture resistant insulation.

#### SP-66 Data to be Submitted on Pumping Station

Within 10 days after the date upon which the Contractor is issued the Notice of Award and prior to his entering into any subcontract or placing any order for the manufacture of any equipment, the Contractor shall submit the following information, in triplicate, to the Engineer:

1. The names and addresses of the equipment manufacturers and the locations of the shops at which the equipment will be manufactured.
2. A general description of the equipment proposed.
3. Any additional information that the Engineer may deem necessary in order to determine the ability of the manufacturer to produce the equipment as called for by the Contract Documents.

#### SP-67 Interruption of Service

Because of the nature of the work, it is imperative that the pumping station not be out of service for very long. The Contractor shall plan all this work, especially the work pertinent to the pumping operation, in detail and ensure that all the required items and equipment are on hand and in good working condition.

Prior to initiating any work pertaining to the operation of the pumping station, the Contractor shall submit to the City a detailed plan for shutdown of the station. No shutdown shall be performed until the plan is approved by the Engineer.

Scheduling of all shutdowns (partial or full) shall be coordinated with Tampa Electric Company (TECO) and the City. The Contractor shall make provisions and pay for temporary power used by him in performing this work.

#### SP-68 Water, Light and Power

Delete Article G-7.01 Water and G-7.02 Light and Power from GENERAL PROVISIONS . The City currently provides water and electrical power facilities to the sites. The Contractor may use the electrical and water sources as presently configured. If necessary to modify, extend, or relocate either the electrical or water facilities to facilitate construction, all costs shall be the responsibility of the Contractor.

#### SP-69 New Electric Service

"The Contractor shall provide, at his own expense, temporary lighting and power facilities required for the proper prosecution and inspection of the work. If, in the opinion of the Engineer, these facilities are inadequate, the Contractor will not be permitted to proceed with any portion of the work affected thereby." (General Provisions G-7.02.)

Prior to construction, the City will pay TECO an installation fee for new service, which will be good for the duration of the contract. Any additional fees required shall be the responsibility of the



Contractor.

The installation of the new permanent electrical service as well as any coordination with the City or County electrical inspection and with Tampa Electric Company shall be solely the responsibility of the Contractor. TECO will not perform any work without the following: (1) All fees paid. (2) Inspection by the appropriate electrical department.

### SP-71 Electrical Requirements

#### Electrical Work

Where definite requirements are not set forth in the Specifications, all electrical equipment, materials, and work under this Division shall comply with the requirements of the Occupational Safety and Health Act (OSHA) and shall be in accordance with applicable ANSI, IEEE, IPCEA, and NEMA standards. The work shall be performed in compliance with the 2014 edition of the National Electrical Code (NEC), all applicable state and municipal regulations and codes, and the service rules of the Tampa Electric Company, unless otherwise specified or directed. All equipment and materials shall be listed and labeled by a nationally recognized testing laboratory (NRTL) as required by the 2017 Florida Building Code, 6<sup>th</sup> edition. All custom control panels shall be assembled by a UL 508A certified panel shop and a UL label shall be applied to the finished product.

#### Electrician Qualifications

The Electrician performing the electrical work shall be licensed / certified in the State of Florida. The Electrician shall be thoroughly experienced with, and regularly engaged in, the demolition, installation, and trouble-shooting of industrial power systems with nominal system voltages of 240 volts or greater. The Electrician shall provide the City with evidence demonstrating at least three (3) years of successful industrial power system installations of similar complexity, content, and scope of the contract bid project. Specifically, the Electrician shall have successfully completed a minimum of two (2) projects involving the electrical work associated with the rehabilitation of a pumping station. The Electrician shall supply the City with references of industrial clients that will attest to the Electrician's work experience and power system installations.

### SP-72 Operation and Maintenance Manual, Submittals / Request for Information / Shop Drawings, and Asset Tracking Form

#### Operation and Maintenance Manuals

The Contractor shall prepare and submit to the Engineer four (4) hardcopies and one (1) high resolution color, bookmarked, and unsecured electronic portable document format (PDF) of an Operation and Maintenance Manual for all equipment and associated control systems furnished and installed under this Contract. Black and white copies will not be accepted. When the work reaches 75 to 80 percent completion, the Contractor shall submit to the Engineer for approval one hardcopy and one (1) PDF electronic copy of the manual with all specified material that is available at that time. The submittal shall accompany the Contractor's partial payment request for the specified completion. Within 30 days after approval of the Engineer of the PDF submittal, the Contractor shall furnish to the Engineer four (4) hardcopies of the manual. Appropriate space shall be left in the manual for material not available at the time of submittal. All missing material for the manual shall be submitted prior to the request for final payment.

Also, along with the missing material submitted with the request for final payment, one electronic copy (in pdf format) complete with all the missing material to be included in the earlier submitted hard copies shall be submitted. The manual shall be prepared and arranged as follows:

1. Space shall be provided in the manual for a reduced set of record Contract Drawings, size approximately 11 by 17 inches and folded to 8-1/2 by 11 inches. Drawings will be furnished by the Engineer.
2. One copy of all approved shop drawings and diagrams for all equipment furnished. The shop drawings and diagrams shall be reduced to either 8-1/2 by 11 inches or to 11 inches in the vertical dimension and as near as practicable to 17 inches in the horizontal dimension. Such sheets shall be folded to 8-1/2 by 11 inches.
3. One copy of manufacturer's operating, lubrication and maintenance instructions for all equipment and controls furnished. All equipment operating, lubrication and maintenance instruction and procedures shall be furnished on 8-1/2 by 11 inch commercially printed or typed forms. Such forms shall include equipment name, serial number and other identifying references.
4. One copy of manufacturer's spare parts list for all equipment furnished and prepared as specified in No. 3 above.
5. One valve schedule, giving the valve number, location, fluid and fluid destination for each valve installed and prepared as specified in No. 3 above. All valves in the same piping system shall be grouped together in the schedule. Valve numbers may include three or four numerals and a letter.
6. List of electrical relay settings and control and alarm contact settings.

Each copy of the manual shall be assembled in one or more binders, each with title page, typed table of contents, and heavy section dividers with copper reinforced holes and numbered plastic index tabs. Each manual shall be divided into sections headed by the equipment specification section included in "Workmanship and Materials." Binders shall be 3-ring hard-back. All data shall be punched for binding and composition and printing shall be arranged so that punching does not obliterate any data. The cover and binding edge of each manual shall have the project title, Division designation and manual title printed thereon, all approved by the Engineer.

Where more than one binder is required, they shall be labeled Vol. 1, Vol. 2, and so on. The table of contents for the entire set, identified by volume number, shall appear in each binder.

The four (4) hardcopies of the manuals and data included therein shall be provided in conformance with the subsection headed "Working Drawings" and, in addition, to the requirements of the General Provisions. The costs of the Operation and Maintenance Manual shall be included in the various Contract Items, or in the total Lump Sum Price, as applicable, and no separate payment will be made therefor.

#### Submittals / Request for Information / Shop Drawings

Contractor shall prepare and submit a minimum four (4) hardcopies and one (1) bookmarked, unsecured electronic portable document format (PDF) file for all Submittals, RFI, and Shop

Drawings. The City will review the submittals and return one (1) hardcopy and PDF file of the marked up submittal to the contractor. The contractor shall have approved hard copies of all submittals at the job site. Each electronic submission must be in a high resolution color format and shall be original electronic documents from the manufacturer. Hardcopies shall be high quality printed in color. Scanned printouts or poor quality resolution PDF files will not be accepted.

### Asset Tracking Form

The Asset Tracking Form (ATF) is a form that is intended to begin tracking assets and their respective preventative maintenance at an early stage in the project. The Contractor will be required to submit an electronic Asset Tracking Form for each piece of equipment. The information to be included on the form will include general information and specifications on the equipment such as, but not limited to, model, voltage, amperage, horsepower, material, manufacturer, serial number, recommended spare parts and preventative maintenance tasks.

During the preconstruction meeting of the project, the City will furnish the contractor with a blank electronic copy of the ATF in Microsoft Office 2010 and a preliminary list of equipment that will require an ATF. The City may provide the contractor a list of additional equipment requiring an ATF as the project progresses.

The Contractor shall submit all ATF(s) after the project is substantially complete. The City prefers one submission of all ATF(s).

### SP-73 Work Directive Change

A Work Directive Change is a written directive to the Contractor, issued on or after the date of the execution of the Agreement, and signed by the Engineer on behalf of the City, ordering an addition, deletion or revision in the work, or responding to an emergency. A Work Directive Change will not change the contract price or the time for completion, but is evidence that the parties expect that the change directed or documented by an Authorization to Proceed with Extra Work letter will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the contract price or the time for completion.

Without invalidating the Agreement, additions, deletions or revisions in the work may, at any time or from time to time, be authorized by a Change Order or a Work Directive Change. Upon receipt of any such document, the Contractor shall promptly proceed with the work involved.

### SP-75 Programmed Controls Equipment

Prior to acceptance of computers and programmable logic controllers, the Contractor shall meet the following requirements:

A full set of the original software media and licenses and documentation for all software items used on the equipment shall be provided to the City. All unique configuration files and databases shall be included in as-built documents and in disk format containing itemized filename lists and ASCII Source listings of each. All unique hardware, wiring schemes and dip switch settings, exact as-built program listings, and digital configurations shall be included in the as-built documents.

No aspect of programmed controls equipment shall have any security or access controls which are not totally in the control of the City. No programmed software self-destructs, of any type, shall be allowed. The software shall allow unlimited restorations and backups from any appropriate storage

media, to all appropriate equipment.

No Software Restriction Plug-in Modules or Software Activation Keys shall be allowed in any system, unless spare modules and keys are on hand for immediate disaster recovery.

Any part, whether hardware, software, or logical for which spare parts are not readily available; whose function or programming is not fully explained in documentation; or which in any way is not able to be replaced, restored, reprogrammed, and immediately placed back into service by the City using the as-built data, program listings, software media, and other resources provided shall not be accepted by the City.

All security information and data, including security bypass procedures for all approved security features, shall be fully documented to the City prior to acceptance. All unique patch cords, cables, connectors, tools, and appurtenant programming devices necessary to restore and maintain programming shall be supplied for use by the City and demonstrated in the appropriate training sessions.

The training for all programmed controls equipment shall include instructions on operation and maintenance of hardware and software. The training shall also demonstrate the full backup and restoration of all software after total equipment failure utilizing reinstallation procedures that accommodate unique hardware requirements, unique configuration files and databases, unique dip switch settings, and unique wiring information. The appropriate City personnel shall be trained to bypass all approved security features of all such equipment. The backup and restoration training shall use the actual as-built information and all unique appurtenances and itemize all such documentation and appurtenances to show that these items are complete.

#### SP-81 Services of Manufacturers' Representatives

The services of manufacturers' representatives shall be provided on the site as required for the supervision of installation, the adjustment and placing in satisfactory trouble-free operation of such equipment, and instructing City personnel in the operation and maintenance of such equipment for which such specialized services are specified, directed, or required.

Such manufacturers' services shall be of sufficient time and include a minimum period of one 8-hour day for instruction of City personnel. Additional time shall be provided if necessary.

The cost of all services of manufacturers' representatives shall be included in the various Contract Unit Price Items, or in the total Lump Sum Price, as applicable, and no separate payment will be made therefor.

#### SP-84 Piping and Equipment Identification

All piping and equipment shall be identified as follows:

1. All painted piping and equipment shall be color coded. Such coding on pipelines shall include painted or plastic tape banding at 10-foot intervals. The Engineer will select the colors. Underground pipelines with plastic tape wrapping shall be wrapped with colored tape and include additional colored bands as directed. Polyethylene or hot bituminous wrapped underground pipelines shall have plastic tape bands. Polyethylene wrapping for ductile iron sewage or force main piping shall be green. Tape bands shall be placed at 10-foot intervals and

all colors shall be selected by the Engineer.

2. All equipment shall have an identification nameplate. The nameplates shall be of Type 304 stainless steel, No. 6 finish, not less than No. 16 gauge with indented stamped lettering. Nameplates shall be attached to equipment bases in accessible locations. Nameplates shall be fastened, in a permanent manner arranged not to damage equipment, with not less than four stainless steel fasteners. All nameplates shall be of the same size (approximately 3- by 8- inch) and shall conform to the following standard sample:

Sewage Pump	(Name of item)
SC-P-1	(General type of designation, final list furnished by Engineer)
(12 digit number)	(Furnished by Engineer)

Lettering shall be block style in size and spacing to suit the nameplate. A sample nameplate including fastenings shall be submitted to the Engineer for approval prior to manufacture of any of the nameplates. Stainless steel identification nameplates shall not be painted.

The cost of piping and equipment identification shall be included in the various Contract Items, or in the total Lump Sum Price, as applicable, and no separate payment will be made therefor.

#### SP-85 Storage of Materials

The Contractor may not use that portion of the right-of-way located between the existing/proposed curb lines or existing/proposed edges of pavement to store pipe, structures, materials, surplus excavated fill, or equipment other than that used for excavating or dewatering. The Contractor may use that portion of the right-of-way behind the existing or proposed curb line or off the edge of pavement for storage provided that this use does not obstruct pedestrian or vehicular traffic and conforms to the City's Tree Ordinance. If the area behind the curb line/off the edge of pavement is insufficient in size to accommodate the Contractor's storage needs, the Contractor is required to secure the use of a vacant parcel of land for use as a storage site for the duration of this project. Upon completion of the project, all storage areas will be restored to a condition which meets or exceeds the pre-construction condition of the storage area. Payment for use and restoration of storage areas will be included in the appropriate lump sum pay items and unless the area is within the pipeline pay limits, no separate payment will be made therefor.

#### SP-86 Temporary Stockpiling

For temporary stockpiling of the excavated material within project limits (and anywhere within City limits), the Contractor shall follow the following procedure:

##### Public Right-of-Way

- a. The Contractor will not be allowed to stockpile suitable, excavated material within right-of-way for a period in excess of 30 calendar days. Unsuitable excavated material shall not be stockpiled within public right-of-way for a period in excess of 7 calendar days.

##### Location other than Public Right-of-way

- b. The Contractor shall:

- 1) Obtain the permission (in writing) from the owner of the property where stockpiling is desired.
- 2) At his own expense present the above letter and a contour plan of the site to the Engineer for approval of the stockpiling site.

The time periods of stockpiling shall be specified by the Contractor in writing.

Upon removal of stockpiled material, the Contractor shall clean up and grade the site to its original contours and conditions.

The City of Tampa shall not be a party to the agreement between the Contractor and the property owner.

Regardless of the location of stockpiling, it shall be the Contractor's responsibility to make sure that stockpiling in no way constitutes a public hazard or nuisance and does not interfere with the natural surface runoff in the area.

#### SP-89 Temporary Work Stoppages

The Contractor shall temporarily discontinue all construction activities from, and including, Thanksgiving Day through the following Sunday, and December 24 through January 2.

Prior to temporary work stoppages, all streets shall be restored to permit access to all businesses and residences and to allow ingress and egress by local traffic only. The Contractor shall maintain all streets at this condition level for the duration of the shutdown period.

All equipment, except that used for excavation and well pointing, and all materials including, but not limited to, manhole structures, pipe, and stockpiled material shall be removed to either the Contractor's storage lot or to a location outside the project area as approved by the City.

All costs associated with furnishing labor, equipment, temporary pavement restoration, demobilization, mobilization, signage, barricades, clean-up, security, and any other incidentals required to accommodate the Thanksgiving, Christmas and New Years' Holidays shall be included in the various contract unit prices, and no additional payment shall be made therefor.

#### SP-91 Project Photographs

The Contractor will not be required to furnish photographs of the project; however, the Engineer may or may not take photographs of the area immediately prior to and after completion of the construction for record and information. To assure that there will not be any conflict with this photography, the Contractor shall not perform clearing operations or action which will disturb any street or area within the project until the Engineer has been advised thereof and has had adequate opportunity to perform the desired photography.

#### SP-92 Project Videotaping

The Contractor shall submit to the Engineer for approval prior to commencing work a continuous color videotape recording complete coverage of pre-construction conditions of all surface

features within the construction's zone of influence, simultaneously produced audio commentary and electronic display of time and date. Unless otherwise indicated, both sides of street/right-of-way shall be covered one side at a time. The videotape recording shall be sufficient to fulfill the technical and forensic requirements of the project and professionally produced by a firm regularly engaged in the business of construction video documentation, shall provide continuous unedited coverage, establishing locations and viewer orientation with clear, bright, steady and sharp video images with accurate colors free of distortion or other imperfections.

#### SP-97 Protection of Existing Buildings

The Contractor shall protect the existing buildings using sound judgement. All costs associated with protection of the facilities or damage resultant from failure to do so shall be included in the price of the work to which they are incidental. No further payment shall be provided.

#### SP-98 Valves

Valves shall be handled with care to avoid damage. All valves shall be loaded and unloaded by lifting, and under no circumstances shall valves be dropped, skidded, or rolled. Valves shall not be placed, under any circumstances, against pipe or other fittings in such a manner that damage could result. Slings, hooks or tongs used for lifting shall be padded in such a manner as to prevent damage. If any part of the valves' coating and lining is damaged by the Contractor, the repair and replacement shall be made by the Contractor at his expense in manner satisfactory to the Engineer before installing. Valves shall also be stored at all times in a safe manner to prevent damage and kept free of dirt, mud or other foreign matter. All valve gaskets shall be stored and placed in a cool location out of direct sunlight and out of contact with petroleum products. All gaskets shall be used on a first-in, first-out basis.

All valves shall be furnished exactly as named on the Drawings, specifically manufacturer and model, unless otherwise approved by the Engineer or the City.

Valves shall be set and joined to new pipe in a manner heretofore specified for cleaning, laying and joining pipe. Valves shall be installed such that the operating nut is plumb.

The valve and valve box shall be installed so Department personnel can insert a valve key through the valve box and completely open and close the valve. This test will be accomplished before final acceptance of the valve and box.

The work shall include all labor, materials, equipment, tools and any incidentals required for the completion of the work.

Payment for valves shall be included in the price of the work to which the valves are incidental.

#### SP-104 Castings Identification

All casting covers, such as for inlets and manholes, shall bear the appropriate City of Tampa identification for storm sewers and for sanitary sewers, as shown on the Plans and directed by the Engineer.

#### SP-123 Pavement Replacement and Reconstruction of Existing Streets

All replacement and reconstruction of existing pavement shall be performed in accordance with the schedule as shown on the Plans.

For reconstruction outside the payment limits for pipeline construction, the Contractor shall excavate the existing street to the proposed grade, and regrade the shoulder from the edge of pavement to 5 feet beyond each side of the shoulder. All costs for reconstruction of existing streets outside the pipeline construction payment limits shall be included in the various Contract Item Unit Prices, and no separate payment shall be made therefor.

#### SP-126 Existing Driveway Replacement

Payment for driveway replacement due to roadway profile changes shall be made at the Contract Item Unit Price for Concrete Sidewalk including Driveway and Apron (6 inches thick) or included in the respective lump sum contract items.

#### SP-128 Spare Parts and Special Tools

Spare parts and special tools shall be furnished in accordance with the requirements of the Workmanship and Materials and General Provisions sections. All such items shall be boxed and tagged and clearly marked for identification as to description and their location in the equipment.

The Contractor shall provide an enclosed weatherproof and lighted facility for spare parts and special tools for storage during the construction period. Immediately prior to final inspection of the work, the Contractor shall arrange for delivery of these items to the Engineer. On delivery, the Contractor shall provide the Engineer with an itemized list of each spare part or special tool and the list shall match the identification tag attached to each item. At this time, the Engineer shall inventory the spare parts and special tools. If the inventory is not complete or some items are damaged, the Contractor shall provide the missing items and replace damaged items. No spare parts or special tools will be accepted by the Engineer until notice of final inspection unless the Engineer expressly requests the advance delivery of items. When so requested, the Contractor shall deliver such items to the Engineer. Items delivered in advance shall be deducted from the inventory and the Contractor shall furnish the Engineer's signed receipts, for items delivered in advance, with the final inventory list. Spare parts and special tools stored by the Contractor shall be and remain his responsibility until acceptance by the Engineer. The Contractor shall deliver all items to a location as directed by the City. The cost of all spare parts and special tools and the storage and delivery thereof shall be included in the various Contract Items, or in the total Lump Sum Price, as applicable, and no separate payment will be made therefor.

#### SP-129 As-Built Plans

During manufacture and construction, installation and testing, records shall be kept of any changes or adjustments made in the work. All such changes shall be incorporated in the "As-Built" plans, shown in red.

The Contractor shall provide the City of Tampa with one (1) hardcopy and (1) electronic high resolution unsecured color PDF copy set of "As-Built" plans along with the supporting survey data and CAD files if available. The survey shall be signed and sealed by a licensed Land Surveyor registered with the Florida Department Board of Professional Surveyors and Mappers. Plan sheets shall have all deviations from original design annotated in red to clearly show as-built conditions. Relocation of existing facilities and utilities must be clearly noted and their location identified by station, offset and



elevation, when performed by the Contractor.

As-builts shall clearly show installed horizontal and vertical location of all bends & fittings, valves, solid sleeves, hot tap sleeves & valves, lines stop tees permanently capped and left in active pipe, air release valve tap & valve boxes, tees, wyes, horizontal & vertical points of inflection, limits of removed pipes, limits of grouted pipes and limits of concrete encasements. Elevation deviations from the plans shall also be noted. If available, the Contractor shall provide the City with the Surveyor's electronic CAD file of the as-built locations.

Where applicable, As-builts shall conform to the "Record Drawing Requirements" section found in the City of Tampa Wastewater Department Technical Standards Guidelines for Construction of Wastewater Facilities (latest version). A copy of this standard can be found online on the City's Wastewater website.

All relocation of structures and pipelines must be clearly shown on Plans with as-built stations and offsets verified. All as-built inverts for the entire project must be clearly noted on plan sheets. No separate payment shall be made for this work.

All as-built plans shall be submitted within seven (7) calendar days of the final inspection. The final payment will not be issued until the as-built plans have been submitted to, and accepted by the City. Upon request by the Contractor, the City will provide AutoCAD drawings when available.

#### SP-130 Safety:

A. Responsibility: Employees shall immediately report any unsafe work practice or unsafe condition to their supervisor(s). The Contractor is solely responsible for the safety of their workers, and shall comply with all applicable requirements [i.e.: 29 CFR 1910 -Occupational Safety and Health Standards, 29 CFR 1926 - Safety and Health Regulations for Construction, etc] and industry safety standards while at the work site. The fact that City personnel may bring un-safe conditions to the attention of any member of the Contractors work force does not relieve the Contractor of this responsibility.

It is recommended that all Contractors employees and sub-contractors be given a copy of SP-130. The Contractor shall have a designated Safety Officer within his organization. At the Pre-Construction meeting, the Contractor shall provide the name and contact information of the Safety Officer to the Engineer.

At the Pre-Construction meeting, the Contractor will be given pertinent safety related information, necessary forms and instructions that pertain to any work that might be utilized during the contract. The Contractor shall be responsible to disseminate that information to their employees and sub-contractors. Special care shall be taken by the Contractor to ensure that any new employee or sub-contractor to the work site shall be briefed on these safety instructions.

If warranted by the project and directed by the Engineer, the Contractor shall develop and implement a comprehensive health and safety plan for their employees that will cover all aspects of onsite construction operations and activities associated with the contract. This plan must comply with all applicable health and safety regulations and any project specific requirements that the contract has specified.

B. Incident Reporting: All accidents that result in personal injury, illness or property damage shall be immediately reported and investigated, regardless of the extent of injury, illness or property

damage. Employees must report accidents within one hour (or as soon as practical) from the time of occurrence to their immediate supervisor who in turn will report it to the City's inspector. The City inspector will record the incident in their daily report and report it to the Risk Management Division (274-5708).

C. Air-Borne Debris: All personnel in close proximity to drilling, sawing, sanding, scraping, spraying, power-washing or other work being done, either in enclosed spaces or in the open, that creates dust or air-borne debris shall wear eye protection [29 CFR 1910.133] and a respirator [29 CFR 1910.134].

D. Hot Work: All welding, soldering, brazing, acetylene cutting or any other work at the AWTP or any pump station; that produces high temperatures shall require a AWTP "Hot Work Permit" and may require one or more fire watches. The number and location of fire watches (if any) shall be a condition of the Hot Work Permit. A current, portable, fully charged fire extinguisher shall be located with each person performing hot work and each fire watch. The Hot Work Permit shall be signed off by the appropriate personnel and maintained in the project file.

E. Confined Spaces: OSHA defines a confined space as having limited or restricted means for entry or exit, and is not designed for continuous employee occupancy. Confined spaces include, but are not limited to: vaults, tanks, manholes, wet-wells, pipelines, utility tunnels, etc.

The Contractor shall take measures [29 CFR 1910.146 (c)(5)] to ensure that atmospheric conditions in confined spaces are not hazardous to occupants. This can be accomplished by forcing a sufficient amount of clean air through the confined space and testing the atmosphere by using a portable certified, calibrated, atmosphere monitor that meets OSHA requirements [29 CFR 1910.146(c)(5)(ii)(C)]. The atmosphere monitor should record oxygen content, flammable gases and vapors and toxic air contaminants, such as the Industrial Scientific TMX-412.

F. Trench Safety: Any excavation deeper than four (4) feet shall adhere to the requirements contained in 29 CFR 1926.650 thru 652 and the Florida Trench Safety Act [Florida Statutes, ss 553.60 - 553.64].

G. Open Flames: No fires shall be allowed. No open flames necessary for any construction activity shall ever be left un-attended. A current, portable, fully charged fire extinguisher shall be located with each activity requiring an open flame.

H. Sparks: Any activity lasting more than 10 continuous minutes, that creates sparks, such as grinding or chipping shall have a dedicated fire watch in attendance. A current, portable, fully charged fire extinguisher shall be located with each activity creating sparks, regardless if a fire watch is required or not.

I. First Aid: The Contractor shall furnish appropriate First Aid Kits [29 CFR 1910.151] and shall be responsible to ensure his employees are properly trained to render first aid. If injurious corrosive materials are to be utilized, eye wash and body wash facilities must be provided in the immediate area.

J. Related Costs: All costs associated with these or any safety measures shall be included in the total lump sum contract price or the various contract item unit prices, as applicable, and no separate payment shall be made thereof.

### SP-144 Discharge Piping

- Pump discharge piping shall be as follows:
- HDPE SDR-11 within and exiting the wet well.
- Ductile iron for pump discharge piping and valves.
- DR 18 C900 PVC for buried force main.



**Page 1 of 2 –DMI Payment**  
**City of Tampa – DMI Sub-(Contractors/Consultants/Suppliers) Payments**  
**(FORM MBD-30)**

[ ] Partial [ ] Final

Contract No.: \_\_\_\_\_ WO#,(if any): \_\_\_\_\_ Contract Name: \_\_\_\_\_

Contractor Name: \_\_\_\_\_ Address: \_\_\_\_\_

Federal ID: \_\_\_\_\_ Phone: \_\_\_\_\_ Fax: \_\_\_\_\_ Email: \_\_\_\_\_

GC Pay Period: \_\_\_\_\_ Payment Request/Invoice Number: \_\_\_\_\_ City Department: \_\_\_\_\_

Total Amount Requested for pay period: \$ \_\_\_\_\_ Total Contract Amount(including change orders):\$ \_\_\_\_\_

Type of Ownership - (F=Female M=Male), BF BM = African Am., HF HM = Hispanic Am., AF AM = Asian Am., NF NM = Native Am., CF CM = Caucasian S = SLBE

Type	Trade/Work Activity	Federal ID	Total Sub Contract Or PO Amount	Amount Paid To Date	Amount To Be Paid For This Period
[ ]Sub [ ]Supplier				Amount Pending Previously Reported	Sub Pay Period Ending Date
				\$	\$
				\$	\$
				\$	\$
				\$	\$
				\$	\$
				\$	\$

**(Modifying This Form or Failure to Complete and Sign May Result in Non-Compliance)**

Certification: I hereby certify that the above information is a true and accurate account of payments to sub – contractors/consultants on this contract.

Signed: \_\_\_\_\_ Name/Title: \_\_\_\_\_ Date: \_\_\_\_\_



## Page 2 of 2 – DMI Payment

### Instructions for completing The DMI Sub-(Contractors/Consultants/ Suppliers) Payment Form (Form MBD-30)

This form must be submitted with all invoicing or payment requests where there has been subcontracting rendered for the pay period. If applicable, after payment has been made to the subcontractor, “Waiver and Release of Lien upon Progress Payment”, “Affidavit of Contractor in Connection with Final Payment”, or an affidavit of payment must be submitted with the amount paid for the pay period. The following will detail what data is required for this form. The instructions that follow correspond to the headings on the form required to be completed. **(Modifying or omitted information from this form my result in non-compliance).**

- **Contract No.** This is the number assigned by the City of Tampa for the bid or proposal.
- **W.O.#** If the report covers a work order number (W.O.#) for the contract, please indicate it in that space.
- **Contract Name.** This is the name of the contract assigned by the City of Tampa for the bid or proposal.
- **Contractor Name.** The name of your business.
- **Address.** The physical address of your business.
- **Federal ID.** A number assigned to a business for tax reporting purposes.
- **Phone.** Telephone number to contact business.
- **Fax.** Fax number for business.
- **Email.** Provide email address for electronic correspondence.
- **Pay Period.** Provide start and finish dates for pay period. (e.g. 05/01/13 – 05/31/13)
- **Payment Request/Invoice Number.** Provide sequence number for payment requests. (ex. Payment one, write 1 in space, payment three, write 3 in space provided.)
- **City Department.** The City of Tampa department to which the contract pertains.
- **Total Amount Requested for pay period.** Provide all dollars you are expecting to receive for the pay period.
- **Total Contract Amount (including change orders).** Provide expected total contract amount. This includes any change orders that may increase or decrease the original contract amount.
- **Signed/Name/Title/Date.** This is your certification that the information provided on the form is accurate.
- **See attached documents.** Check if you have provided any additional documentation relating to the payment data. Located at the bottom middle of the form.
- **Partial Payment.** Check if the payment period is a partial payment, not a final payment. Located at the top right of the form.
- **Final Payment.** Check if this period is the final payment period. Located at the top right of the form.

The following instructions are for information of any and all subcontractors used for the pay period.

- **(Type) of Ownership.** Indicate the Ethnicity and Gender of the owner of the subcontracting business or SLBE.
- **Trade/Work Activity.** Indicate the trade, service, or material provided by the subcontractor.
- **SubContractor/SubConsultant/Supplier.** Please indicate status of firm on this contract.
- **Federal ID.** A number assigned to a business for tax reporting purposes. This information is critical in proper identification of the subcontractor.
- **Company Name, Address, Phone & Fax.** Provide company information for verification of payments.
- **Total Subcontract Amount.** Provide total amount of subcontract for subcontractor including change orders.
- **Amount Paid To Date.** Indicate all dollars paid to date for the subcontractor.
- **Amount Pending, Previously Reported.** Indicate any amount previously reported that payments are pending.
- **Amount To Be Paid for this Period.** Provide dollar amount of dollars requested for the pay period.
- **Sub Pay Period Ending Date.** Provide date for which subcontractor invoiced performed work.

*Forms must be signed and dated or will be considered incomplete. The company authorized representative must sign and certify the information is true and accurate. Failure to sign this document or return the document unsigned can be cause for determining a company is in non-compliance of Ordinance 2008-89.*

If any additional information is required or you have any questions, you may call the Minority Business Development Office at (813) 274-5522.

0 1 2 3 4 5 6 7 8

**Sign Information**

**Building a Better Tampa**

**David L. Tippin Water Treatment Facility  
Caustic Soda Piping Improvements**

*Project provides for Improvements at the David L. Tippin Water Treatment Facility to Improve the reliability and safety of the Sodium Hydroxide System of the water distribution system within the facility.*

\$TBD investment  
Scheduled for completion in TBD 2014

TBD

**Colors**

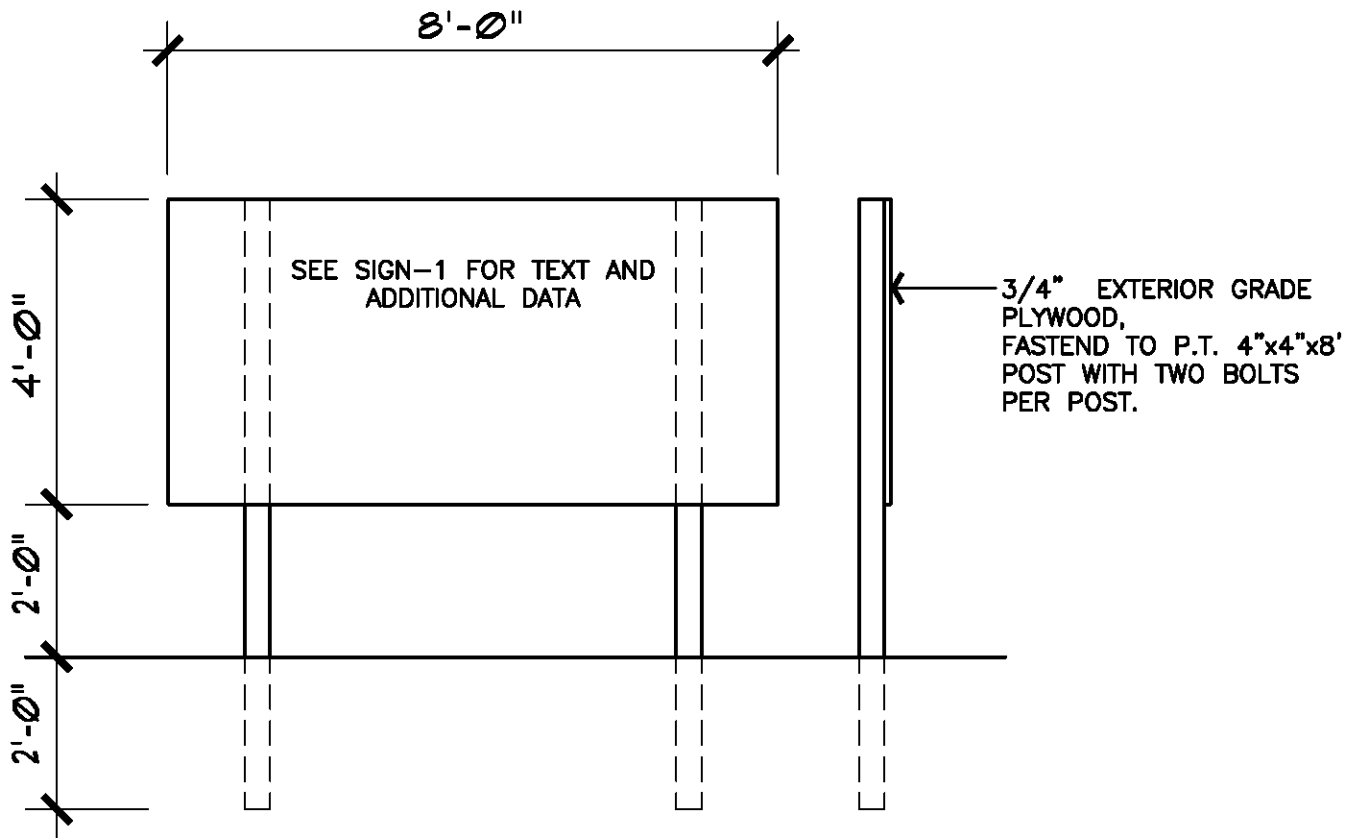
Blue: Sherwin Williams Naval SW6244  
Green: Sherwin Williams Center Stage SW 6920  
White: Sherwin Williams Pure White SW7005

**Font**

Franklin Gothic

**SIGN EXAMPLE ONLY GRAPHIC TO BE DEVELOPED BY CONTRACTOR**

not to scale



## WORKMANSHIP AND MATERIALS

### SECTION 1 - EXCAVATION - EARTH AND ROCK

#### W-1.01 General

Open cut excavations shall be made to the widths and depths necessary for constructing all structures, pipelines and other conduits included in the Contract, according to the Plans, and includes the excavation of any material which, in the opinion of the Engineer, is desirable to be excavated for any purpose pertinent to the construction of the work. Banks more than 5 feet high, where a danger of slides or cave-ins exist, shall be shored or sloped to the angle of repose.

Where excavations are to be made below groundwater, the Contractor shall submit to the Engineer for approval, in detail, his proposed method for control of groundwater, including a description of the equipment he plans to use and the arrangement of such equipment. No such excavation shall be started until approval of the Engineer has been obtained. Dewatering work shall be included in the Contract Items for pipelines, box culverts, inlets, manholes and other structures, and pumping stations, and no separate payment will be made therefor.

#### W-1.02 Clearing

The site of all open cut excavations shall first be cleared of obstructions preparatory to excavation. This includes the removal and disposal of vegetation, trees, stumps, roots and bushes, except as specified under the subsection headed "Trench Excavation."

#### W-1.03 Authorized Additional Excavation

In case the materials encountered at the elevations shown are not suitable, or in case it is found desirable or necessary to go to an additional depth, or to an additional depth and width, the excavation shall be carried to such additional depth and width as the Engineer may direct in writing. The Contractor shall refill such excavated space with either Class D concrete, or select sand or crushed stone fill material, as ordered. Where necessary, fill materials shall be compacted to avoid future settlement. Additional earth excavations so ordered and concrete, or selected sand or crushed stone fill material ordered for filling such additional excavation and compaction of select sand or crushed stone fill material will be paid for under the appropriate Contract Items or where no such items exist, as extra work as specified in Article 7 of the Agreement.

#### W-1.04 Unauthorized Excavation

Wherever the excavation is carried beyond or below the lines and grades shown or given by the Engineer, except as specified in the subsection headed "Authorized Additional Excavation," all such excavated space shall be refilled with such material and in such manner as may be directed in order to ensure the stability of the various structures. Spaces beneath all manholes, structures or pipelines excavated without authority shall be refilled by the Contractor at his own expense, with Class D concrete, or select sand or crushed stone fill material, and properly compacted, as ordered by the Engineer, and no separate payment will be made therefor.

#### W-1.05 Segregation and Disposal of Material



Topsoil suitable for final grading and landscaping and excavated material suitable for backfilling or embankments shall be stockpiled separately on the site in locations approved by the Engineer. Excavated and other material shall not be stored nearer than 4 feet from the edge of any excavation and shall be so stored and retained as to prevent its falling or sliding back into the excavation. Surplus excavated material and excavated material unsuitable for backfilling or embankments shall become the property of the Contractor and shall be transported, as approved by the Engineer, away from the site of the work to the Contractor's own place of disposal.

#### W-1.06 Shoring and Sheeting

All excavations shall be properly shored, sheeted, and braced or cut back at the proper slope to furnish safe working conditions, to prevent shifting of material, to prevent damage to structures or other work, and to avoid delay to the work, all in compliance with the U. S. Department of Labor Safety and Health Regulations for Construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54). The minimum shoring, sheeting and bracing for trench excavations shall meet the general trenching requirements of the safety and health regulations. Before starting excavation for jacking pits and structures, the Contractor shall submit complete design calculations and working drawings of proposed sheeting and bracing arrangements which have been prepared, signed and sealed by a Professional Engineer registered in the State of Florida. Bracing shall be so arranged as not to place any strain on portions of completed work until the general construction has proceeded far enough, in the opinion of the Engineer, to provide ample strength. If the Engineer is of the opinion that at any point the sheeting or supports furnished are inadequate or unsuited for the purpose, he may order additional sheeting or supports to be installed. Whether or not such orders are issued, the sole responsibility for the design, methods of installation, and adequacy of the sheeting and supports shall be and shall remain that of the Contractor.

Tight sheeting shall be used in that portion of the excavation in City collector and arterial streets and in State and County highways below the intersection of a 1 on 1 slope line from the edge of the existing pavement to the nearest face of the excavation.

In general, sheeting for pipelines shall not be driven below the elevation of the top of the pipe. If it is necessary to drive the sheeting below that elevation in order to obtain a dry trench or satisfactory working conditions, the sheeting shall be cut off at the top of the pipe and left in place below the top of the pipe at no additional cost.

The sheeting and bracing shall be removed as the excavation is refilled in such a manner as to avoid the caving in of the bank or disturbance to adjacent areas or structures except as otherwise shown or directed. Voids left by the withdrawal of the sheeting shall be carefully filled by ramming or otherwise as directed.

Permission of the Engineer shall be obtained before the removal of any shoring, sheeting, or bracing. Such permission by the Engineer shall not relieve the Contractor from the responsibility for injury or to other property or persons from failure to leave such sheeting and bracing in place.

### W-1.07 Sheeting Left in Place

The Engineer may order, in writing, any or all sheeting or bracing to be left in place for the purpose of preventing injury to the structures or to other property or to persons, whether such sheeting or bracing was shown on the Plans or placed at his direction or otherwise. If left in place, such sheeting shall be cut off at the elevation ordered, but, in general, such cutoffs shall be at least 18 inches below the final ground surface. Bracing remaining in place shall be driven up tight.

The right of the Engineer to order sheeting and bracing left in place shall not be construed as creating any obligation on his part to issue such orders.

Sheeting and bracing left in place, by written order of the Engineer, will be paid for under the appropriate Contract Item if included in the Proposal or otherwise by provisions of extra work as specified in Section 7 of the Agreement.

### W-1.08 Removal of Water

At all times during the excavation period and until completion and acceptance of the work at final inspection, ample means and equipment shall be provided with which to remove promptly and dispose of properly all water entering any excavation or other parts of the work. The excavation shall be kept dry. No water shall be allowed to rise over or come in contact with masonry and concrete until the concrete and mortar have attained a set satisfactory to the Engineer and, in any event, not sooner than 12 hours after placing the masonry or concrete. Water pumped or drained from the work hereunder shall be disposed of in a safe and suitable manner without damage to adjacent property or streets or to other work under construction. Water shall not be discharged onto streets without adequate protection of the surface at the point of discharge. No water shall be discharged into sanitary sewers. No water containing settleable solids shall be discharged into storm sewers. Any and all damage caused by dewatering the work shall be promptly repaired by the Contractor.

### W-1.09 Structure Excavation

Excavations shall be of sufficient size and only of sufficient size to permit the work to be economically and properly constructed in the manner and of the size specified. The bottom of the excavation in earth and rock shall have the shape and dimensions of the underside of the structure wherever the nature of the ground will permit.

### W-1.10 Trench Excavation

Before starting trench excavation, all obstructions which are to be removed or relocated shall be cleared away. Trees, shrubs, poles, and other structures which are to be preserved shall be properly braced and protected. All trees and large shrubs shall be preserved with damage to the root structure held to a minimum, unless otherwise shown or specified. Small shrubs may be preserved or replaced with equivalent specimens.

The width of trenches shall be such as to provide adequate space for workmen to place, joint, and backfill the pipe properly, but shall be kept to a minimum. Unless otherwise approved by the Engineer, the clear width of the trench at the level of the top of the pipe shall not exceed the sum of the outside diameter of the pipe barrel plus 24 inches.

In sheeted trenches, the clear width of the trench at the level of the top of the pipe shall be measured to the inside of the sheeting.

Should the Contractor exceed the maximum trench widths specified above, without written approval of the Engineer, he may be required to provide, at his own expense, concrete cradle or encasement for the pipe as directed by the Engineer, and no separate payment will be made therefor.

The Contractor shall excavate trenches to the respective depths, below the bottom of the pipe, for the various classes of pipe bedding shown on the Plans so that pipe bedding material can be placed in the bottom of the trench and shaped to provide a continuous, firm bearing for the pipe barrel and bells.

If unstable material is exposed at the level of the bottom of the trench excavation, it shall be excavated in accordance with the subsection headed "Authorized Additional Excavation." When in the judgement of the Engineer the unstable material extends to an excessive depth, he may advise the Contractor in writing to stabilize the trench bottom with a crushed stone, sand mat or gravel mat to ensure firm support for the pipe by other suitable methods. Payment for such trench stabilization will be made under the appropriate Contract Items or where no such items exist, as extra work as specified in Section 7 of the Agreement.

The open excavated trench preceding the pipe laying operation and the unfilled trench with pipe in place shall be kept to a minimum length causing the least disturbance to traffic and use of adjacent property. Ladders shall be provided and so located as to provide means of exit from the trench without more than 25 feet of lateral travel.

#### W-1.11 Rock Excavation

The term "rock" as used herein shall include all materials which have compressive strengths in excess of 300 psi in their natural undisturbed state and which, in the opinion of the Engineer, require drilling and blasting, wedging, sledging, barring or breaking with power tools not otherwise required for normal excavating.

Rock shall be excavated, within the boundary lines and grades as shown on the Plans, specified, or given by the Engineer. Rock removed from the excavation shall become the property of the Contractor and shall be removed by him away from the site of the work to his own place of disposal, and no separate payment will be made therefor.

All shattered rock and loose pieces shall be removed.

For trench excavation in which pipelines or other conduits are to be placed, the rock shall be excavated to a minimum depth of 6 inches below the bottom of the pipe and the excavated space refilled with pipe bedding material. Placing, compacting, and shaping pipe bedding material shall be included in the various classified unit price Contract Items for pipelines, and no separate payment will be made therefor.

For manhole excavation, the rock shall be excavated to a minimum depth of 8 inches below the bottom of the manhole base for pipelines 24 inches in diameter and larger, and 6 inches below the bottom manhole base for pipelines less than 24 inches in diameter and the excavated space

refilled with crushed stone. Placing, compacting, and shaping crushed stone for manhole bases shall be included in the appropriate Contract Items for manhole bases, and no separate payment will be made therefor.

For cast-in-place structures, the rock shall be excavated only to the bottom of the structure or foundation slab.

Excavated space in rock below structures, pipelines, and manholes which exceeds the depths specified above shall be refilled with Class D concrete, crushed stone, or other material as directed by the Engineer. Refilling of over-excavated rock in rock shall be included as part of the rock excavation, and no separate payment will be made therefor.

Where applicable, the requirements of the subsections on "Trench Excavation" and "Structure Excavation" shall be followed.

Blasting may be performed only when approved by the Engineer and authorized by the Agency having jurisdiction over the subject location and in accordance with all laws, ordinances, and regulations of the Agency.

#### W-1.12 Excavation for Jacking and Augering

Excavation for jacking or augering shall meet the requirements of the Workmanship and Materials section headed "Jacking and Augering."

\* \* \*

## SECTION 2 - BACKFILLING

### W-2.01 General

All excavation shall be backfilled to the original surface of the ground or to such other grades as may be shown or directed. For areas to be covered by topsoil, backfill shall be left 4 inches below the finished grade or as shown on the Plans. The time elapsing before backfilling is begun shall be subject to the approval of the Engineer. In all backfilling, all compressible and destructible rubbish and refuse which might cause later settlement and all lumber and braces shall be removed from the excavated space before backfilling is started, except that sheeting and bracing shall be left in place or removed as the work progresses.

Construction equipment used to backfill against and over cast-in-place concrete structures shall not be permitted to travel over these structures until the designated concrete strength has been obtained as verified by concrete test cylinders. In special cases where conditions warrant, as determined by the Engineer, the above restriction may be modified if the concrete has gained sufficient strength, as determined from test cylinders, to satisfy design requirements for the removal of forms and the application of load.

### W-2.02 Unsuitable Backfill Material

Before backfilling around structures, all rubbish shall be removed from behind the walls.

When the excavated material contains garbage, cinders, glass, tin cans, wood, or other trash or objectionable organic material, as determined by the Engineer, it shall not be used for backfill but shall be disposed of by the Contractor away from the site of the work to his own place of disposal. The unsuitable materials shall be replaced with backfill material which shall be sand, clay, gravel, sandy loam, or other excavated material free of objectionable organic matter, as approved by the Engineer.

### W-2.03 Select Fill Material - General

Select fill material shall be used for pipe bedding, manhole bedding, trench and structure backfill, and other purposes as shown on the Plans, specified, and ordered in writing by the Engineer.

Select fill material shall be sand, conforming to the requirements of the subsections headed "Select Fill Material - Sand" or crushed stone or limestone screenings, conforming to the requirements of the subsection headed "Select Fill Material - Crushed Stone."

### W-2.04 Select Fill Material - Sand

Sand used for pipe bedding or as select fill material for trench or structure backfill shall consist of job excavated sand or imported sand which can be readily and thoroughly compacted. Sand shall be reasonably well graded and shall fall within the following gradation limits:

Passing No. 4 sieve - 95 percent (minimum)

Passing No. 200 sieve - 10 percent (maximum)

Sand containing more than 10 percent of material passing the No. 200 sieve or sand which, in the opinion of the Engineer, would have a tendency to flow under pressure when wet will not be acceptable for use as pipe bedding or select fill material for trench or structure backfill

Sand shall not be used for bedding for manholes or other structures.

#### W-2.05 Select Fill Material - Crushed Stone

Crushed stone used for pipe bedding, manhole base bedding, or as select fill material for trench or structure backfill shall consist of clean, durable rock, angular in shape, which can be readily and thoroughly compacted. Crushed stone shall be reasonably well graded and shall be no greater than a No. 57 stone.

#### W-2.06 Pipe and Structure Bedding

All pipelines shall be bedded in well graded, compacted select fill material. Select fill material shall be sand, conforming to the subsection headed "Select Fill Material - Sand" and/or crushed stone, conforming to the subsection headed "Select Fill Material - Crushed Stone," as shown on the Plans, specified or ordered in writing by the Engineer. Pipe bedding shall be constructed in accordance with the details shown on the Plans.

When shown on the Plans or ordered in writing by the Engineer, pipelines (except PVC) shall be laid in Class D concrete cradle or encasement.

Precast concrete manhole bases shall be bedded on No. 57 stone, conforming to the subsection headed "Select Fill Material - Crushed Stone," as shown on the Plans.

Cast-in-place manhole bases and other foundations for structures shall be cast against undisturbed earth in clean and dry excavations.

Existing underground structures, tunnels, conduits and pipes crossing the excavation shall be bedded with compacted select fill material. Bedding material shall be placed under and around each existing underground structure, tunnel, conduit or pipe and shall extend underneath and on each side to a distance equal to the depth of the trench below the structure, tunnel, conduit or pipe.

#### W-2.07 Bedding Placement for Pipelines

Select fill material, used as pipe bedding, shall be placed by hand, in uniform layers not greater than 6 inches in loose thickness and thoroughly compacted in place. Select fill material pipe bedding shall extend to one foot over the top of the pipe.

Each layer of select fill shall be thoroughly tamped and compacted in place by hand or with suitable mechanical or pneumatic tools to a dry density not less than 95 percent of the maximum dry density as determined by AASHTO Des: T-180. No large stone fragments shall be placed in the pipe bedding nor closer than two feet to any point on any pipe.

### W-2.08 Bedding Placement for Precast Concrete Manholes

No. 57 stone used for bedding beneath precast manhole bases shall be placed in uniform layers not greater than 6 inches in loose thickness and thoroughly compacted in place with suitable mechanical or pneumatic tools.

### W-2.09 Structure Backfill

Backfill around manholes, risers, and structures shall be suitable job excavated material, selected fill material, or other material approved by the Engineer. Such backfill shall extend from the bottom of the excavation or top of structure bedding to the bottom of pavement base course, subgrade for lawn replacement, the top of the existing ground surface, or to such other grades as may be shown or given by the Engineer.

The backfill shall be placed in uniform layers not greater than 18 inches in loose thickness and thoroughly compacted in place with suitable mechanical or pneumatic tools to a dry density of not less than 98 percent of the maximum dry density as determined by AASHTO Des: T-180.

### W-2.10 Trench Backfill

Trenches shall be backfilled from 1 foot over the top of the pipe to the bottom of pavement base course, subgrade for lawn replacement, to the top of the existing ground surface or to such other grades as may be shown or given by the Engineer. Trench backfill shall be select fill material, suitable job excavated material or other material, as approved by the Engineer.

Except under pavements and railroad tracks, trench backfill shall be placed in uniform layers not greater than 18 inches in loose thickness and thoroughly compacted in place using heavy-duty tampers such as pneumatic jackhammers with tamping foot attachment or vibrating rollers if required. Each layer shall be compacted to a dry density of not less than 95 percent of the maximum dry density as determined by AASHTO Des: T-180.

Where railroad tracks or pavements and appurtenances for streets or highways are to be placed over trenches, the trench backfill shall be placed in uniform layers not greater than 12 inches in loose thickness and thoroughly compacted in place with equipment as specified above. Each layer shall be compacted to a dry density of not less than 98 percent of the maximum dry density as determined by AASHTO Des: T-180. On City of Tampa streets, each layer shall be compacted as specified above to the bottom of the subbase which is defined as 10 inches below the bottom of the base course. The subbase shall be compacted to 98 percent of modified proctor.

Trench backfilling work shall be done in a manner to prevent dropping of material directly on top of any conduit or pipe through any great vertical distance. In no case shall backfilling material from a bucket be allowed to fall directly on a structure or pipe and in all cases, the bucket shall be lowered so that the shock of falling earth will not cause damage.

Lumps shall be broken up and if there are any stones, pieces of crushed rock or lumps which cannot be readily broken up, they shall be distributed throughout the mass so that all interstices are solidly filled with fine material.

#### W-2.11 Backfill for Short Tunnel

Where pipelines are placed in short tunnels, the annular space between the outside of the pipe wall and the tunnel wall shall be completely filled with select fill material or suitable excavated material. Pipelines in short tunnels shall be suitably supported, to permit placing backfill which shall be suitably tamped in place.

#### W-2.12 Finish Grading

Finish grading shall be performed to meet the existing contour elevations and grades shown on the Plans or given by the Engineer and shall be made to blend into adjacent natural ground surfaces. All finished surfaces shall be left smooth and free to drain.

Grading outside of pipelines or structure lines shall be performed in such a manner as to prevent accumulation of water within the area. Where necessary or where shown on the Drawings, finish grading shall be extended to ensure that water will be carried to drainage ditches, and the construction area left smooth and free from depressions holding water.

#### W-2.13 Responsibility for After Settlement

Any depression which may develop in backfilled areas from settlement within one year after the work is fully completed and accepted shall be the responsibility of the Contractor. The Contractor shall, at his own expense, provide as needed additional backfill material, pavement base replacement, permanent pavement sidewalk curb and driveway repair or replacement, and lawn replacement and shall perform the necessary reconditioning and restoration work to bring such depressed areas to proper grade as approved by the Engineer.

#### W-2.14 Inspection and Testing of Backfilling

All backfill shall be subject to test by the City with the assistance of the Contractor. Testing for projects located at the Howard F. Curren Treatment Plant or projects related to pumping station rehabilitations shall be tested by an approved third party lab at the expense of the Contractor.

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## SECTION 4 – CONCRETE AND CONCRETE MATERIALS

### W-4.01 General

This section covers concrete materials and performance requirements for wastewater structures.

### W-4.02 Cement

Cement shall be from a source approved by the Engineer before the cement is ordered. Domestic manufacturers of cement shall furnish to the Engineer notarized Certificates of Manufacture as evidence that the cement conforms to the requirements of the Specifications. These certificates shall include mill test reports on the cement. Suppliers of foreign cements shall furnish to the Engineer test data from a testing laboratory approved by the Engineer to show conformance with all applicable requirements of ASTM Des: C 150. Samples for testing shall be taken in accordance with ASTM Des: C 183. The cost of tests on foreign cement shall be considered as part of the cost of the work and shall be included under the appropriate Contract items. No separate payment for such testing will be made. Cement shall be either air-entraining portland cement or standard portland cement, except as otherwise specified. If standard portland cement is used, an air-entraining agent meeting the requirements of ASTM Des: C 260 shall be added to the concrete at the time of mixing in an amount sufficient to produce from 4 to 6 percent entrained air in the concrete for plastic mixes having a slump of 2 to 4 inches. Standard portland cement shall meet the requirements of ASTM Des: C 150, Type I or Type II, and air-entraining cement shall meet the requirements of ASTM Des: C 150, Type IA or Type IIA.

### W-4.03 High-Early Strength Cement

In case high-early strength cement is used in any special part of the work, it shall be true portland cement with no chemicals or other substances added to expedite hardening and shall be of a brand approved by the Engineer. The cement shall meet the requirements of ASTM Des: C 150 Type III or Type IIIa. High-early strength cement shall be used only with the approval of the Engineer.

### W-4.04 Fine Aggregate

Fine aggregate shall be natural sand, washed clean, having hard, strong, sharp, durable, uncoated grains; and shall be free from injurious amounts of dust, lumps, soft or flaky particles, mica, shale, alkali, organic matter, loam, or other deleterious substances. Fine aggregate shall conform to the requirements of Section 902 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

### W-4.05 Coarse Aggregate

Coarse aggregate shall consist of gravel or broken stone composed of strong, hard, durable, uncoated pebbles or rock fragments, washed clean and free from injurious amounts of shale, coal, clay, lumps, soft fragments, dirt, glass, and organic and other deleterious substances. It shall conform to ASTM Des: C 33. The size shall be No. 57, as specified in Table II of ASTM Des: C 33.

#### W-4.06 Admixtures

The use of admixtures will be permitted but must be approved by the Engineer. Set retarders shall be Pozzoloth 100-XR as manufactured by BASF, Cleveland, Ohio, or Plastiment as made by Sika Chemical Corporation, Lakewood, OH, or equal. Retarding admixtures shall be used in strict accordance with the manufacturer's directions and the manufacturer shall make available, at no cost upon 72 hours notification, the services of a qualified full time field representative to assure proper use of the admixture.

Set retarding admixtures shall be used only with the approval of the Engineer. The amount of set retarder added shall be sufficient to keep the concrete workable during the period of placement and finishing.

#### W-4.07 Water

Water used in mixing concrete shall be clean and shall not contain deleterious amounts of acids, alkalies, or organic materials. All water shall be furnished from sources approved by the Engineer.

#### W-4.08 Fly Ash

Fly ash shall be a local product with cementitious properties, conforming to the requirements of ASTM C 618, Class C or F, with the following exceptions:

Loss on ignition	- 5% maximum
Sulfur trioxide	- 4% maximum

Fly ash shall have a uniform light color, and shall be from a source approved by the Engineer.

Fly ash shall be stored at the concrete mixing plant separate from the cement, in accordance with the requirements specified for storage of cement. Cement and fly ash shall not be intermixed prior to being added to the concrete mix.

#### W-5.01 Concrete Strength Classes

Concrete shall be divided into two grades, classified according to compressive strength, to be used in the respective places shown on the Plans, called for in the Specifications, or ordered by the Engineer. The classes of concrete mixtures are referred to as Class B, and Class D.

Class B concrete is intended principally for reinforced concrete structures, and shall be used for columns, walls, beams, slabs, equipment pads, precast structures and the like.

Class D concrete is intended principally for low strength concrete, plain or reinforced, used for soil stabilization, filling, and other similar purposes. For large volume, boulders or fragments of rock excavated during construction may be embedded in the concrete to provide added bulk. Care shall be taken in placing the boulders or rock fragments, so that there are no voids in the concrete.

### W-5.02 Strength and Proportion

Concrete mixes shall be designed and proportioned to provide the following minimum compressive strengths and the proper workability without exceeding the stipulated maximum quantities of mixing water:

Class	Compressive Strength - psi		<u>Maximum Water</u> Gallons Per Sack
	7-day Test	28-day Test	
B	2,700	4,000	5-1/2
D	1,300	2,000	7-1/4

Concrete, except Class D, shall contain not less than 564 pounds (six standard 94-pound bags) of cement per cubic yard.

### W-5.03 Moisture Content of Aggregates

The quantity of free water contained in the aggregate shall be determined from time to time as required by the Engineer, and this quantity shall be deducted from the water added at the mixer, but no change shall be made in the water-cement ratio.

The quantity of water used in each batch shall be the total quantity, including the free moisture contained in the aggregate.

### W-5.04 Consistency

Proportions of ingredients shall be varied to secure the desired concrete consistencies when tested in accordance with ASTM Des: C 143, conforming to the following slump requirements:

Concrete	Minimum and Maximum Slump in Inches	
	Class B	Class D
Normal	3 to 4	3 to 5
Pumped	4 to 6	4 to 6

In all cases, the proportions of aggregates for concrete shall be such as to produce mixtures which will work readily into the corners and angles of the forms and around reinforcement, without permitting the segregation of materials or the collection of free water on the surface. The combined aggregates shall be of such composition of sizes that when separated on the No. 4 standard sieve, the weight passing the sieve shall not be less than 30 percent, nor greater than 45 percent of the

total, unless otherwise required by the Engineer.

#### W-5.05 Field Tests

During the progress of the work, a reasonable number of test cylinders shall be made, cured, and stored in accordance with ASTM Des: C 31 and shall be tested in accordance with ASTM Des: C 39. Each test shall consist of three cylinders, one laboratory control cylinder to be tested at 7 days, and one field control cylinder to be tested at 28 days. If the 7-day cylinder is not satisfactory, the third cylinder, a laboratory control cylinder, will be tested at 7 days. Otherwise, the third cylinder will be tested at 28 days.

The Contractor shall furnish all labor, equipment and materials necessary for making concrete test cylinders. Concrete test cylinders must be tested by a materials testing laboratory approved by the Engineer. The Contractor is responsible for all costs associated with testing.

The average strength of all the cylinders shall be equal to or greater than the strengths specified, and at least 90 percent of all the tests shall indicate a strength equal to or greater than the strength specified. In cases where the strength of the test cylinders for any portion of the structure falls below the requirements specified herein, the Engineer may order a change in the mix or water content for the remaining portion of the work, and may require the Contractor to secure test specimens of the hardened concrete represented by these cylinders. The number of test specimens required to be taken shall be the same as the number of test cylinders made for each concrete placement. Specimens shall be secured and tested in accordance with ASTM Des: C 42. If the specimen tests further substantiate that the concrete represented by the cylinders and specimens is below the strength requirements specified herein, the Engineer may order such concrete removed and rebuilt at the expense of the Contractor.

#### W-5.06 Ready-Mixed Concrete

Ready-mixed concrete shall be mixed and delivered in accordance with the requirements set forth in ASTM Des: C 94, and subject to all provisions herein relative to materials, strength, proportioning, consistency, measurement, and mixing.

The rate of delivery of the mixed concrete shall be such that the interval between placing of successive batches shall not exceed 45 minutes. The elapsed time between the introduction of mixing water to the cement and aggregates and depositing concrete in the work shall not exceed 45 minutes including mixing and agitating time.

#### W-5.07 Forms - General

Forms shall conform to shape, lines, and dimensions of the member as shown on the Plans. They shall be substantial, properly braced, and tied together so as to maintain position and shape and to resist all pressures to which they may be subjected. Forms shall be sufficiently tight to prevent leakage of mortar. The size and spacing of studs and walers shall be determined by the nature of the work and the height to which concrete is placed. In all cases, walers shall be doubled, and the size of studs and walers used shall not be less than 2 by 6 inches. Joints shall be snug and shall occur at the designated locations only. Horizontal joints shall be level and vertical joints plumb.

The entire inside surfaces of forms shall be oiled with an approved form oil or shall be

thoroughly wetted just prior to placing concrete.

The Contractor shall be responsible for the adequacy of all forms and for remedying any defects resulting from their use, notwithstanding inspection and prior approval by the Engineer.

#### W-5.08 Placing Concrete

Concrete shall be placed only in forms which have been approved by the Engineer and in his presence. Where the procedure is not specifically described herein, the placing of concrete shall be in accordance with the recommendations of ACI Standard 614.

After mixing, concrete shall be transported rapidly to the place of deposit. Concreting operations shall be continuous until the section, panel, or scheduled placement is completed.

Concrete may be conveyed in buckets, buggies, chutes, or other approved means. Apparatus used for conveying concrete shall be flushed thoroughly with water before and after each run. The point of delivery of concrete shall be as close to the work as possible and in no case more than 5 feet from the point of final deposit in the horizontal direction. Rehandling of concrete will not be permitted.

Concrete shall be deposited level in layers not to exceed 18 inches in a manner to prevent segregation of the ingredients.

Wall concrete shall be deposited through heavy duck canvas or galvanized iron chutes equipped with suitable hopper heads. Chutes shall be of variable lengths, so that the free fall of concrete shall not exceed 3 feet.

Freshly laid exposed concrete shall be protected in an approved manner against damage from the elements and unavoidable construction operations.

Special care shall be taken to place the concrete against the forms, particularly in angles and corners, in order to prevent voids, pockets, and rough areas. The concrete shall be rodded and spaded in a manner to work the coarse aggregate away from the forms, whether vibrators are used or not. Every precaution shall be taken to make all concrete masonry solid, compact, watertight, and smooth.

#### W-5.09 Cold Weather Requirements

When the atmospheric temperature at the work is 40 degrees F or below, or when the U.S. Weather Bureau forecasts such temperatures within 24 hours, the freshly placed concrete shall be protected against freezing.

#### W-5.10 Hot Weather Requirements

For placement of concrete in hot weather, the recommendations of ACI Standard 305R shall be followed.

#### W-5.11 Curing

Standard portland cement concrete surfaces normally exposed to the atmosphere shall be protected against excessively rapid drying by curing a minimum period of seven days. When

average daily temperatures are above 70 degrees F, similarly exposed high-early strength concrete surfaces shall be cured for a minimum period of three days. When daily average temperatures are below 70 degrees F, the curing period for all concrete shall be extended as directed by the Engineer. The curing period shall commence immediately following the placing of the concrete. Curing shall be accomplished by a method approved by the Engineer. Should there be any delay in the application of the method of curing used, the concrete shall be covered with moistened burlap or kept wet by sprinkling.

#### W-5.12 Grout and Mortar

Grout for grouting around tunnel linings and for other locations as specified or directed shall be mixed in the proportions of one (1) part portland cement to one (1) part of sand by volume.

Non-shrink grout shall be a pre-blended mixture of a non-shrinking agent and shall be Embecco 636 as manufactured by the Master Builders Company, Cleveland, Ohio, or Propak as manufactured by Protex Industries, Denver, Colorado, or equal.

Lean grout for backfilling the space surrounding the sewer sections in tunnels or other areas as specified or directed shall be mixed in the proportion of one (1) part portland cement to twelve (12) parts of sand, by volume.

Mortar for brick or concrete block masonry shall be composed of one (1) part Type IIA portland cement to one (1) part of sand, by volume. Sufficient water shall be added to give the proper consistency. The mixture shall be thoroughly worked to produce a uniform mortar with all particles of aggregate well coated.

#### W-5.13 Water Stops

Water stops shall be installed in construction joints as shown on the Plans or specified. Water stops shall be made of extruded polyvinyl chloride. Reclaimed plastic material shall not be used in the manufacture of the water stops.

The water stop shall be 4 inches wide and not less than 1/8 inch thick at the narrowest point and 3/8-inch thick immediately adjacent to the center of the water stop. The water stop shall have longitudinal ribs with a hollow bulb center pleat. Water stops shall have a Shore A durometer hardness between 65 and 75, a finished tensile strength of not less than 2,000 psi, and a specific gravity of not more than 1.38.

In matters not covered herein, plastic water stops shall meet the requirements of the latest specifications of the Society of the Plastics Industry, Inc. for Polyvinyl Chloride Water Stops.

Field splices for water stops shall be made by heat fusion using a field splicing unit. Each water stop type shall have its own splice mold built to the size and shape of the water stop to be spliced. Splicing mold and materials, including splicing cement, solvent, splicing stock, and other items, shall be as furnished by the manufacturer of the water stop. Field splicing shall be performed in strict accordance with the manufacturer's directions and to cause as little damage as possible to the continuity of the ribbed strips, all to the satisfaction of the Engineer.

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## SECTION 6 - REINFORCING STEEL

### W-6.01 Standards

Reinforcing steel bars for concrete reinforcement shall be deformed bars meeting the requirements of ASTM Des: A 615, Grade 60, unless shown or specified otherwise. They shall be free from defects, kinks, and from bends that cannot be readily and fully straightened in the field. Test certificates of the chemical and physical properties covering each shipment shall be submitted for approval.

Reinforcing mesh shall be of the electrically welded type, with wires arranged in rectangular patterns, of the sizes shown or specified and shall meet the requirements of ASTM Des: A 185.

### W-6.02 General

Reinforcing steel bars shall be supplied in lengths which will allow them to be conveniently placed in the work and provide sufficient lap at joints. Dowels of proper lengths, size, and shape shall be provided for tying walls, beams, floors, and the like together when shown, specified, or ordered.

Stirrups and ties shall have a minimum inside radius of bend of 2-1/2 bar diameters. All other bars No. 7 and smaller shall have a minimum inside radius of bend of 3 bar diameters, and No. 8 bars and larger shall have a minimum inside radius of bend of 4 bar diameters.

Splices in all reinforcements shall be lapped as specified hereinafter in "Table 1 - Grade 60 Reinforcing Bar Splice Lapping Lengths" unless shown or specified otherwise. All splices shall be staggered, unless otherwise approved by the Engineer.

TABLE 1 - GRADE 60  
REINFORCING BAR SPLICE LAPPING LENGTHS

Bar Size	#3	#4	#5	#6	#7	#8	#9	#10	#11
Top Bars - ACI Class B	13	17	22	28	38	50	64	81	100
Top Bars - ACI Class C	17	23	29	37	50	66	83	106	130
Other Bars - ACI Class B	12	12	16	20	27	36	46	58	71
Other Bars - ACI Class C	12	16	20	26	36	47	60	75	93

### Notes:

1. Splice length given in inches.
2. Top bars are all horizontal reinforcement so placed that more than 12 inches of concrete is cast in the member below the bar. This includes horizontal wall reinforcement.
3. Where lapping bars of different sizes, use lap required for larger bar.

4. For all bars spaced closer than 6 inches, increase lap length 25 percent.
5. Unless otherwise specified, the length of lap for splices shall be as shown for ACI Class B where no more than 50 percent of the bars are lap spliced, and as shown for ACI Class C where more than 50 percent of the bars are lap spliced.

#### W-6.03 Detailing

The Contractor shall submit detailed placing drawings and bar listed to the Engineer for approval in accordance with the requirements for "Working Drawings" of the General Provisions, except as otherwise specified herein.

All provisions of the latest ACI "Manual of Standard Practice for Detailing Reinforced Concrete Structures" shall be followed in the preparation of placing drawings and bar lists.

Wall and slab reinforcing shall not be billed in sections. Complete elevations of all walls and complete plans of all slabs must be shown, except that when more than one wall or slab are identical only one such elevation or plan will be required. These plans or elevations need not be true views of the walls or slabs shown. Every reinforcing bar in a slab or a wall shall be billed on either a plan or an elevation. Where necessary, sections shall be taken to clarify the arrangement of the steel reinforcement. All bars shall be identified on such sections, but in no case shall bars be billed on such sections.

For all reinforcing bars, unless the location of a bar is perfectly obvious, the location of such bar or bars shall be given by a dimension to some structural feature which must be readily distinguishable at the time bars are placed.

The set of placing drawings shall be complete in and by themselves to the extent that the bar setters will have no occasion to refer to the design drawings.

Before submittal to the Engineer, every placing drawing and bar list shall be completely checked including the quantity, size, type, length, bend dimensions, and type of support for all bars or mesh, and all other information on the drawing and list. The checking shall be done by a qualified person and all necessary corrections made.

If after placing drawings and bar lists have been submitted to the Engineer for approval, a partial or spot check by the Engineer reveals that the placing drawings obviously have not been checked by a qualified person, they will be returned to the Contractor for such a check and corrections, after which they shall be resubmitted for approval by the Engineer.

#### W-6.04 Delivery

Reinforcing steel shall be delivered to the work in bundles strongly tied, and each group of both bent and straight bars shall be identified with a metal tag giving the identifying number corresponding to the shop drawings and bar schedules. All bars shall be properly stored in an orderly manner, at least 12 inches off the ground and kept clean and protected from the weather, as directed by the Engineer, after delivery at the site of the work.



#### W-6.05 Protection

Reinforcing steel shall be delivered without rust other than that which may have accumulated during transportation to the work. It shall at all times be fully protected from moisture, grease, dirt, mortar, and concrete. Before being placed in position, it shall be thoroughly cleaned of all loose mill scale and rust and of any dirt, coatings, or other material that might reduce the bond. If there is a delay in depositing concrete, the steel shall be inspected and satisfactorily cleaned immediately before the concrete is placed.

#### W-6.06 Fabrication and Installation - Bars

Bars shall be cut to required length and accurately bent before placing. Bars shall be bent in the shop unless written approval of field bending is obtained from the Engineer. If field bending is permitted, it shall be done only when the air temperature where the bending operation is performed is above 30 degrees F.

The bars shall be placed in the exact positions shown with the required spacing and shall be securely fastened in position at intersections to prevent displacement during the placing of the concrete. The bars shall be fastened with annealed wire of not less than 18 gauge or other approved devices. Spacing chairs of a type approved by the Engineer shall be furnished and properly placed to support and hold reinforcing bars in position in all beams and slabs, including slabs placed directly on the subgrade. Chairs which rest on the forms for slabs, the underside of which will be exposed to view in the finished work, shall have those portions galvanized or plastic coated which come in contact with the forms.

Splices in all reinforcement shall be lapped as specified in "Table 1 - Grade 60 Reinforcing Bar Splice Lapping Lengths" in the subsection headed "General." Splices at points of maximum tensile stress shall be avoided wherever possible. Temperature bars shall have a minimum clear spacing of 2-1/2 diameters. All bar splices shall be staggered where possible.

All welded splices shall be full penetration, butt welds, made by certified welders in accordance with AWS D12.1. Thermitite welding or Cadweld type couplers may be used where approved by the Engineer.

On any section of the work where horizontal bars run further than the length of the forms, the form or head against which the work ends shall be perforated at the proper places to allow the bars to project through a distance at least equal to the lap specified. The projecting ends, however, unless otherwise directed by the Engineer, shall be of different lengths so that in no place will laps in adjoining bars in the same place occur opposite each other.

#### W-6.07 Installation - Mesh

Reinforcing mesh shall be placed in the positions shown, specified, or required to fit the work. Suitable spacing chairs or supports as specified for bars shall be furnished and placed to maintain the mesh in correct location. Where a flat surface of mesh is required, the mesh shall be rolled or otherwise straightened to make a perfectly flat surface before placing. The length of laps not indicated shall be approved by the Engineer.

W-6.08 Concrete Protection for Reinforcing Steel

Reinforcing steel shall be placed and held in position so that the concrete cover, as measured from the surface of the bar to the surface of the concrete, shall be not less than the following, except as otherwise shown, specified, or directed:

1. General
  - a. Concrete deposited directly against soil - 3 inches.
  - b. Concrete in contact with soil or exposed to weather or sewage:
    - (1) #6 bars or larger - 2 inches
    - (2) #5 bars or smaller - 1-1/2 inches
2. Slabs (See Item 6)
  - a. Troweled surfaces - 1-1/2 inches
  - b. Elsewhere - 1 inch
3. Beams - Girders - Columns (See Item 6)
  - a. To main reinforcement - 2 inches
  - b. To ties - 1-1/2 inches
4. Walls (See Item 6)
  - a. 12 inches or more thick - 2 inches
  - b. Less than 12 inches thick:
    - (1) #6 bars or larger - 2 inches
    - (2) #5 bars or smaller - 1-1/2 inches
5. Footings and Base Slabs
  - a. Top face - 2-1/2 inches
  - b. Sides and ends - 3 inches
  - c. Bottom, Concrete deposited directly against ground - 3 inches

Concrete deposited directly against lean concrete work mat - 2 inches
6. Add 1/2 inch for surfaces contacting or exposed to water or sewage.
7. Laps - as specified in "Table 1 - Grade 60 Reinforcing Bar Splice Lapping Lengths" in the subsection headed "General."
8. Spacing - clear distance between parallel bars - 2 inches minimum.

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## SECTION 8 - METAL CASTINGS

### W-8.01 General

Metal castings include all miscellaneous ferrous and nonferrous castings.

Wheel guards, valve boxes, manhole frames and covers, stop log grooves, brackets and supports for piping, gutter inlets, floor, roof and gallery drains, stormwater inlets, beehive grates and frames, cleanout covers, and special malleable iron castings and inserts are included in this classification.

### W-8.02 Materials

Metal castings shall meet the requirements of the following standards, except as otherwise specified herein.

Gray Iron	ASTM Des: A 48
Malleable Iron	ASTM Des: A 47
Carbon Steel	ASTM Des: A 27
Alloy Steel	ASTM Des: A 148
Aluminum	ASTM Des: B 26
Aluminum Bronze	ASTM Des: B 148
Silicon Bronze	Navy Spec. 46B28
Manganese Bronze	ASTM Des: B 132 or B 147
Ductile Iron	ASTM Des: A 536

### W-8.03 Workmanship

Castings shall be made accurately to approved dimensions and shall be planed or ground where marked or where otherwise necessary to secure perfectly flat and true surfaces. Allowance shall be made in the patterns so that the specified thickness shall not be reduced. Manhole and cleanout frames and covers shall conform to the details shown on the Plans and shall be true and shall seat at all points. No plugging of defective castings will be permitted. All castings shall be erected to accurate grades and alignment, and when placed in concrete, they shall be carefully supported to prevent movement during concreting.

### W-8.04 Weights

No castings weighing less than 95 percent of the theoretical weight, based on required dimensions, will be accepted. The Contractor shall provide facilities for weighing castings in the presence of the Engineer, or shall furnish invoices showing true weights, certified by the supplier.

\* \* \*

## SECTION 10 - DUCTILE IRON PIPE AND FITTINGS

### W-10.01 General

All ductile iron pipe shall meet the requirements of AWWA C151. The type and configuration of pipe bedding for buried pipe shall be as shown on the Plans. Coatings and linings for ductile iron pipe and fittings shall conform to the subsection headed "Coatings and Linings," contained herein. Pipe joints shall be bell and spigot, flanged, or mechanical joint as shown on the Plans.

Ductile iron pipe and ductile iron fittings buried in the ground for force mains or installed in pumping stations shall have a minimum thickness of Class 52 unless specified otherwise as shown on the Plans. Ductile push-on iron pipe and fittings for gravity systems, including house laterals, shall be Class 54 and shall have an interior lining as specified in the subsection "Lining for Ductile Iron Gravity Pipe."

### W-10.02 Flanged Pipe

Flanged pipe shall conform to the requirements of AWWA C115. Flanges shall be ductile iron and shall have long hubs. There shall be no leakage through the pipe threads, and the flanges shall be designed to prevent corrosion of the threads from outside.

### W-10.03 Fittings

All ductile iron fittings shall meet the requirements of AWWA C110 or AWWA C153 and have a pressure rating of 250 psi, or as specified, whichever is larger.

### W-10.04 Flanged Joints

Flanged joints shall meet the requirements of ANSI Specification B16.1. Flanges, flange facing drilling, and protecting shall be as specified for flanged pipe. Bolts and nuts for flanged joints shall be Type 316 stainless steel unless otherwise stated on the Plans or directed by the Engineer.

Except where otherwise directed by the Engineer, gaskets for flanged joints shall be of the full-face type, meeting the requirements of ANSI B16.21. Gaskets shall be Nitrile rubber, also known as Buna-N and NBR, as made by the American Seal & Packing Company, Garlock of EnPro Industries, U.S. Rubber Supply Company, or equal.

### W-10.05 Mechanical Joints

Mechanical joints shall meet the applicable requirements of AWWA C111/A21.11.

### W-10.06 Push-on Joints

Push-on joints shall be of the bell and spigot type which employs a single, elongated grooved gasket to affect the joint seal. Push-on joints shall meet the applicable requirements of AWWA C111.

### W-10.07 Wall Castings, Connecting Pieces, and Special Fittings

Wall castings and connecting pieces, such as bell and bell, bell and spigot, bell and flange,

flange and flange, flange and spigot, and flange and flare, shall meet the requirements of ANSI Specification A21.10. Unless otherwise shown or specified, fittings 14 inches and larger shall have a pressure rating of 250 psi.

Where special fittings are required, they shall be of an approved design and shall have the same diameters and thickness' as standard fittings, unless otherwise required, but their laying lengths and other functional dimensions shall be determined by their positions in the pipelines and by the particular piping materials to which they connect.

Where water tightness is essential and at other locations where indicated, wall castings shall be provided with an integrally cast intermediate collar located at the center of the wall.

#### W-10.08 Sleeve-Type Couplings

Except where standard solid sleeves or split sleeves are shown or specified, sleeve-type couplings for ductile iron pipe shall be Style 38 couplings as made by Dresser Industries, Inc., or Type 411 as made by Smith-Blair, or equal. Gaskets shall be of molded rubber, Dresser Plain Grade 27, Smith-Blair 003, or equal. Middle rings shall be without a pipe stop and shall be at least 1/4 inch thick and 5 inches wide for 8-inch and smaller pipe, 3/8 inch thick and 7 inches wide for 10-inch through 30-inch pipe, and 1/2 inch thick and 10 inches wide for 36-inch and larger pipe with follower rings of appropriate thickness, unless otherwise shown or specified.

Sleeve-type couplings shall be shop coated with Dresser Red "D" Shop-Coat, Smith-Blair Standard Blue Shop Coat, or equal nontoxic material compatible with the finished coatings specified.

#### W-10.09 Coatings and Linings

Pipe which is to be buried shall have the standard outside coating specified in AWWA C151-8.1.

Unless otherwise shown on the Plans or specified, all ductile iron pipe and fittings shall be coated with 40 mils of Protecto 401 interior ceramic epoxy, or approved equal.

The weight and class designation shall be painted conspicuously in white on the outside of each pipe, fitting, and special casting after the shop coat has hardened.

#### W-10.10 Thrust Restraints

Unless otherwise shown on the Plans, specified or directed by the Engineer, concrete thrust blocks are not allowed.

Ductile iron pipe and fittings with mechanical joints shall be restrained by a device meeting the requirements of Workmanship and Materials section "Restraining Devices".

Ductile iron pipe and fittings with push-on joints that require restraining shall be Clow F-128 "Super Lock Joint," American Cast Iron Pipe "Lok-Fast Joint," U.S. Pipe and Foundry Company "TR Flex," or equal.

Where the glands are to be buried or not exposed to view, the assembly shall be given 2 heavy

coats of asphalt varnish after installation.

#### W-10.11 Lining for Ductile Iron Gravity Pipe

Unless otherwise shown on the Plans or specified, all ductile iron pipe and fittings shall be coated with 40 mils of Protecto 401 interior ceramic epoxy, or approved equal.

#### W-10.12 Polyethylene Encasement

Unless otherwise shown on the Plans, specified or directed by the Engineer, polyethylene encasement shall be installed on all ductile iron pipe and fittings in accordance with AWWA/ANSI C105/A21.5.

Although not intended to be a completely air-and-water-tight enclosure, the polyethylene shall prevent contact between the pipe and the surrounding backfill.

Polyethylene encasement shall be installed in accordance with the pipe manufacturer's instructions, or in a manner acceptable to the Engineer. Polyethylene encasement shall extend 1 foot beyond the joint in both directions (a total of 2-foot overlap) and shall be adhered to said joint with 2-inch wide green marking tape. The slack width shall be taken up at the top of the pipe to make a snug, but not tight, fit along the barrel of the pipe, securing the fold at quarter points. Upon installation of the encasement, any cuts or damaged portions of the polyethylene encasement shall be securely mended with tape or with a short length of polyethylene sheet, or a tube cut open, wrapped around the pipe to cover the damaged area, and secured in place.

Backfill material shall be the same as specified for pipe without polyethylene wrapping; however, extra care should be taken that the backfill be free from cinders, refuse, boulders, rocks, stones, or other materials that could damage the encasement. Special care shall be taken to prevent damage to the polyethylene wrapping when placing backfill.

Because prolonged exposure to sunlight will deteriorate polyethylene film, such exposure prior to backfilling the wrapped pipe shall be kept to a minimum.

#### W-10.13 Ductile Iron Pipe Exterior Coating

All pipe and fittings shall have an exterior asphaltic coating conforming to the following requirements:

Viscosity, KU at 25 degrees C	56-60
Flashpoint, degrees F (TCC)	40 degrees F Min
Dry set to touch, minutes	6
Dry hard, minutes	22

#### W-10.14 Force Main Identification

Ductile iron pipe sanitary force main shall be continuously spiral wrapped with 2-inch wide green stick-on vinyl tape prior to installation for permanent identification purposes. The tape shall have a minimum thickness of 6 mils with a minimum tensile strength of 22 pounds per inch and a minimum adhesive factor of 40 ounces per inch. The pipe shall be clean and dry when wrapped.

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## SECTION 11 - PVC PIPE GRAVITY

### W-11.01 General

All pipe and fittings, 6"-27" nominal diameter, shall be solid wall Polyvinyl Chloride (PVC) Pipe **MANUFACTURED** to standards as outlined in the following sections.

All references to ASTM Designations shall include Manufacturing (PVC Cell Classification) and Performance (Inspection, Sampling and Testing) Specifications, and the most recent shall govern. Pipe and fittings meeting **ONLY** the Performance Test Specification will not be acceptable. The minimum nominal diameter for mainline pipe is 8 inches and for laterals is 6 inches. The maximum laying length shall be 13.0 feet.

### W-11.02 Standards (6"-15" Diameter)

Solid wall PVC pipe shall comply with ASTM D 3034 and all applicable ASTM documents as covered in Section No. 2 of ASTM D 3034. All pipe and fittings shall be made of PVC plastic having cell classifications as outlined in Section No. 5 "Materials" of ASTM D 3034 and as defined in ASTM D 1784. For depths of cut through 18 feet, a minimum wall thickness of SDR-35 is required. For depths of cut greater than 18 feet, a minimum wall thickness of SDR-26 is required. Fittings shall be either integrally cast (factory molded) or factory solvent welded and a separate section from the mainline pipe. SDR-26 fittings shall be used with SDR-26 pipe.

### W-11.03 Standards (18"-27" Diameter)

Solid wall PVC pipe and fittings shall comply with ASTM F 679 and all applicable ASTM documents as covered in Section No. 2 of ASTM F 679. All pipe and fittings shall be made of PVC plastic having cell classifications as outlined in Section No. 4 "Materials" of ASTM F 679 and as defined in ASTM D1784. All pipe and fittings shall meet the wall thickness and cell classification requirements of either T-1 or T-2 of Table 1 "Pipe Dimensions and Minimum Pipe Stiffness" of ASTM F 679. Fittings shall be either integrally cast (factory molded) or factory solvent welded and a separate section from the mainline pipe.

### W-11.04 Joints (6"-27" Diameter)

Joints for solid wall PVC pipe and fittings shall be gasket, bell and spigot, push-on type. Joints shall be a molded integral part of the pipe section. Joints or couplings furnished loose shall not be permitted. Solvent cemented joints shall not be permitted. Lubricant shall be as recommended by the pipe manufacturer. (Assembly of gasketed joints is outlined in the Section "Joining of PVC Pipe").

Joints for pipe and for fittings shall comply with ASTM D 3212 "Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals." Elastomeric gaskets shall meet the requirements of ASTM F 477. Joints for pipe and fittings shall comply with ASTM D 3034 for 6"-15" diameter, ASTM F 679 for 18"-27" diameter, and ASTM F 1336 for 6"-27" diameter.

### W-11.05 Pre-installation Tests, Reports, Markings and Submittals

All 6"-15" pipe and fittings shall be marked per Section No. 12 "Marking" of ASTM D 3034. All 18"-27" pipe and fittings shall be marked per Section 11 "Marking" of ASTM F 679. All required information shall be marked on the pipe. If in code, the markings shall be decoded in writing by letter to the City in advance.

**PRIOR TO SHIPMENT** of the pipe and fittings to the project site, the Contractor shall submit to the Engineer certifications as described below duly certified by the manufacturer's testing facility or an independent certified testing laboratory demonstrating full compliance with the applicable ASTM specifications described above. Certification from the

supplier is **not** acceptable.

An original plus four (4) copies of the following shall be submitted to the Engineer.

1. The name, address, and phone number of the pipe and fittings manufacturer and the location of the plant at which they will be manufactured.
2. A letter of certification stating that each lot of pipe used on this project has been manufactured, sampled, tested, and conforms to Section 8 "Test Methods" of ASTM D 3034 for 6"-15" diameter and Section 7 "Test Methods" of ASTM F 679 for 18"-27" diameter pipe. A letter of certification from the fittings manufacturer shall be provided stating that all fittings conform with ASTM D 3034 for 6"-15" diameter, ASTM F 679 for 18"-27" diameter, and ASTM F 1336 for 6"-27" diameter.

#### W-11.06 Bedding Requirements

Unless otherwise indicated on the Plans, solid wall PVC pipe shall be installed with Class "C" bedding as described in Section W-2 - Backfilling." If soil conforming to subsection W-2.04 "Select Fill Material-Sand" is not excavated at the project site, it shall be imported. Compaction requirements are described in subsection W-2.07 "Bedding Placement for Pipelines." In no case shall a concrete cradle be used. In the event the Plans call for or the Contractor opts to install crushed stone, it shall be NO GREATER THAN a #57 stone.

#### W-11.07 Post-installation Tests

##### **SCOPE:**

Prior to final acceptance of the project all PVC pipelines shall be leakage tested, deflection tested, and T.V inspected, all at the expense of the Contractor. The leakage test shall be performed by the Contractor or a Wastewater Department approved test lab after the subbase has been compacted. The Contractor or a Wastewater Department approved test lab shall perform the deflection testing. The deflection test shall be performed a minimum of 7 days after the base has been compacted and sealed. The Contractor shall perform the T.V. inspection only **AFTER** the pipelines have passed both the leakage and deflection tests.

##### **DEFLECTION TESTING:**

A deflection test shall be performed on all new gravity sewers to ensure that the pipe is not out of round, contains deflected or off-sets joints, or other defects. The Contractor shall have the option of testing for 5% deflection after the base has been compacted and sealed for a minimum of 7 days; or for 7½% deflection after the base has been compacted and sealed for a minimum of 30 days. The maximum installed deflection shall not exceed 5% or 7-1/2% of the base inside diameter of the pipe as listed in the following table:



INCHES

**SDR-35**

<u>Nominal Size</u>	<u>Base Inside Diameter</u>	5% Deflection after 7 days <u>Mandrel</u>	7-1/2% Deflection after 30 days <u>Mandrel</u>
8	7.665	7.28	7.09
10	9.563	9.08	8.85
12	11.361	10.79	10.51
15	13.898	13.20	12.86

**TYPE T-1**

18	16.976	16.13	15.70
21	20.004	19.01	18.50
24	22.480	21.36	20.79
27	25.327	24.06	23.43

**SDR-26**

<u>Nominal Size</u>	<u>Base Inside Diameter</u>	5% Deflection after 7 days <u>Mandrel</u>	7-1/2% Deflection after 30 days <u>Mandrel</u>
8	7.488	7.11	6.93
10	9.342	8.87	8.64
12	11.102	10.55	10.27
15	13.575	12.90	12.56

**TYPE T-2**

18	17.054	16.20	15.77
21	20.098	19.09	18.59
24	22.586	21.46	20.89
27	25.446	24.17	23.54

If the pipe fails the 7 day, 5% deflection test, the Contractor shall immediately conduct a 7-1/2% deflection test. If the pipe passes the 7-1/2% deflection test, the Contractor has the option of repairing that section at that time or waiting until a minimum of 30 days after the base has been compacted and sealed and then re-testing for a maximum of 7-1/2% deflection.

If the pipe fails the 7-1/2% deflection test after 7 days or at 30 days, the Contractor shall repair that section immediately.

If the Contractor performs the deflection testing rather than employing an approved test lab, the following shall apply:

The Contractor shall furnish the mandrel, labor, materials, and equipment necessary to perform the tests as

approved by the Engineer. The mandrel shall be pulled through by HAND or a HAND operated reel in the presence of the Engineer. Prior to performing the deflection tests, the Contractor shall submit to the Engineer certification that the 9-arm mandrels are preset as stated above. Each mandrel shall be engraved with the following:

Serial Number  
Nominal pipe diameter  
Either "ASTM D 3034," year and either "SDR-35" or "SDR26"  
or "ASTM F 679," year and either "Type T-1" or "Type T-2"  
% deflection as stated above.

If the mandrel fails to pass any section of pipe, the Contractor shall excavate and make all repairs necessary to correct the excessive deflection. The Contractor shall then backfill, recompact, and reseal the permanent pavement base, and retest the line. If the mandrel fails to pass a second time, the section shall be replaced. Re-rounding is **NOT** permitted.

### **Leakage Testing**

The Contractor or a reputable test lab shall perform either an infiltration, exfiltration or an air leakage test as authorized by the Engineer. If the groundwater level is two (2) feet or more above the crown of the pipe, an infiltration test must be performed. The Contractor shall notify the Engineer of the date and time of the test a minimum of 5 days prior to the test.

The infiltration/exfiltration tests shall be performed as described in Section W-18.

**AIR TESTING** - The minimum time duration permitted for pressure drops of 1.0 psi and 0.5 psi are shown in Tables I and II on the following page and are based on a maximum allowable exfiltration rate of 0.0015 cu. ft./min./sq. ft. of internal pipe surface. Derivations may be found in the Uni-Bell PVC Pipe Association publication: "Recommended Practice for Low-Pressure Air Testing of Installed Sewer Pipe," UNI-B-6-85. (Available from Uni-Bell, 2655 Villa Creek Drive, Suite 155, Dallas, Texas 75234.

The test shall commence after the plugged line has reached a stabilized gauge pressure of  $4.0 \pm 1/2$  psi. Air testing equipment shall be arranged so that it is located at the ground surface and shall have an approved air relief arrangement to prevent the sewer from being pressurized to greater than 9.0 psig.

If the pressure drops 1.0 psig (or 0.5 psig) before the appropriate time shown in Table I (Page W11-8) or Table II (Page W11-9) has elapsed, the line has failed. In such case, the Contractor shall structurally repair or replace all defective materials and/or workmanship to the satisfaction of the Engineer.

Sealants are **NOT** permitted. The completed pipe installation shall then be retested.

The lengths of lateral sewers may be ignored for computing required test times. In the event a test section (mainline and laterals), having a combined total internal surface area less than 625 square feet, fails to pass the air test when laterals have been ignored; the test time may be reduced per Section 9.4 of UNI-B-6-85. If the reduced test time is short enough to allow the section to pass, the computations shall be included with the test results.

### **TV Inspection**

All completed gravity sewers shall be subject to two TV inspections. The first TV inspection shall be performed after the new gravity sewer has passed both the leakage test and the deflection test. An additional TV inspection shall be performed eleven (11) months from the date the City has accepted the wastewater facilities. The inspection shall be used to identify deficiencies such as cracked pipe, leaking joints, damaged connections, and

depressions or dip in the pipe alignment (see below for allowable dips). Any deficiencies identified by the inspections shall be repaired by the Contractor at no cost to the City.

The TV inspections shall be completed by the Contractor or a private company that specializes in TV inspection. The TV inspected shall be completed by means of a closed-circuit color television. Prior to the inspection of newly constructed collection systems, water shall be run through the pipeline so that depressions or dips can be identified during the inspection. TV inspections shall be completed in accordance with Section W-72 TV Inspection.

If the TV inspection identifies standing water in the pipe revealing a depression or dip in the pipe alignment, the magnitude of the depression shall be approximated by a means approved by the City. Approved methods include attaching a cylinder, disc, or ball of distinct size in front of the camera during the inspection. For example, if a 1" diameter disc is utilized and is totally submerged during the inspection, the depression is approximated to be greater than 1-inch. Listed below is the allowable depth of depression for the various pipe sizes. Depressions exceeded the allowable limits shall be repaired by the Contractor at no cost to the City.

<b>Pipe Diameter</b>	<b>Minimum Dip for Failure</b>
<b>8" – 10"</b>	<b>1.0"</b>
<b>12" – 16"</b>	<b>1.5"</b>
<b>18" – 24"</b>	<b>2.0"</b>

#### W-11.08 Joining of PVC Pipe

The assembly of gasketed joints shall be performed as recommended by the pipe manufacturer. In all cases, clean the gasket and bell, especially the groove area and the spigot area with a rag, brush, or paper towel to remove any dirt or foreign material before the assembly. Lubricant shall be applied as specified by the pipe manufacturer.

Align the spigot to the bell and insert the spigot into the bell until it contacts the gasket uniformly. Apply firm steady pressure either by hand or by bar and block assembly until the spigot easily slips through the gasket.

If undue resistance to insertion of the pipe end is encountered or the reference mark does not position properly, disassemble the joint and check the position of the gasket. If it is twisted or pushed out of its seat ("fish-mounted"), inspect components, repair or replace damaged items, clean the components, and repeat the assembly steps. Be sure both pipe lengths are in concentric alignment. If the gasket was not out of position, verify proper location of the reference mark.

To join field-cut pipe, first square cut the pipe end. Use a factory-finished beveled end as a guide for proper bevel angle and depth of bevel plus the distance to the insertion reference mark. Bevel the end using a pipe beveling tool or a wood rasp which will cut the correct taper. Round off any sharp edges on the leading edge of the bevel.

#### W-11.10 Joining PVC Pipe to Clay Pipe

The joining of PVC to clay pipe shall be accomplished with flexible compression couplings. Couplings shall

include stainless steel shear rings and stainless steel compression bands. Such couplings shall meet the requirements of ASTM Des: C 425, ASTM C1173 and shall be Series No. 1002 flexible polyvinyl chloride couplings with stainless steel compression bands and shear rings as manufactured by Fernco Joint Sealer Co., Ferndale, Michigan; Band-Seal couplings as manufactured by Mission Clay Products Corp., Whittier, California; or equal. Installation of flexible couplings shall be done in accordance with the manufacturer's instructions.

After the joint has been completed, any voids in the excavation beneath the coupling shall be thoroughly tamped full of granular fill material to provide a full bearing for the pipe and prevent excessive pressure on the bottom of the joint.

#### W-11.11 Joining PVC Pipe to Ductile Iron Pipe

The joining of PVC pipe to ductile iron pipe shall be accomplished with rigid PVC C900 x SDR-35 adapter couplings. Such couplings shall be molded of PVC material meeting ASTM D-1784 specifications. Joints shall meet ASTM D-3213 requirements with gaskets conforming to ASTM F-477. The adapter couplings shall be manufactured by Harco, Lynchburg, Virginia, or equal. Installation of rigid couplings shall be done in accordance with the manufacturer's instructions.

After the joint has been completed, any voids in the excavation beneath the coupling shall be thoroughly tamped full of granular fill material to provide a full bearing for the pipe and prevent excessive pressure on the bottom of the joint.

#### W-11.12 Connection to Manholes

The Contractor will be required to submit a shop drawing, detailing the method of connecting the proposed pipe to the manhole and making it watertight. For connecting PVC pipe, the Contractor shall use a flexible rubber boot, precast into the manhole. The boot shall have stainless steel bands to compress and seal to the proposed pipe or shall be a compression type, such as A-Lock.

Should the flexible rubber boot need to be relocated when connecting to an existing manhole, the Contractor shall perform the connection by one of two methods. The preferred method is to core the manhole and install a rubber boot. The rubber boot shall be manufactured by Kor-n-Seal, or equal. The boot shall be installed and the PVC pipe connection shall be in accordance with the manufacturer's instructions. If the manhole cannot be cored or if the manhole is constructed of brick, the connection shall be made with a PVC manhole adapter which has an exterior impregnated silica surface layer. The adapter shall be manufactured by GPK Products, Inc., Fargo, North Dakota, or equal. The adapter shall be installed and grouted into the manhole wall in accordance with the manufacturer's instructions with non-shrink grout. The PVC pipe shall be inserted through the adapter.

#### W-11.13 Storage of PVC Pipe

Pipe shall be stored at the job site in unit packages provided by the manufacturer. Caution shall be exercised to avoid compression, damage, or deformation to bell ends of the pipe. When unit packages of PVC pipe are stacked, ensure that the weight of upper units does not cause deformation to pipe in lower units.

PVC pipe unit packages shall be supported by racks or dunnage to prevent damage to the bottom during storage. Supports shall be spaced to prevent pipe bending.

PVC pipe shall not be stored close to heat sources or hot objects such as heaters, boilers, steam line, engine exhaust, etc.

When unit packages of PVC pipe are stacked, ensure that the height of the stack does not result in instability which could cause stack collapse, pipe damage, bodily injury, and property damage.

The interior as well as all sealing surfaces or pipe, fittings, and other accessories shall be kept free from dirt and

foreign matter.

Gaskets shall be protected from excessive exposure to heat, direct sunlight, ozone, oil and grease.

#### W-11.14 Handling of PVC Pipe - Standard Procedures

When using fork lifts or other handling equipment, prevent damage to PVC pipe.

When handling PVC pipe, avoid severe impact blows, abrasion damage and gouging or cutting by metal surfaces or rocks. Avoid stressing bell joints and damage of bevel ends.

Pipe shall be lowered, not dropped, from trucks and into trenches.

In preparation for pipe installation, placement (stringing) of pipe shall be as close to the trench as practical and on the opposite side from excavated earth. Bell ends shall point in the direction of work progress.

The Engineer may reject any pipe that shows visible signs of damage resulting from poor storage and handling practices.

TABLE I

SPECIFICATION TIME REQUIRED FOR A 1.0 PSIG PRESSURE DROP  
FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015

Pipe Diameter (in)	Minimum Time (min:sec)	Length for Minimum Time (ft)	Time for Longer Length (sec)	Specification Time for Length (L) Shown (min:sec)									
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft		
4	3:46	597	.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48	19:56	25:38
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38	35:36	40:04
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04	44:52	57:41
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41	69:48	78:31
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31	91:10	102:33
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33	115:22	129:48
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48	142:26	160:15
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15	172:21	193:53
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53	205:07	230:46
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46	243:35	270:04

TABLE II

SPECIFICATION TIME REQUIRED FOR A 0.5 PSIG PRESSURE DROP  
FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015

Pipe Diameter (in)	Minimum Time (min:sec)	Length for Minimum Time (ft)	Time for Longer Length (sec)	Specification Time for Length (L) Shown (min:sec)										
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft			
4	1:53	597	.190 L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	.427 L	2:50	2:50	2:50	2:50	2:50	2:50	2:50	2:50	2:51	2:51	3:12
8	3:47	298	.760 L	3:47	3:47	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:04	5:42
10	4:43	239	1.187 L	4:43	4:43	4:43	4:43	4:43	4:57	5:56	6:55	7:54	7:54	8:54
12	5:40	199	1.709 L	5:40	5:40	5:42	7:08	8:33	9:58	11:24	13:21	15:35	17:48	20:02
15	7:05	159	2.671 L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	19:14	22:26	25:38	28:51
18	8:30	133	3.846 L	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51	31:04	34:16	37:29
21	9:55	114	5.235 L	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16	43:38	47:59	52:21
24	11:20	99	6.837 L	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17	56:59	62:41	68:23
27	12:45	88	8.653 L	14:25	21:38	28:51	36:04	43:16	50:30	57:42	64:54	72:07	79:19	86:31
30	14:10	80	10.683 L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07	88:51	97:45	106:39
33	15:35	72	12.926 L	21:33	32:19	43:56	53:52	64:38	75:24	86:10	96:57	107:43	118:29	129:15
36	17:00	66	15.483 L	25:39	38:28	51:17	64:06	76:55	89:44	102:34	115:23	128:12	141:01	153:50

## SECTION 12 - PRECAST CONCRETE MANHOLES

### W-12.01 General

Manholes shall be constructed of precast reinforced concrete sections. Each manhole shall have a base section or tee section, barrel section, and an eccentric or concentric cone top, all as required. Manholes shall be built without steps. Except as otherwise specified or shown, precast concrete manholes shall comply with ASTM Des: C 478.

Manholes are classified as either Standard Deep Type Manholes, Standard Shallow Type Manholes, or Standard Drop Manholes. The maximum depths permitted for Standard Shallow Type Manholes and the locations where Standard Drop Manholes are to be used shall be as shown on the Plans.

Manhole barrel sections shall be constructed with preformed openings properly located for making sewer line connections. The diameter of such openings shall be not more than 4 inches larger than the outside diameter of the pipe or pipe bell to be connected. The distance between the nearest edge of such openings and the shoulder of the barrel joint shall be 6 inches minimum.

### W-12.02 Materials

Cement, sand, and water shall meet the requirements of the Workmanship and Materials section headed "Concrete Materials."

Brick shall meet the requirements of ASTM Des: C 32 Grade SM and shall have minimum dimensions of 2-1/4 inches by 3-1/2 inches by 7-1/2 inches. Brick shall be new, solid, sound, hardburned throughout, and uniform in size and quality.

Manhole frames and covers shall be of gray iron, shall meet the requirements of the Workmanship and Materials section headed "Metal Castings" and shall conform to the details shown on the Plans.

#### W-12.03.1 Manholes on Sewers 24 Inches or Less in Diameter

Base sections for Standard Deep Type and Shallow Type Manholes shall consist of a circular slab base with a minimum thickness of 8 inches, and shall be reinforced as shown on the Plans. The base slab may extend beyond the outside diameter of the barrel section a maximum of 6 inches, providing the extension is equal at all points on the circumference of the slab. The manhole shall be set on not less than 6 inches of thoroughly compacted limestone screenings.

Barrel sections for Standard Deep Type Manholes shall have an inside diameter of



48 inches plus or minus 1/2 inch and a minimum wall thickness of 8 inches plus or minus 2/5 inch. The minimum cover from the inside face of the wall to the reinforcement shall be 4-1/4 inches, and the minimum cover from the outside face of the wall to the reinforcement shall be 1-1/4 inches. The bottom section of manhole barrel shall be integrally precast with the manhole base section.

Top sections for Standard Deep Type Manholes shall be eccentric cones as shown on the Plans, with a minimum wall thickness of 8 inches plus or minus 2/5 inch. The minimum cover from the inside face of the cone to the reinforcement shall be 4-1/4 inches, and the minimum cover from the outside face of the cone to the reinforcement shall be 1-1/4 inches.

Standard Drop Manholes shall comply with all applicable sections of the specifications for Standard Deep Type manholes and shall conform to the details as shown on the Plans.

#### W-12.03.2 Manholes on Sewers 27 to 42 Inches in Diameter

Base sections for Standard Deep Type and Shallow Type Manholes shall consist of a circular slab base, 5 feet or 6 feet in diameter as shown on the Plans, with a minimum thickness of 8 inches, and shall be T-Lok lined and reinforced as shown on the Plans. The base slab may extend beyond the outside diameter of the barrel section a maximum of 6 inches, providing the extension is equal at all points on the circumference of the slab. The manhole shall be set on not less than 8 inches of thoroughly compacted #57 stone.

Barrel sections for Standard Deep Type Manholes shall have an inside diameter of 48 inches plus or minus 1/2 inch, be T-Lok lined and a minimum wall thickness of 5 inches plus or minus 1-1/4 inches, and the minimum cover from the outside face of the wall to the reinforcement shall be 1-1/4 inches.

Top sections for Standard Deep and Shallow Type Manholes shall be a flat slab as shown on the Plans, with a minimum thickness of 10.5 inches and shall be T-Lok lined.

Standard Drop Manholes shall comply with all applicable sections of the specifications for Standard Deep Type manholes and shall conform to the details as shown on the Plans.

#### W-12.03.3 Manholes on Sewers 48 Inches or Greater in Diameter

Base sections for Standard Deep Type and Shallow Type Manholes shall be precast reinforced concrete pipe tees in the sewer lines as shown on the Plans. The run of each tee shall have the same diameter as the sewer and shall have the same joints. The run section shall conform to the requirements for Class V pipe, ASTM Des: C 76.

Barrel sections for Standard Deep Type Manholes shall have an inside diameter of

48 inches plus or minus 1/2 inch, T-Lok lined and a minimum wall thickness of 5 inches plus or minus 1/4 inch. The minimum cover from the inside face of the wall to the reinforcement shall be 1-1/4 inches, and the minimum cover from the outside face of the wall to the reinforcement shall be 1-1/4 inches. The bottom section of the manhole barrel shall be integrally precast with the manhole base section.

Top sections for Standard Deep Type Manholes shall be a flat slab, T-Lok lined as shown on the Plans, with a minimum wall thickness of 10.5 inches.

Standard Drop Manholes shall comply with all applicable sections of the specifications for Standard Deep Type Manholes and shall conform to the details as shown on the Plans.

#### W-12.04 Workmanship

Mortar shall be composed of one part cement to two parts sand.

Concrete for the base invert shall be Class D. The invert shall be constructed as shown in detail on the Plans and shall have a smooth channel with a circular shaped bottom with a radius equal to the inside radius of the sewer section.

Connections to pipes shall be without projections or voids. Connections to pipes shall be made with flexible type boot, cast integrally into the wall of the manhole and stainless steel bands, as detailed on the Plans, or equal.

Manhole sections shall be joined with rubber gaskets as specified for reinforced concrete pipe sewers, except that a preformed joint sealing compound, Waterstop-RX Cold Joint Water Stop, Volclay Waterproofing Systems as manufactured by American Collord Co.; Ram-Nek, manufactured by Hamilton-Kent, Kent, Ohio; or equal, be applied in accordance with the manufacturer's instructions. This may be substituted for the rubber gasket in manholes on sewers 42 inches or less in diameter. Sufficient preformed joint sealing compound shall be installed so as to completely fill the joint and show a "squeeze-out" on the inside and outside of the joint. Annular spaces on the inside and outside of joints with rubber gaskets shall be filled with mortar.

The elevation of the top rim of manhole frames shall be set to conform with grades and transverse slopes furnished by the Engineer. Precast concrete manhole components shall not be ordered until such elevations are issued by the Engineer. Manhole frames shall be firmly embedded in mortar. Wedges of shims shall be provided to ensure accurate placing of the frame.

#### W-12.05 Curing

All precast concrete manhole sections shall be cured in accordance with any one of

the methods specified in ASTM Des: C 478. The facilities for curing shall, however, be subject to review and prior approval of the Engineer. No precast concrete manhole sections shall be delivered to the job site until the specified minimum compressive strength of 4,000 psi (6,000 psi in the case of manhole base sections on sewers 48 inches or larger in diameter), as determined by crushing tests on cured concrete cylinders, has been obtained.

#### W-12.06 Inspection and Testing of Precast Concrete Manholes

All precast concrete manholes shall be inspected by an independent, certified testing laboratory, approved by the Engineer, to establish the strength of the concrete and the adequacy of curing, to certify the date that the manhole were cast and to confirm that the steel has been properly placed, all in accordance with the Plans and Specifications. The cost of these tests shall be included in the various unit price Contract Items, and no special payment will be made therefor. This testing shall be performed by the laboratory at the Contractor's manufacturing plant, prior to shipment.

All concrete cylinders must be cured in a natural environment. At least three (3) cylinders shall be taken each day that manholes are cast, with batch samples to be designated by the laboratory representative. At least one set of cylinders shall be taken for each 9 cubic yards of concrete used in the construction of the manhole sections. These samples shall be tested for strength. If the samples fail to meet minimum concrete strength requirements set forth in the Specifications, all manhole sections manufactured from the concrete from which the cylinders were made will be considered rejected.

In addition, the Engineer reserves the right to core manholes either at the site or point of delivery to validate strength of concrete and placement of steel. If cores fail to demonstrate the required strength or indicate incorrect placement of reinforcing steel, all sections not previously tested will be considered rejected until sufficient additional cores are tested, at the Contractor's expense, to substantiate conformance to these requirements.

#### W-12.07 Transportation and Delivery

Every precaution shall be taken to prevent injury to the precast manhole sections during the transportations and unloading of the sections. The precast sections shall be unloaded using skids, pipe hooks, rope slings, or suitable power equipment, if necessary, and the sections shall be under perfect control at all times. Under no conditions shall the precast sections be dropped, dumped, or dragged.

If any precast section is damaged in the process of transportation, or handling, such section shall be rejected and immediately removed from the site and replaced at the Contractor's expense.

#### W-12.08 Test Reports

Each manhole delivered to the construction site must have a concrete test report indicating a minimum of 4,000 psi strength. If the manhole sections are produced from different pours, each section must have a concrete test report. Test reports must be submitted to the Engineer prior to shipment of the manholes.

\* \* \*

## SECTION 13 –DIRECTIONAL DRILLING HDPE PIPE

### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. The work specified in this section consists of furnishing and installing underground utilities using the horizontal directional drilling (HDD) method of installation, also commonly referred to as directional boring or guided horizontal boring utilizing high density polyethylene (HDPE) pipe. This work shall include all services, equipment, materials, and labor for the complete and proper installation testing, restoration of underground utilities and environmental protection and restoration.

#### 1.02 QUALITY ASSURANCE

##### A. Design Requirements

1. Horizontal alignment shall be as shown on the Drawings. The pipe shall have a minimum 48-inch cover. The maximum depth shall be determined based on 36-inch minimum clearance under water or gas lines and 24-inch minimum clearance under all other existing or proposed utilities to be crossed. Compound curvatures may be used, but shall not exceed the maximum deflections as set forth by the HDPE pipe manufacturer or AWWA Standards, whichever is stricter.
2. Entry angle shall be 12° - 14° ideal (not to exceed 15°). Exit angle shall be 6° - 12° to facilitate “pull-back.”
3. Entry and exist angles are defined as angles from the horizontal.

- B. Qualifications: Directional drilling contractor (or subcontractor) shall have a minimum of four years experience with similar construction including pipelines of the same or larger diameter and the same or greater lengths. The Contractor shall also have successfully completed a minimum of five (5) similar projects of the same or larger diameter and of equal or greater lengths. All pipe and appurtenances of similar type and material shall be furnished by a single manufacturer.

#### 1.03 SUBMITTALS

- A. Work Plan: Prior to beginning work, the Contractor must submit to the Engineer a work plan detailing the procedure and schedule to be used to execute the project. The work plan should include a description of all equipment to be used, down-hole tools, a list and résumé of key personnel and their qualifications and experience, list of subcontractors, a schedule work activity, a safety plan, traffic control plan, an environmental protection plan and contingency plans for possible problems. Work plan should be

comprehensive, realistic and based on actual working conditions for this particular project. Plan should document the thoughtful planning required to successfully complete the project.

- B. Equipment: Contractor will submit specifications on directional drilling equipment to be used to ensure that the equipment will be adequate to complete the project. Equipment shall include but not be limited to: drilling rig, mud system, mud motors (if applicable), down-hole tools, guidance system, rig safety systems. Calibration records for guidance equipment shall be included and evidence of calibration within the last 6 months must be provided. Specifications for any drilling fluid additives that Contractor intends to use or might use will be submitted.
- C. Material: Specifications on material to be used shall be submitted to Engineer. Material shall include the pipe, fittings and any other item which is to be an installed component of the project.

## PART 2 - EQUIPMENT AND PRODUCTS

### 2.01 GENERAL

- A. The directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the bore and pull-back the pipe, a drilling fluid mixing, delivery and recovery system of sufficient capacity to successfully complete the crossing, a drilling fluid recycling system to remove solids from the drilling fluid so that the fluid can be reused, a magnetic guidance system to accurately guide boring operations and record data for as-built purposes, a vacuum truck of sufficient capacity to handle the drilling fluid volume, trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials and spare parts on hand to maintain the system in good working order for the duration of this project.

### 2.02 DRILLING SYSTEM

- A. The directional drilling machine shall consist of a hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the crossing. The hydraulic power system shall be self-contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull-back pressure during pull-back operations. The rig shall be grounded during drilling and pull-back operations. There shall be a system to detect electrical current from the drilling string and an audible alarm, which automatically sounds when an electrical current is detected.

## 2.03 PIPE

- A. Pipe shall be AWWA C-906 HDPE and have a ductile iron pipe outside diameter ("DIPS"). The pipe shall contain a minimum of 2 impregnated, longitudinal green stripes. The dimension ratio shall be verified by the Contractor based on the pipe pull strength required for the directional drilling. The minimum working pressure rating of the pipe supplied shall be 160 psi.
- B. HDPE resin shall be PE4710 resin characterized by ASTM D3350.
- C. HDPE pipe shall have a minimum thickness as that of SDR-11. HDPE pipe shall be in minimum nominal lengths of 20 feet.
- D. Fittings shall be HDPE with ductile iron outside diameter meeting ANSI/AWWA C906, latest revision, with a minimum working pressure rating of 160 psi. Ductile iron fittings may be used only where specified on the plans and provided butt fused HDPE MJ adapters are used to transition from the pipe to the fitting. HDPE transition fittings, adapters, and service fittings shall be heat (butt) fused unless otherwise approved by the engineer.
- E. Pipes shall be marked in accordance with AWWA requirements.

## 2.04 DRILLING FLUIDS

- A. Drilling fluids shall consist of a mixture of potable water and gel-forming colloidal material such as bentonite, or a polymersurfactant mixture producing a slurry of custard-like consistency.

## PART 3 - EXECUTION

### 3.01 PERSONNEL REQUIREMENTS

- A. Responsible representatives of the Contractor and Subcontractor(s) shall be present at all times during the actual crossing operations. A responsible representative as specified herein is defined as a person experienced in the type of work being performed and who has the authority to represent the Contractor in a routine decision making capacity concerning the manner and method of carrying out the work specified herein.
- B. The Contractor and Subcontractor(s) shall have sufficient number of competent workers on the project at all times to ensure the utility placement is made in a timely, satisfactory manner. Adequate personnel for carrying out all phases of the actual crossing operation (where applicable: tunneling system operators, operator for removing spoil material, and laborers as necessary for various related tasks) must be on the job site at the beginning of work. A competent and experienced supervisor representing the Contractor or Subcontractor that is thoroughly familiar with the equipment and type of work to be performed, must be in direct charge and control of the operation at all

times. In all cases, the supervisor must be continually present at the project site during the actual crossing operation.

### 3.02 COORDINATION OF THE WORK

- A. The Contractor shall notify the Engineer at least 24 hours in advance of starting work. In addition, the actual crossing operation shall not begin until the Engineer or his representative is present at the project site and agrees that proper preparations for the crossing have been made. The Engineer's approval for beginning the crossing shall in no way relieve the Contractor from the ultimate responsibility for the satisfactory completion of the work.
- B. The Contractor and the Engineer shall select a mutually convenient time for crossing operation to begin in order to avoid schedule conflicts.

### 3.03 MAINTENANCE OF TRAFFIC

- A. Erection or installation of appropriate safety and warning devices in accordance with the Florida Department of Transportation (FDOT) Manual on Traffic Control and Safe Practices shall be completed prior to beginning work.

### 3.04 JOINING AND CUTTING

- A. **Joining and Connections:** Before joining, and before any special surface preparation, surfaces must be clean and dry. General dust and light soil may be removed by wiping the surfaces with clean, dry, lint-free cloths. Heavier soil may be washed or scrubbed off with soap and water solutions, followed by thorough rinsing with clean water, and drying with dry, clean, lint-free cloths.
- B. **Cutting Pipe:** Joining methods for plain end pipe require square-cut ends. Pipe cutting is accomplished with guillotine shears, run around cutters, and saws.
- C. **Cutting Branch Outlet Holes:** Except for self-tapping saddle tees, hole cutting is required for field installed side outlet fittings. Polyethylene pipe hole saws shall be used.
- D. **Conventional heat fusion joining** is the process where mating surfaces are prepared for joining, heated until molten, joined together, and cooled under pressure. All fusion procedures require appropriate surface preparation tools, alignment tools, and temperature controlled heating irons with properly shaped, non-stick heater faces. An open flame cannot be used for heating because it oxidizes the surface and prevents bonding. During joining, all heat fusion procedures require the mating components to be moved several inches apart to accommodate surface preparation and surface heating tools. All fusions shall be constructed in strict accordance with pipe and fitting



manufacturers' recommendations. The following methods of conventional heat fusion with restrictions may be used:

1. Socket fusion shall be used with ½ inch through 4-inch pipe and fittings.
  2. Saddle fusion outlets may be used on 8 inch and smaller outlets applied to 12 inch and smaller mains. Larger outlets and pipe sizes shall be factory fabricated.
  3. Butt fusion joints shall be field constructed between pipe and fittings. Fusion may occur in the trench.
- E. Electrofusion is an acceptable heat fusion process where a socket or saddle fitting contains an integral heating source. After surface preparation, the fitting is installed on the pipe, and the heating source is energized. During heating, the fitting and pipe materials melt, expand, and fuse together. Heating and cooling cycles are automatically controlled.
- F. All heat fusion techniques and methods shall be in **STRICT ACCORDANCE** with the manufacturer's recommendations.

### 3.05 INSTALLATION

- A. Erosion and sedimentation control measures and on-site containers shall be installed to prevent drilling mud from spilling out of entry and/or exit pits. Drilling mud will be disposed of off-site in accordance with local, state and federal requirements and/or permit conditions.
1. No other chemicals or polymer surfactant shall be used in the drilling fluid without written consent of the Engineer, and after a determination is made that the chemicals to be added are not harmful or corrosive to the facility and are environmentally safe.
- B. Pilot Hole: Pilot hole shall be drilled on bore path with no deviations greater than 2 percent of depth over a length of 100 feet. In the event that pilot does deviate from bore path more than 2 percent of depth in 100 feet, Contractor will notify Engineer and Engineer may require Contractor to pull-back and re-drill from the location along bore path before the deviation.
- C. Reaming: Upon successful completion of pilot hole, Contractor will ream bore hole to a minimum of 25 percent greater than outside diameter of pipe using the appropriate tools. Contractor will not attempt to ream at one time more than the drilling equipment and mud system are designed to safely handle. The Contractor shall take all precautions required to avoid inadvertent mud returns (frac outs).
- D. Pull-Back: After successfully reaming bore hole to the required diameter, Contractor will put the pipe through the bore hole. In front of the pipe will be a swivel and barrel reamer to compact bore hole walls. Once pull-back

operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull-back operations, Contractor will not apply more than the maximum safe pipe pull pressure at any time. Contractor shall protect the pipe from damage or gouging at all times and at no time overstress the pipe during pull back or any other operation. Above ground rollers shall be used to prevent gouging or damage during fusing and pullback operations.

- E. The system must be remotely steerable and permit electronic monitoring of tunnel depth and locations. The system must be able to control the depth and direction of the pipe and must be accurate to a window of  $\pm 2$ ".
- F. Equipment shall be fitted with a permanent alarm system capable of detecting an electrical current. The system shall have an audible alarm to warn the operator if the drill head contacts electrified cables.
- G. Two strands of #8 gauge green insulated copper or #10 gauge green insulated copper clad steel tracing wire shall be attached to the pipe in a manner that assures the wires will be affixed near the top of the pipe. See Section W-24 "PVC Pipe Force Main" requirements for direct bury pipe. Wire insulation must be suitable for buried service such as HDPE or HMWPE. Nylon insulation is not acceptable. Wires must be spliced together with wire connectors suitable for buried service such as DBR Kit by 3M, Snakebite by Copperhead Industries or approved equal. Twisting wires together and sealing with electrical tape is not acceptable. No payment will be made for pipe that does not pass a continuity test through the wires after installation. See standard details for additional requirements.

The locating wire shall terminate at the top of each valve box, air release valve box and manhole and must be capable of extending 24" above the top of the box (or manhole) in such a manner so as not to interfere with the valve operation.

- H. The Contractor shall field locate all utilities and plan his work to avoid conflict with all sewer laterals and all other utilities. SP-31 details the Contractor's responsibilities for locating utilities.
- I. Depth and horizontal location of the pipe shall be shown on the As-built Drawings at intervals of 10 feet. Horizontal location shall be referenced to edge of pavement, right-of-way line or as directed by the Engineer. Horizontal location shall be accurate to within 2 feet. All valves, fittings, points of connection, depth and horizontal changes from the plans shall be shown on the As-built Drawings at all locations.
- J. The pipe entry area shall be graded to provide support for the pipe to allow free movement into the bore hole. The pipe shall be guided in the bore hole to avoid deformation of, or damage to, the pipe.

- K. If unexpected subsurface conditions are encountered during the bore, the procedure shall be stopped. The installation shall not continue until the Engineer has been consulted.
- L. The pipe shall be pulled back through the bore hole using the wet insertion construction technique. The pipe may be installed full of water.
- M. The pipe shall be installed in a manner that does not cause upheaval, settlement, cracking, movement or distortion of surface features.
- N. Prior to construction, the Contractor shall submit for approval by the Engineer, a plan that establishes a means to determine if other utilities have been damaged by directional drilling operations. For gravity sewers, sewer laterals, storm sewer and other non-pressure conduits this may involve checking manholes, inlets or other structures for evidence of drilling fluids or drilled soil materials.

### 3.06 FIELD TESTING

- A. Testing shall be in accordance with Section W-18 "Leakage Tests" and as described below:

All newly joined and laid pipe, including fittings, valves and service lines shall be pressure tested in accordance with AWWA standard C-600. Allowable leakage shall be as defined by the equation in Section 4.1.6. of AWWA C-600.

The Contractor shall provide all necessary equipment and instrumentation required for flushing and testing of the piping systems. If requested by the City, the Contractor shall furnish to the City certified test data for the pressure gauges and recorders used on hydrostatic equipment. The cost to purchase water for test purposes will be paid by the City. Testing shall be conducted in the presence of and to the satisfaction of the City as a condition precedent to the approval and acceptance of the system. Not less than 3 days notice shall be given prior to start of such tests, and such testing shall not be scheduled until preliminary testing by the Contractor has indicated that the test section is ready for testing. The schedule and procedures for testing shall be determined by the Contractor and reviewed with the City prior to testing.

The duration of the pressure test shall be at least 2 hours with a test pressure of 100 psi. At no time shall the test or line pressure exceed 110 psi. If required by the City, pump test equipment will be equipped with pressure relief valves pre-set to 110 psi. Each valved section of pipe shall be slowly filled with water and a pump shall be connected to the low point of the section being tested.

Before conducting the test, the Contractor shall backfill all pipe and reaction blocking unless the City directs certain joints or connections to be left

uncovered. When reaction blocking is provided, the pressure test shall not be made until adequate curing time for the blocking has been allowed.

Before application of the test pressure, all air shall be expelled from the pipe.

At the end of the 2-hour test period, the Contractor will be required to pump the lines back up to the highest pressure obtained during the duration of the test period.

Pressure tests shall be made to demonstrate the ability of the valve to sustain pressure. All piping systems shall be tested in accordance with these test methods in addition to any other tests required by local plumbing codes or building authorities. At the option of the City, flow meters and/or pressure gauges used on hydrostatic testing equipment with approved strip or round chart recorders shall be supplied by the Contractor. Tests shall be made in sections not to exceed ½ mile.

Throughout the duration of the test, the Contractor is required to maintain a minimum pressure in excess of 100 psi. The Contractor is advised that, should the test pressure fall to or below 100 psi any time during the 2-hour test, the test will be considered invalid, and a retest will be required. Therefore, it is advised that the Contractor should pump water into the line as the test pressure approaches 100 psi.

The Contractor is warned that pressure testing against existing valves is done at his own risk. Failure of these valves to hold test pressure will not relieve the Contractor of the pressure testing.

All exposed pipe, fittings, valves and joints shall be carefully examined for leaks. Any cracked or defective pipe, fittings, valves or other appurtenances discovered as a consequence of the pressure test shall be removed and replaced with acceptable material. All leaking or defective joints shall be repaired, corrected or replaced. After all necessary replacements and corrections have been made, the test shall be repeated to the satisfaction of the City.

If the pipeline fails the pressure test twice, then the Contractor shall be required to retest the pipeline and provide to the certification by a Professional Engineer registered in the State of Florida, that the pipeline has passed the test in accordance with these standards before the department will witness another test.

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SECTION 15 - LAYING AND JOINTING PIPE  
FOR FORCE MAINS AND SEWERS

W-15.01 General

The installation, delivery, transportation, unloading, and stringing of pipes, fittings, and accessories for force mains and sewers shall be done in accordance with AWWA C600 for ductile iron pipe and ASTM Des: C 12 for clay and concrete pipe and ASTM D 2321 and pipe manufacturer's recommendations for PVC pipe, as modified or supplemented by the specifications of this section and by the details shown on the Plans.

Proper and suitable tools and appliances for the safe and convenient cutting, handling, and laying of the pipe and fittings shall be used.

Suitable fittings shall be used where shown and at connections where grade or alignment changes require offsets greater than those recommended by the pipe manufacturer.

Pipes and fittings shall be thoroughly cleaned before they are laid and shall be kept clean until they are accepted in the completed work.

All lines shall be closed off with bulkheads when pipe laying is not in progress.

Before being laid, all pipe and specials shall be thoroughly examined for defects, and no piece shall be installed which is known to be defective. If any defective piece should be discovered after having being installed, it shall be removed and replaced with a sound one in a satisfactory manner by the Contractor at his own expense.

Pipe shall be thoroughly cleaned before it is laid and shall be kept clean until it is accepted in the completed work. Special care shall be exercised to avoid leaving bits of wood, dirt, and other foreign particles in the pipe. If any such particles are discovered before the final acceptance of the work, they shall be removed and the pipe cleaned at the Contractor's expense.

Pipe laying for sewers shall begin at the low end of a run and proceed upgrade. Generally, all such pipe shall be laid with bells or grooves pointing uphill. Each pipe shall be carefully placed and checked for line and grade.

Adjustments to bring pipe to line and grade shall be made by scraping away or filling in granular material under the body of the pipe, but in no case by wedging or blocking up the barrel. The faces of the spigot ends and the bells shall be brought into fair contact, and the pipe shall be firmly and completely shoved home. As the work progresses, the interior of the pipelines shall be cleaned of all dirt and superfluous materials of every description. All lines shall be kept absolutely clean during construction. Pipelines shall be laid accurately to line and grade.

Gaskets for pipe joints shall be stored in a cool place and protected from light, sunlight, heat, oil, or grease until installed. Any gaskets showing signs of checking, weathering, or other deterioration will be rejected.

Pipe shall be of the types, sizes, and classes shown on the Plans or as listed in the Contract Items.

Each piece of pipe shall be inspected and cleaned before it is lowered in the trench and any lumps or projections on the face of the spigot or tongue end or the shoulder shall be cut away. No cracked, broken, or defective pieces shall be used in the work.

Concrete pipe manufactured with a plastic sheet liner shall be laid so that the liner is on the crown of the pipe and placed symmetrically about the vertical centerline of the pipe.

Pipe laying will be permitted only in dry trenches having a stable bottom. Where groundwater is encountered, the Contractor shall make every effort to secure an absolutely dry trench bottom.

If, in the opinion of the Engineer, the Contractor has failed to obtain an absolutely dry trench bottom by improper or insufficient use of all known methods of trench dewatering, the Engineer may then order the Contractor to excavate below grade and place sufficient selected fill material, crushed stone, or Class D concrete over the trench bottom at the Contractor's own expense.

If all efforts fail to obtain this condition and the Engineer determines that the trench bottom is unsuitable for pipe foundation, he will order in writing the kind of stabilization to be constructed.

#### W-15.02 Transportation and Delivery

Every precaution shall be taken to prevent injury to the pipe during transportation and delivery to the site. Extreme care must be taken in loading and unloading the pipe and fittings. Such work must be done slowly with skids or suitable power equipment, and the pipe shall be under perfect control at all times. Under no condition shall the pipe be dropped, bumped, dragged, pushed, or moved in any way which will cause damage to the pipe or coating. When handling the pipe with a crane, a suitable pipe hook or sling around the pipe shall be used. Under no condition shall the sling be allowed to pass through the pipe unless adequate measures are taken to prevent damage to the pipe ends.

If in the process of transportation, handling, or laying, any pipe or special is damaged, such pipe or pipes shall be replaced or repaired by the Contractor at his own expense.

The Contractor shall furnish and install suitable blocking and stakes so as to prevent the pipe from rolling. The type of blocking and stakes, and the method of installation, shall be approved by the Engineer.

#### W-15.03 Pipe Laying - Trenches

Pipelines shall be laid in trench excavation on bedding material as specified under the Workmanship and Materials section headed "Backfilling," Class D concrete cradle or other foundations as shown on the Plans, specified, or ordered in writing by the Engineer. The pipe shall be properly secured against movement and pipe joints shall be made in the excavation as required.

The pipe bedding shall be carefully graded, compacted, and formed to fit the bottom quadrant of the pipe. Bell holes shall be cut out for each joint as required to permit the joint to be properly made and allow the barrel of the pipe to have full bearing throughout its length.

Where pipelines are laid in Class D concrete cradle or encasement, the installation shall conform to the requirements of the Workmanship and Materials section headed "Pipe Cradles and Encasements."

Pipelines laid on other type foundations shall be installed as specified for such other foundations or as directed in writing by the Engineer.

#### W-15.04 Lateral Detection Tape

Detectable underground marking tape shall be installed over all laterals from the edge of pavement to the property line. The tape shall be Lineguard encased aluminum foil, or equal. The 2-inch wide tape shall be APWA green and reverse printed bearing the identification of the sewer line below it and a warning such as "CAUTION."

The tape shall be buried 4-6 inches. After trench backfilling, the tape shall be placed in the backfill and allowed to settle into place with the backfill.

#### W-15.05 Mechanical Joints for Ductile Iron Pipe

In making up mechanical joints, the spigot shall be centered in the bell. The surface with which the rubber gasket comes in contact shall be cleaned thoroughly and the gasket shall be washed thoroughly with soapy water just prior to assembly of the joint. The gasket and gland shall be placed in position, the bolts inserted, and the nuts tightened fingertight. The nuts then shall be tightened by means of a torque wrench in such a manner that the gland shall be brought up evenly into the joint. The following range of bolt torques shall be applied:

<u>Bolt Size</u> <u>Inches</u>	<u>Range of Torque</u> <u>Foot-Pounds</u>
5/8	45 - 60
3/4	75 - 90
1	80 - 100
1-1/4	105 - 120

If effective sealing is not obtained at the maximum torque listed above, the joint shall be disassembled and reassembled after a thorough cleaning.

All bolts and nuts shall be field coated with a bituminous coating after assembly of the joint.

#### W-15.06 Push-on Joints for Ductile Iron Pipe

In making up push-on joints, the gasket seat in the socket shall be cleaned thoroughly and the rubber gasket shall be wiped clean with a cloth. The gasket shall be placed in the socket and a thin film of lubricant shall then be applied to the inside surface of the gasket that will come in contact with the entering pipe. The plain end of the pipe to be entered shall be cleaned thoroughly and placed in alignment with the

bell of the pipe to which it is to be joined. The joint shall be made up by exerting sufficient force on the entering pipe so that its plain end is moved past the gasket until it makes contact with the base of the socket.

#### W-15.07 Joining Clay Pipe

The joining of clay pipe with flexible plastic joints shall be done in accordance with the manufacturer's instructions. The joint surface on both the bell and spigot ends shall be wiped clean and coated with a lubricant furnished by the manufacturer to facilitate assembly. The spigot end shall be inserted in the bell and pressure applied sufficient to seat the pipe properly. After the joint has been completed, any voids in the excavation beneath the spigot shall be thoroughly tamped full of granular fill material to provide a full bearing for the pipe and prevent excessive pressure on the bottom of the joint.

#### W-15.08 Joining of PVC Pipe-Gravity

The assembly of gasketed joints shall be performed as recommended by the pipe manufacturer. In all cases clean the gasket and bell, especially the groove area and the spigot area, with a rag, brush or paper towel to remove any dirt or foreign material before the assembly. Lubricant shall be applied as specified by the pipe manufacturer.

Align the spigot to the bell and insert the spigot into the bell until it contacts the gasket uniformly. Apply firm steady pressure either by hand or by bar and block assembly until the spigot easily slips through the gasket.

If undue resistance to insertion of the pipe end is encountered or the reference mark does not position properly, disassemble the joint and check the position of the gasket. If it is twisted or pushed out of its seat ("rolled"), inspect components, repair or replace damaged items, clean the components, and repeat the assembly steps. Be sure both pipe lengths are in concentric alignment. If the gasket was not out of position, verify proper location of the reference mark.

To join field-cut pipe, first square cut the pipe end. Use a factory-finished beveled end as a guide for proper bevel angle and depth of bevel plus the distance to the insertion reference mark. Bevel the end using a pipe beveling tool or a wood rasp which will cut the correct taper. Round off any sharp edges on the leading edge of the bevel.

#### W-15.09 Joining Concrete Pipe

Before joining concrete pipe using flexible rubber gaskets, the joint surfaces of both the bell and spigot (tongue and groove) ends shall be wiped clean. Any lumps, projections, burrs, or chips which would interfere with the proper compression of the gasket shall be repaired. The spigot or tongue end with the gasket in place and with all surfaces lubricated as recommended by the manufacturer, shall be inserted into the bell or groove. Pressure shall be applied to seat the pipe properly in the bell or groove. Voids under the pipe shall be tamped full of granular material to provide full bearing for the pipe.

Curves for reinforced concrete pipe sewers shall be constructed with standard pipe where the opening of the joint on the outside of the curve is less than 1/2 inch. Where greater opening of the joint would be required, the curves shall be constructed using beveled or radius pipe with standard joints.

Curves for reinforced concrete pressure pipe or prestressed concrete pipe shall be constructed with



standard pipe sections, where the opening of the joint on the outside of the curve is less than 1/2 inch, or with beveled pipe, precast elbows or combination of these methods.

#### W-15.10 Concrete Pipe Rubber Gasket Joints

Rubber gaskets shall be of the O-ring type or equivalent cross section approved by the Engineer. The composition and properties of the gaskets for gravity flow sewers shall meet the requirements of ASTM Des: C 443.

Composition and properties for concrete pressure pipe gaskets shall meet the requirements of the specifications for the concrete pressure pipe with which the gasket will be used.

In making O-ring rubber gasketed joints, the gasket and the pipe socket shall be lubricated with an approved rubber gasket lubricant, and the gasket shall be stretched over the spigot and placed accurately in position. The tongue or spigot end shall be carefully centered in the socket of the preceding pipe so as to avoid displacement of the gasket, and the pipe shall be drawn home fully compressing the gasket. Adjustments to line and grade shall be made in such a manner that the compressed rubber gasket will not be disturbed. Before proceeding with backfilling, the joint shall be felt completely around to determine whether the gasket is in its proper position. If the gasket can be felt out of place, the pipe shall be withdrawn and the gasket examined for cuts or breaks. If the gasket has been damaged, it shall be replaced with a new one before the pipe is replaced.

Rubber gaskets shall be stored in a cool place and protected from light, sunlight, heat, oil, or grease until installed. Any gaskets showing signs of checking, weathering, or other deterioration will be rejected.

#### W-15.11 Temporary Bulkheads

At the ends of contract sections, where adjoining pipelines have not been completed, and in connections built into pipelines where adjoining pipelines or structures have not been completed and are not ready to be connected, temporary bulkheads, approved by the Engineer, shall be built. Such bulkheads encountered in connecting sewers or structures included in the Contract, or pipelines or structures previously built, shall be removed by the Contractor when the need for them has passed or when ordered by the Engineer.

#### W-15.12 Testing

The testing of pipelines shall be done in accordance with the requirements of the Workmanship and Materials section headed "Leakage Tests."

#### W-15.13 Joining Different Types (Clay, PVC, or Ductile Iron) of Pipe

The joining of clay pipe to ductile iron pipe or clay pipe to PVC pipe, shall be accomplished with flexible compression couplings. Couplings shall include stainless steel shear rings and stainless steel compression bands. Such couplings shall meet the requirements of ASTM DES: C 425, ASTM C1173 and shall be Series No. 1002 flexible polyvinyl chloride couplings with stainless steel compression bands and shear rings as manufactured by Fernco Joint Sealer Co., Ferndale, Michigan; Band-Seal couplings as manufactured by Mission Clay Products Corp., Whittier, California; or approved equal. After the joint has been completed, any voids in the excavation beneath the coupling shall be thoroughly tamped full of granular fill material to provide a full bearing for the pipe and prevent excessive pressure on the bottom of

the joint.

The joining of SDR-35 or SDR-26 PVC pipe to ductile iron or C-900 PVC pipe, shall be accomplished with rigid PVC C900 x SDR-35 adapter couplings. Such couplings shall be molded of PVC material meeting ASTM D-1784 specifications. Joints shall meet ASTM D-3213 requirements with gaskets conforming to ASTM F-477. The adapter couplings shall be manufactured by Harco, Lynchburg, VA, or equal. Installation of rigid couplings shall be done in accordance with the manufacturer's instructions. After the joint has been completed, any voids in the excavation beneath the coupling shall be thoroughly tamped full of granular fill material to provide a full bearing for the pipe and prevent excessive pressure on the bottom of the joint.

#### W-15.14 Connection to Manholes

The Contractor will be required to submit a shop drawing, detailing the method of connecting the proposed pipe to the manhole and making it watertight:

1. For connecting vitrified clay or ductile iron pipe, the Contractor shall use nonshrink grout to seal the opening between the pipe O.D. and manufactured opening in the manhole or flexible rubber boot, precast into the manhole. The boot shall have stainless steel bands to compress and seal to the proposed pipe or shall be a compression type, such as A-Lock.
2. For connecting PVC pipe, the Contractor shall use a flexible rubber boot, precast into the manhole. The boot shall have stainless steel bands to compress and seal to the proposed pipe or shall be a compression type, such as A-Lock. Should the flexible rubber boot need to be relocated or when connecting to an existing manhole, the Contractor shall perform the connection by one of two methods. The preferred method is to core the manhole and install a rubber boot. The rubber boot shall be manufactured by Kor-n-Seal, or equal. The boot shall be installed and the PVCP connection shall be in accordance with the manufacturer's instructions. If the manhole cannot be cored or if the manhole is constructed of brick, the connection shall be made with a PVC manhole adapter which has an exterior impregnated silica surface layer. The adapter shall be manufactured by GPK Products, Inc., Fargo, ND, or equal. The adapter shall be installed and grouted into the manhole wall in accordance with the manufacturer's instructions with nonshrink grout. The PVCP shall be inserted through the adapter.

#### W-15.15 Joint Grouting

Joints for concrete pipelines using rubber gaskets and steel end rings shall be grouted on the outside with cement mortar composed of one part Type IA portland cement to one part sand by volume. The materials shall be thoroughly mixed to produce a uniform mortar with all aggregate particles well coated.

The joint grouting shall not advance closer than two pipe lengths to the laying operations. In grouting the joint, a cloth diaper shall be used to encase the outside diameter of the bell of the pipe and adequately straddle the joint recess so as to keep out dirt and to serve as a form for grouting. The joint space shall be filled with cement mortar, just thin enough to run around the joint. The diaper is to be left in place permanently. Before the mortar has taken its initial set, the diaper shall be examined, and if not completely filled, additional mortar shall be forced into the joint.

\* \* \*

## SECTION 16 - RESTORATION OF STREET PAVEMENTS

### W-16.01 General

The various street surfaces disturbed, damaged, or destroyed during the performance of the work under this Contract shall be restored and maintained as shown, specified, and directed. Included in this classification are permanent pavement surfaces of all types, pavement bases, curb, curb and gutter, alleys, driveways, and sidewalks.

The quality of workmanship and materials used in the restoration shall produce a street surface equal to or better than the condition before the work began.

Service boxes, manhole frames and covers, and similar structures not conforming to the new work shall be set to established grade at the Contractor's expense, and no separate payment will be made therefor.

All portland cement and asphaltic concrete pavements shall be removed in rectangular sections with sawed vertical cuts, or to existing joints, as directed by the Engineer. Concrete pavements shall be cut with a concrete saw. Asphaltic concrete pavements one-inch thick or greater shall be cut with a tool having a square neat edge. The edges of adjacent pavement shall be trimmed to straight lines which a roller can follow. Where reinforced concrete pavement is removed, one foot of existing reinforcement on each side of the excavation shall be left exposed and tied to the replaced reinforcing steel.

The equipment necessary for the proper performance of pavement replacement shall be on the site in satisfactory working condition and shall be subject to approval of the Engineer before the work is started.

All replaced concrete pavements shall have a minimum bearing on undisturbed earth outside the line of excavations of at least nine (9) inches.

### W-16.02 Standards

The restoration of street pavement shall be performed in strict conformance with the standards relating to equipment, materials, and methods of construction of the authority having jurisdiction over the pavements, unless otherwise specified herein. Pavements to be restored are under the jurisdiction of the several agencies as follows:

1. State Highways are under the jurisdiction of the State of Florida Department of Transportation. Work on such pavements shall conform to the Department of Transportation Standard Specifications for Road and Bridge Construction.
2. City Streets are under the jurisdiction of the City of Tampa Department of Transportation and Stormwater Services. Work on such pavements shall conform to the Florida Department of Transportation Standard Specifications for Road and

Bridge Construction, latest edition, except that densities (including for subgrade) and other testing requirements shall follow current Department of Transportation and Stormwater Services specifications, and except that Sections 330 and 331 shall be modified as shown in this Section. The type and thickness of pavement, base and stabilization shall be as shown, specified, and directed by the Engineer.

3. County Roads are under the jurisdiction of the Hillsborough County Engineering Department. Work on such pavements shall conform to County specifications.

All specifications of the several agencies having jurisdiction over pavement restoration work shall be the current issue of such specifications as of the date of the "Notice to Bidders," except as specified otherwise herein.

#### W-16.03 Temporary Restoration

Upon completion of backfilling, the street or sidewalk surface damaged or destroyed shall be promptly placed in condition for safe temporary use. Temporary work shall be maintained in a suitable and safe condition for traffic until the permanent pavement is laid, or until final acceptance of the work.

Where the area over which existing pavement has been disturbed is to be repaved as part of an overall project by the agency having jurisdiction, any special temporary pavement replacement shall be as specified in the "Specific Provisions."

Pavement surfaces shall be temporarily restored by placing thereon, to proper line, grade and transverse profile, a layer or layers of compacted limerock conforming to all requirements regarding configuration, thickness, and density as detailed in the Plans, specified, and directed by the Engineer. When the compacted thickness of the limerock layer is greater than 6 inches, the base shall be constructed in multiple courses. Each course shall not exceed 6 inches in compacted thickness. Where the existing pavement has a permanent wearing surface, the temporary pavement shall be finished with a suitable grade of asphalt and sand to provide a temporary wearing course and to eliminate dust nuisance.

Curbs, where possible, shall be temporarily reset in place, as part of the work of temporary restoration of pavement.

Damaged or destroyed sidewalks shall be temporarily restored, immediately upon placing of the backfill, by placing a compacted layer of fine crushed limestone, choked with limestone screenings, which shall have a minimum thickness of three inches below the existing finished sidewalk grade.

The temporary pavement shall be maintained by the Contractor and all holes and depressions filled until the permanent pavement is placed.

Limerock or shell placed in areas where the existing pavement is shell, limerock, crushed stone, or other similar material and is classed as nonpermanent pavement, will not be measured for

separate payment. Placement of limerock or shell as nonpermanent pavement replacement will be included for payment under the various classified Unit Price Contract Items for pipelines.

Temporary sand and asphalt wearing courses placed on limerock base on which a permanent pavement surface will be constructed shall be incidental to the permanent pavement base work, and no separate payment will be made therefor.

Limestone screenings for temporary sidewalk surface shall be incidental to sidewalk replacement, and no separate payment will be made therefor.

Limerock base placed in areas to receive a permanent pavement surface will be measured for payment under the appropriate Contract Item for permanent pavement base.

#### W-16.04 Preparation of Temporary Pavement for Permanent Pavement Replacement

After due notice and within the time specified, the temporary limerock pavement shall be prepared as the base to receive the new permanent pavement surface.

Prior to construction of the pavement base, the City will furnish the Contractor with the preconstruction survey notes for the streets disturbed by construction. The Contractor shall use these notes in bringing the base installed to grade allowing for the permanent pavement surface to be constructed.

The preparation of the base shall consist of bringing the area to be replaced to a grade conforming to the required grade and cross section, of uniform density, ready to receive the permanent pavement. This is to be accomplished by excavating or backfilling as needed, shaping, watering as required, or permitting to dry to proper consistency, and rolling the entire area with an approved self-propelled roller weighing not less than eight tons. Shaping and rolling shall be continued until the base has been properly prepared and shows that no further compaction of any practical benefit would result from continued rolling. The base shall be tested as to cross section, crown, and elevation. After being properly prepared, it shall be so maintained until the permanent pavement is constructed. Any part of the base area not accessible to the roller shall be thoroughly compacted by hand or by mechanical compaction in a manner acceptable to the Engineer. Preparation shall include sawing, cutting and trimming edges of existing pavements to provide a neat, uniform edge to abut the new pavement.

After completion of the base, the Contractor shall furnish the Engineer with survey notes verifying the base has been constructed to grade. Upon approval, payment will be made for permanent pavement base.

#### W-16.05 Certification for Limerock for Pavement Base

The Contractor shall furnish notarized certifications from all suppliers of limerock stating that all limerock supplied for use as pavement base conforms to the requirements of the applicable sections of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

#### W-16.06 Permanent Pavement Base Densities

Permanent base material shall be installed and compacted to the required densities (98% modified proctor) in layers not exceeding six inches.

#### W-16.07 Permanent Pavement Surface Restoration

Permanent restoration of pavement shall be pavement of the type and thickness detailed in the Plans, Specific Provisions, or as directed by the Engineer.

If the existing type of pavement is classified as nonpermanent pavement, the temporary restoration shall be reworked and completed and left in a condition at least equivalent to the existing nonpermanent pavement.

#### W-16.08 Replacement of Curb, Curb and Gutter, Sidewalk and Driveways

All permanent restoration of street curb or curb and gutter shall be of the same type and thickness as the curb or curb gutter which abuts. The grade of the restored curb and curb and gutter shall conform with the grade of the existing adjacent curb or curb and gutter.

Except as otherwise specified herein or detailed in the Plans, all permanent restoration of driveways and sidewalks shall conform to the manner of construction as originally placed and to the lines and grades as given by the Engineer. No patching of concrete driveway areas will be allowed between joints or dummy joints.

Where sidewalks are replaced, the replacement shall be the full width of the walk and minimum lengths shall be 60 inches. Restoration of adjacent lawn is incidental to sidewalk replacement, and no separate payment will be made therefor.

#### W-16.09 Replacement of Traffic Markings and Signalization Loops

The Contractor shall furnish all labor, equipment and materials to replace, test and maintain all traffic markings (temporary and permanent) and signalization loops removed or damaged by pipeline construction and appurtenance work as shown on the Plans, specified and directed by the Engineer.

The replacement of traffic markings (temporary and permanent), signalization loops and all appurtenant work shall be replaced by the Contractor in kind.

It shall be the Contractor's responsibility to field verify before construction begins all markings and signalization loops to be replaced.

All traffic markings and signalization loops shall conform to the Workmanship and Materials standards set forth in the latest edition of the Florida Department of Transportation Standard and Supplemental Specifications.

Payment for the replacement of temporary and permanent traffic markings, signalization loops and all appurtenant work shall be included in the unit bid price for Permanent Pavement Surface Replacement, Asphaltic Concrete, and no separate payment shall be made therefor.

W-16.10 Hot Bituminous Mixtures (Section 330) Type S Asphaltic Concrete (Section 331)

**This Subsection shall Replace and/or Modify Portions of F.D.O.T. Standard Specifications for Road and Bridge Construction (2007) Sections 330, 331 and 334.**

SECTION 330 HOT BITUMINOUS MIXTURES

All references to the CITY OF TAMPA shall mean the local agency. All references to the Engineer shall mean the designated Engineer of the local agency. Any incorrect references to FDOT specifications, test methods, or standards should be brought to the attention of the Engineer for clarification.

330-1 Description. Construct plant-mixed hot bituminous pavements and bases. Establish and maintain a quality control system that provides assurance that all materials, products and completed construction submitted for acceptance meet Contract requirements.

330-1.1 General: Meet the requirements of Section 320 for plant and equipment, and meet the general construction requirements of Section 330. The Engineer will accept the work based on one of the following methods as described in 334-5 and 334-6:

- 1) Asphalt Work Category 1,
- 2) Asphalt Work Category 2,
- 3) Asphalt Work Category 3

330-1.2 Quality Control/Acceptance Testing: The contractor's submittal of documentation for quality control testing may be waived by the Engineer; however, the contractor shall not be exempt from implementing quality control procedures regarding material and workmanship. The local agency shall perform the quality acceptance testing, or utilize a licensed private testing laboratory of the Engineer's choice.

SECTION 331 TYPE S ASPHALTIC CONCRETE

331-1 Description.

331-1.1 General: Construct a Type S Hot Mix Asphalt (HMA) pavement course as specified by the Contract. The general composition and physical test properties for all mixes shall be met per F.D.O.T Standard Specifications for Road and Bridge Construction. Meet the applicable requirements for plants, equipment, and construction requirements.

Where Type S Asphalt Concrete is specified in the Contract, if approved by the Engineer, the equivalent fine Type SP Asphalt Concrete mixture (Traffic Level C) meeting the requirements of Section 334 may be selected as an alternate at no additional cost to the Department. The equivalent mixes are as follows:

Type S-I.....	Type SP-12.5
Type S-II.....	Type SP-19.0
Type S-III.....	Type SP-9.5

Meet the requirements for plant and equipment specified in Section 320. Meet the general construction requirements specified in Section 330.

331-1.2 Layer Thicknesses:

331-1.2.1 Structural Layers: The allowable layer thicknesses for Type S Asphalt Concrete mixtures used in structural and overbuild applications is as follows:

Type S-III.....	3/4 – 1 1/4 inches [20 – 30mm]
Type S-I.....	1 1/4 – 2 1/2 inches [30 – 60 mm]
Type S-II.....	2 – 2 3/4 inches [50 – 70mm]

In addition to the minimum and maximum thickness requirements, the following restrictions are placed on Type S mixtures when used as a structural course:

Type S-III – Limited to the final (top) structural layer, one layer only.

Type S-I – May not be used in the first layer of courses over 3 1/2 inches [90 mm] thick, nor in the first layer of courses over 2 3/4 inches [70 mm] thick on limited access facilities.

Type S-II – May not be used in the final (top) structural layer.

331-1.2.2 Additional Requirements: The following requirements also apply to Type S Asphalt Concrete mixtures:

1. A minimum 1 1/2 inch [40 mm] initial lift is required over an Asphalt Rubber Membrane Interlayer (ARMI).

2. When construction includes the paving of adjacent shoulders (#5 feet [#1.5 m] wide), the layer thickness for the upper pavement layer and shoulder shall be the same and paved in a single pass, unless shown differently in the plans.

3. All overbuild layers shall be Type S asphalt concrete. Use the minimum and maximum layer thicknesses as specified in 331-1.2.1 unless shown differently in the plans. On variable thickness overbuild layers, the minimum allowable thickness may be **reduced by 1/2 inch (13 mm), and the maximum allowable thickness may be increased 1/2 inch (13 mm)**, unless shown differently in the plans. Other variations from these thicknesses must be approved by the Engineer.

331-4 General Composition of Mixture.

331-4.3 Mix Design: Prior to the production of any asphalt mixture, obtain the Engineer’s conditional approval of the mix design. If required by the Engineer, send representative samples of all component materials, including asphalt binder to a laboratory designated by the Engineer for verification. The Engineer will consider any marked variations from original test data for a mix design or any evidence of inadequate field performance of a mix design as sufficient evidence that



the properties of the mix design have changed, and at his discretion, the Engineer may no longer allow the use of the mix design. Furnish the following information:

1. The specific project on which the mixture will be used.
2. The source and description of the materials to be used.
3. The gradation and approximate proportions of the raw materials as intended to be combined in the paving mixture. The gradation of the component materials shall be representative of the material at the time of use.
4. A single percentage of the combined mineral aggregate passing each specified sieve. Degradation of the aggregate due to processing (particularly No. 200 [75  $\mu$ m]) should be accounted for and identified for the applicable sieves.
5. A single percentage of asphalt by weight of total mix intended to be incorporated in the completed mixture, shown to the nearest 0.1%. For structural mixes (S-I, S-II and S-III) establish the optimum asphalt content at a level corresponding to a minimum of 4.5% air voids. For FC-3 mixes, establish optimum asphalt content at a level corresponding to a minimum of 5.0% air voids.
6. A single temperature at which the mixture is intended to be discharged from the plant.
7. The laboratory density of the asphalt mixture for all mixes except Open-Graded Friction Courses.
8. Evidence that the completed mixture will meet all specified physical requirements.
9. The name signature dated of the individual responsible for the Quality Control of the mixture during production.

331-4.4 Contractor Quality Control: Assume full responsibility for controlling all operations and processes such that the requirements of these Specifications are met at all times. Perform any tests necessary at the plant and roadway for quality control purposes.

331-5 Acceptance Procedures:

331-5.1 General Construction Requirements: shall meet same requirements as 334-5 General Construction Requirements (with exception to requirements regarding SP spread rates, unless specified by the Engineer).

331-6 Acceptance of the Mixture: shall meet same requirements as 334-6 Acceptance of the Mixture (with exception to Table 334-3 to be replaced with Table 331-6).

<b>Table 331-6 Tolerances for Acceptance Tests</b>	
Characteristic	Tolerance
Asphalt Binder Content	±0.55%
Passing No. 4 [4.75 mm] sieve	±7.00%
Passing No. 10 [2.00 mm] sieve	±5.50%
Passing No. 40 [425 $\mu$ m] sieve*	±4.50%
Passing No. 200 [75 $\mu$ m] sieve	±2.00%
*Applies only to Types S-I, S-II, S-III, and FC-3.	

331-7 Acceptance of the Mixture at the Roadway: shall meet same requirements as 334-6

Acceptance of the Mixture (with exception to Table 334-3 shall be replaced with Table 331-6).

<b>Table 334-7 Roadway Density Acceptance Values</b>	
Characteristic	Tolerance
Roadway Density (average of three cores)	92.0% $G_{mm}$ (proposed mix design)
Roadway Density (avg. of 5 tests nuclear method)	95.0% $G_{sb}$ (proposed mix design)
Roadway Density (avg. of 5 tests nuclear method)	96.0 % $G_{sb}$ (lab density)

## SECTION 334 SUPERPAVE ASPHALT CONCRETE

### 334-1 Description.

334-1.1 General: Construct a Type SP Hot Mix Asphalt (HMA) pavement based on the type of work specified in the Contract and the Asphalt Work Categories as defined below. Meet the applicable requirements for plants, equipment, and construction requirements as defined below. Use a HMA mix that meets the requirements of this specification.

334-1.2 Asphalt Work Mix Categories: Construction of Hot Mix Asphalt Pavement will fall into one of the following work categories:

334-1.2.1 Asphalt Work Category 1: Includes the construction of bike paths.

334-1.2.2 Asphalt Work Category 2: Includes the construction of new HMA turn lanes, paved shoulders and other non-mainline pavement locations.

334-1.2.3 Asphalt Work Category 3: Includes the construction of new mainline HMA pavement lanes, milling and resurfacing.

334-1.3 Mix Types: Use the appropriate HMA mix as shown in Table 334-1.

<b>Table 334-1 HMA Mix Types</b>		
Asphalt Work Category	Mix Types	Traffic Level
1	Type SP-9.5 , or equivalent as determined by the Engineer	A
2	Type SP-9.5, SP-12.5, or equivalent as determined by the Engineer	B or C
3	Type SP-9.5, SP-12.5	C

A Type SP mix one traffic level higher than the traffic level specified in the Contract may be substituted, at no additional cost (i.e. Traffic Level B may be substituted for Traffic Level A, etc.).

334-1.4 Gradation Classification: HMA mixes are classified as either coarse or fine, depending on the overall gradation of the mixture. Coarse and fine mixes are defined in 334 3.2.2. Use only fine mixes.

The equivalent AASHTO nominal maximum aggregate size Superpave mixes are as follows:

Type SP-9.5.....	9.5 mm
Type SP-12.5.....	12.5 mm

334-1.5 Thickness: The total pavement thickness of the HMA Pavement will be based on a specified spread rate or plan thickness as shown in the Contract Documents. Before paving, propose a spread rate or thickness for each individual layer meeting the requirements of this specification, which when combined with other layers (as applicable) will equal the plan spread rate or thickness. When the total pavement thickness is specified as plan thickness, the plan thickness and individual layer thickness will be converted to spread rate using the following equation:

$$\text{Spread rate (lbs/yd}^2\text{)} = t \times G_{\text{mm}} \times 43.3$$

where:            t            = Thickness (in.) (Plan thickness or individual layer thickness)  
                       G<sub>mm</sub>        = Maximum specific gravity from the mix design

For target purposes only, spread rate calculations shall be rounded to the nearest whole number.

334-1.5.1 Layer Thicknesses: Unless otherwise called for in the Contract Documents, the allowable layer thicknesses for HMA mixtures are as follows:

Type SP-9.5 .....	3/4 - 1 1/2 inches
Type SP-12.5 .....	1 1/2 - 2 1/2 inches

334-1.5.2 Additional Requirements: The following requirements also apply to HMA mixtures:

1. When construction includes the paving of adjacent shoulders (≤5 feet wide), the layer thickness for the upper pavement layer and shoulder shall be the same and paved in a single pass, unless otherwise called for in the Contract Documents.
2. For overbuild layers, use the minimum and maximum layer thicknesses as specified above unless called for differently in the Contract Documents. On variable thickness overbuild layers, the minimum allowable thickness may be reduced by 1/2 inch, and the maximum allowable thickness may be increased by 1/2 inch, unless called for differently in the Contract Documents.

334-1.6 Weight of Mixture: The weight of the mixture shall be determined as provided in 320 2.2 of the Florida Department of Transportation (FDOT) specifications.

334-2 Materials.

334-2.1 Superpave Asphalt Binder: Unless specified elsewhere in the Contract or in 334-2.3.3, use a PG 67 22 asphalt binder from the FDOT Qualified Products List (QPL).

334-2.2 Aggregate: Use aggregate capable of producing a quality pavement. For Category 2 and 3 projects, require the aggregate supplier to certify that the material meets FDOT requirements.

334-2.3 Reclaimed Asphalt Pavement (RAP) Material:

334-2.3.1 General requirements: RAP may be used as a component of the asphalt mixture if approved by the Engineer. Usage of RAP is subject to the following requirements:

1. Limit the amount of RAP material used in the mix to a maximum of 50 percent by weight of total aggregate.
2. Do not use RAP material in any friction course mixes.
3. Provide stockpiled RAP material that is reasonably consistent in characteristics and contains no aggregate particles which are soft or conglomerates of fines.
4. Provide RAP material having a minimum average asphalt content of 4.0 percent by weight of total mix. The Engineer may sample the stockpile to verify that this requirement is met.
5. Use a grizzly or grid over the RAP cold bin, in-line roller crusher, screen, or other suitable means to prevent oversized RAP material from showing up in the completed recycle mixture. If oversized RAP material appears in the completed recycle mix, take the appropriate corrective action immediately. If the appropriate corrective actions are not immediately taken, stop plant operations.

334-2.3.2 Material Characterization: Assume responsibility for establishing the asphalt binder content, gradation, viscosity and bulk specific gravity (Gsb) of the RAP material based on a representative sampling of the material.

334-2.3.3 Asphalt Binder for Mixes with RAP: Select the appropriate asphalt binder grade based on Table 334 2. Maintain the viscosity of the recycled mixture within the range of 4,000 to 12,000 poises.

<b>Table 334-2 Asphalt Binder Grade for Mixes Containing RAP</b>	
Percent RAP	Asphalt Binder Grade
<20	PG 67-22
20 – 29	PG 64-22
≥ 30	Recycling Agent

### 334-3 Composition of Mixture.

334-3.1 General: Compose the asphalt mixture using a combination of aggregates, mineral filler, if required, and asphalt binder material. Size, grade and combine the aggregate fractions to meet the grading and physical properties of the mix design. Aggregates from various sources may be combined.

#### 334-3.2 Mix Design:

334-3.2.1 General: Design the asphalt mixture in accordance with AASHTO R35 04, except as noted herein. Submit the proposed mix design with supporting test data indicating compliance with all mix design criteria to the Engineer. Prior to the production of any asphalt mixture, obtain the Engineer’s conditional approval of the mix design. If required by the Engineer, send representative samples of all component materials, including asphalt binder to a laboratory designated by the Engineer for verification. The Engineer will

consider any marked variations from original test data for a mix design or any evidence of inadequate field performance of a mix design as sufficient evidence that the properties of the mix design have changed, and at his discretion, the Engineer may no longer allow the use of the mix design.

334-3.2.2 Mixture Gradation Requirements: Combine the aggregates in proportions that will produce an asphalt mixture meeting all of the requirements defined in this specification and conform to the gradation requirements at design as defined in AASHTO M323 04, Table 3. Aggregates from various sources may be combined.

334-3.2.2.1 Mixture Gradation Classification: Plot the combined mixture gradation on an FHWA 0.45 Power Gradation Chart. Include the Control Points from AASHTO M323 04, Table 3, as well as the Primary Control Sieve (PCS) Control Point from AASHTO M323 04, Table 4. Fine mixes are defined as having a gradation that passes above or through the primary control sieve control point. Use only fine mixes

334-3.2.3 Gyratory Compaction: Compact the design mixture in accordance with AASHTO T312 04. Use the number of gyrations as defined in AASHTO R35 04, Table 1.

334-3.2.4 Design Criteria: Meet the requirements for nominal maximum aggregate size as defined in AASHTO M323 04, as well as for relative density, VMA, VFA, and dust-to-binder ratio as specified in AASHTO M323 04, Table 6.

334-3.2.5 Moisture Susceptibility: Test 4 inch specimens in accordance with FM 1 T 283. Provide a mixture having a retained tensile strength ratio of at least 0.80 and a minimum tensile strength (unconditioned) of 100 psi. If necessary, add a liquid anti-stripping agent from the FDOT's Qualified Products List, or hydrated lime in order to meet these criteria.

In lieu of moisture susceptibility testing, add a liquid anti-stripping agent from the FDOT Qualified Products List. Add 0.5% liquid anti-stripping agent by weight of binder.

334-3.2.6 Additional Information: In addition to the requirements listed above, provide the following information on each mix design:

1. The design traffic level and the design number of gyrations ( $N_{\text{design}}$ ).
2. The source and description of the materials to be used.
3. The FDOT source number and the FDOT product code of the aggregate components furnished from an FDOT approved source (if required).
4. The gradation and proportions of the raw materials as intended to be combined in the paving mixture. The gradation of the component materials shall be representative of the material at the time of use. Compensate for any change in aggregate gradation caused by handling and processing as necessary.
5. A single percentage of the combined mineral aggregate passing each specified sieve. Degradation of the aggregate due to processing (particularly material passing the No. 200 sieve) should be accounted for and identified.
6. The bulk specific gravity ( $G_{\text{sb}}$ ) value for each individual aggregate and.
7. A single percentage of asphalt binder by weight of total mix intended to be incorporated in the completed mixture, shown to the nearest 0.1 percent.
8. A target temperature at which the mixture is to be discharged from the plant and a target roadway temperature. Do not exceed a target temperature of 330°F for modified asphalts and 315°F for unmodified asphalts.
9. Provide the physical properties achieved at four different asphalt binder

contents. One shall be at the optimum asphalt content, and must conform to all specified physical requirements.

10. The name of the Mix Designer.

11. The ignition oven calibration factor.

#### 334-4 Contractor Quality Control.

Assume full responsibility for controlling all operations and processes such that the requirements of these Specifications are met at all times. Perform any tests necessary at the plant and roadway for quality control purposes.

#### 334-5 General Construction Requirements.

334-5.1 Weather Limitations: Do not transport asphalt mix from the plant to the roadway unless all weather conditions are suitable for the laying operations.

334-5.2 Limitations of Laying Operations:

334-5.2.1 General: Spread the mixture only when the surface upon which it is to be placed has been previously prepared, is intact, firm, and properly cured, and is dry.

334-5.2.2 Air Temperature: Spread the mixture only when the air temperature in the shade and away from artificial heat is at least 40°F for layers greater than 1 inch (100 lb/yd<sup>2</sup>) in thickness and at least 45°F for layers 1 inch (100 lb/yd<sup>2</sup>) or less in thickness (this includes leveling courses). The minimum temperature requirement for leveling courses with a spread rate of 50 lb/yd<sup>2</sup> or less is 50°F.

334-5.3 Mix Temperature: Heat and combine the ingredients of the mix in such a manner as to produce a mixture with a temperature at the plant and at the roadway, within a range of ±30°F from the target temperature as shown on the mix design. Reject all loads outside of this range.

334-5.4 Transportation of the Mixture: Transport the mixture in vehicles previously cleaned of all foreign material. After cleaning, thinly coat the inside surface of the truck bodies with soapy water or an asphalt release agent as needed to prevent the mixture from adhering to the beds. Do not allow excess liquid to pond in the truck body. Do not use diesel fuel or any other hazardous or environmentally detrimental material as a coating for the inside surface of the truck body. Cover each load at all times.

334-5.5 Preparation of Surfaces Prior to Paving:

334-5.5.1 Cleaning: Clean the surface of all loose and deleterious material by the use of power brooms or blowers, supplemented by hand brooming where necessary.

334-5.5.2 Patching and Leveling Courses: Where the HMA is to be placed on an existing pavement which is irregular, wherever the plans indicate, or if directed by the Engineer, bring the existing surface to proper grade and cross-section by the application of patching or leveling courses.

334-5.5.3 Application over Surface Treatment: Where an asphalt mix is to be placed over a surface treatment, sweep and dispose of all loose material from the paving area.

334-5.5.4 Tack Coat: Apply a tack coat on existing pavement structures that are to be overlaid with an asphalt mix and between successive layers of all asphalt mixes, unless directed otherwise by the Engineer. Use a tack coat product meeting FDOT specifications. Use an emulsified tack coat spread rate of 0.02 to 0.08 gal/sy or as specified by the Engineer.

### 334-5.6 Paving:

334-5.6.1 Alignment of Edges: With the exception of pavements placed adjacent to curb and gutter or other true edges, place all pavements by the stringline method to obtain an accurate, uniform alignment of the pavement edge. Control the unsupported pavement edge to ensure that it will not deviate more than  $\pm 1.5$  inches from the stringline.

334-5.6.2 Rain and Surface Conditions: Immediately cease transportation of asphalt mixtures from the plant when rain begins at the roadway. Do not place asphalt mixtures while rain is falling, or when there is water on the surface to be covered. Once the rain has stopped and water has been removed from the tacked surface to the satisfaction of the Engineer and the temperature of the mixture caught in transit still meets the requirements as specified in 334-5.3, the Contractor may then place the mixture caught in transit.

334-5.6.3 Checking Depth of Layer: Check the depth of each layer at frequent intervals, and make adjustments when the thickness exceeds the allowable tolerance. When making an adjustment, allow the paving machine to travel a minimum distance of 32 feet to stabilize before the second check is made to determine the effects of the adjustment.

334-5.6.4 Hand Spreading: In limited areas where the use of the spreader is impossible or impracticable, spread and finish the mixture by hand.

334-5.6.5 Spreading and Finishing: Upon arrival, dump the mixture in the approved paver, and immediately spread and strike-off the mixture to the full width required, and to such loose depth for each course that, when the work is completed, the required weight of mixture per square yard, or the specified thickness, is secured. Carry a uniform amount of mixture ahead of the screed at all times.

334-5.6.6 Thickness of Layers: Construct each course of Type SP mixtures in layers of the thickness shown in 334-1.5.1.

### 334-5.7 Leveling Courses:

334-5.7.1 Patching Depressions: Before spreading any leveling course, fill all mixture, and compact thoroughly.

334-5.7.2 Spreading Leveling Courses: Place all courses of leveling with an asphalt paver or by the use of two motor graders, one being equipped with a spreader box. Other types of leveling devices may be used upon approval by the Engineer.

334-5.7.3 Rate of Application: When using Type SP-9.5 (fine graded) for leveling, do not allow the average spread of a layer to be less than 50 lb/yd<sup>2</sup> or more than 75 lb/yd<sup>2</sup>. The quantity of mix for leveling shown in the plans represents the average for the entire project; however, the Contractor may vary the rate of application throughout the project as directed by the Engineer. When leveling in connection with base widening, the Engineer may require placing all the leveling mix prior to the widening operation.

334-5.8 Compaction: For each paving or leveling train in operation, furnish a separate set of rollers, with their operators.

When density testing for acceptance is required (Asphalt Work Category 3) to meet the specified density requirement, select equipment, sequence, and coverage of rolling. Regardless of the rolling procedure used, complete the final rolling before the surface temperature of the pavement drops to the extent that effective compaction may not be achieved or the rollers begin to

damage the pavement.

When density testing for acceptance is not required (Asphalt Work Categories 1 and 2), use a rolling pattern approved by the Engineer.

Use hand tamps or other satisfactory means to compact areas which are inaccessible to a roller, such as areas adjacent to curbs, headers, gutters, bridges, manholes, etc.

### 334-5.9 Joints.

334-5.9.1 Transverse Joints: Construct smooth transverse joints, which are within 3/16 inch of a true longitudinal profile when measured with a 15 foot manual straightedge.

334-5.9.2 Longitudinal Joints: For all layers of pavement except the leveling course, place each layer so that longitudinal construction joints are offset 6 to 12 inches laterally between successive layers. Do not construct longitudinal joints in the wheelpaths. The Engineer may waive these requirement where offsetting is not feasible due to the sequence of construction.

334-5.10 Surface Requirements: Construct a smooth pavement with good surface texture and the proper cross-slope.

334-5.10.1 Texture of the Finished Surface of Paving Layers: Produce a finished surface of uniform texture and compaction with no pulled, torn, raveled, crushed or loosened portions and free of segregation, bleeding, flushing, sand streaks, sand spots, or ripples. Correct any area of the surface that does not meet the foregoing requirements in accordance with 334-5.10.4.

334-5.10.2 Cross Slope: Construct a pavement surface with cross slopes in compliance with the requirements of the Contract Documents.

334-5.10.3 Pavement Smoothness: Construct a smooth pavement meeting the requirements of this Specification. Furnish a 15 foot manual and a 15 foot rolling straightedge meeting the requirements of FM 5-509. Make them available at the job site at all times during paving operations for Asphalt Work Category 3 and make them available upon request of the Engineer for Asphalt Work Categories 1 and 2.

#### 334-5.10.3.1 Asphalt Work Category 3:

334-5.10.3.1.1 Acceptance Testing: Straightedge the final Type SP structural layer and friction course layer with a rolling straightedge. Test all pavement lanes where the width is constant using a rolling straightedge and document all deficiencies on a form approved by the Engineer. Notify the Engineer of the location and time of all straightedge testing a minimum of 48 hours before beginning testing.

334-5.10.3.1.2 Rolling Straightedge Exceptions: Testing with the rolling straightedge will not be required in the following areas: intersections, tapers, crossovers, parking lots and similar areas. In addition, testing with the rolling straightedge will not be performed on the following areas when they are less than 50 feet in length: turn lanes, acceleration/deceleration lanes and side streets. However, correct any individual surface irregularity in these areas that deviates from the plan grade in excess of 3/8 inch as determined by a 15 foot manual straightedge, and that the Engineer deems to be objectionable, in accordance with 334-5.10.4. The Engineer may waive or modify straightedging requirements if no milling, leveling, overbuild or underlying structural layer was placed on the project and the underlying



layer was determined to be exceptionally irregular.

334-5.10.3.1.3 Final Type SP Structural Layer: Straightedge the final Type SP structural layer with a rolling straightedge behind the final roller of the paving train. Correct all deficiencies in excess of 3/16 inch in accordance with 334-5.10.4.2, and retest the corrected areas.

334-5.10.3.1.4 Friction Course Layer: At the completion of all paving operations, straightedge the friction course. Correct all deficiencies in excess of 3/16 inch in accordance with 334-5.10.4.3. Retest all corrected areas.

334-5.10.3.2 Asphalt Work Categories 1 and 2: If required by the Engineer, straightedge the final structural layer with a rolling straightedge, either behind the final roller of the paving train or as a separate operation. Correct all deficiencies in excess of 5/16 inch in accordance with 334-5.10.4.2. Retest all corrected areas. If the Engineer determines that the deficiencies on a bicycle path are due to field geometrical conditions, the Engineer will waive corrections with no deduction to the pay item quantity.

334-5.10.4 Correcting Unacceptable Pavement:

334-5.10.4.1 General: Correct all areas of unacceptable pavement at no additional cost.

334-5.10.4.2 Structural Layers: Correct deficiencies in the Type SP structural layer by one of the following methods:

a. Remove and replace the full depth of the layer, extending a minimum of 50 feet on either side of the defective area for the full width of the paving lane.

b. Mill the pavement surface to a depth and width that is adequate to remove the deficiency. (This option only applies if the structural layer is not the final surface layer.)

334-5.10.4.3 Friction Course: Correct deficiencies in the friction course layer by removing and replacing the full depth of the layer, extending a minimum of 50 feet on either side of the defective area for the full width of the paving lane. Corrections may be waived if approved by the Engineer.

334-6 Acceptance of the Mixture.

334-6.1 General: The asphalt mixture will be accepted based on the Asphalt Work Category as defined below:

- 1) Asphalt Work Category 1 – Certification by the Contractor as defined in 334-6.2.
- 2) Asphalt Work Category 2 – Certification and quality control testing by the Contractor as defined in 334-6.3
- 3) Asphalt Work Category 3 – Quality control testing by the Contractor and acceptance testing by the Engineer as defined in 334-6.4.

334-6.2 Certification by the Contractor: On Asphalt Work Category 1 construction, the Engineer will accept the mix on the basis of visual inspection. Submit a Notarized Certification of Specification Compliance letter on company letterhead to the Engineer stating that all material produced and placed on the project was in substantial compliance with the Specifications. The Engineer may run independent tests to determine the acceptability of the material.

334-6.3 Certification and Quality Control Testing by the Contractor: On Asphalt Work

Category 2 construction, submit a Notarized Certification of Specification Compliance letter on company letterhead to the Engineer stating that all material produced and placed on the project was in substantial compliance with the Specifications, along with supporting test data documenting all quality control testing as described in 334-6.3.1. If so required by the Contract, utilize an Independent Laboratory as approved by the Engineer for the quality control testing. The mix will also require visual acceptance by the Engineer. In addition, the Engineer may run independent tests to determine the acceptability of the material.

334-6.3.1 Quality Control Sampling and Testing Requirements: Perform quality control testing at a frequency of once per day. Obtain the samples in accordance with FDOT Method FM 1 T 168. Test the mixture at the plant for gradation (P-8 and P-200) and asphalt binder content ( $P_b$ ). Test the mixture on the roadway for density using six-inch diameter roadway cores obtained at a frequency of three cores per day or by Nuclear Density Method if approved by Engineer.

Determine the asphalt content of the mixture in accordance with FM 5 563. Determine the gradation of the recovered aggregate in accordance with FM 1 T 030. Determine the roadway density in accordance with FM 1 T 166 or with FM 1-T 238. The minimum roadway density will be based on the percent of the maximum specific gravity ( $G_{mm}$ ) from the approved mix design. If the Contractor or Engineer suspects that the mix design  $G_{mm}$  is no longer representative of the asphalt mixture being produced, then a new  $G_{mm}$  value will be determined from plant-produced mix with the approval of the Engineer. Roadway density testing will not be required in certain situations as described in 334-6.4.1. Assure that the asphalt content, gradation and density test results meet the criteria in Table 334-3.

Characteristic	Tolerance
Asphalt Binder Content (percent)	Target $\pm$ 0.55
Passing No. 8 Sieve (percent)	Target $\pm$ 6.00
Passing No. 200 Sieve (percent)	Target $\pm$ 2.00
Roadway Density (average of three cores)	91.5% $G_{mm}$
Roadway Density (any single core)	90.0 % $G_{mm}$
Roadway Density (any single core)	90.0 % $G_{mm}$
Roadway Density (avg. of 5 tests nuclear method if approved by Engineer)	91.5% $G_{mm}$

334-6.4 Quality Control Testing by the Contractor and Acceptance Testing by the Engineer: On Asphalt Work Category 3, perform quality control testing as described in 334-6.3.1. In addition, the Engineer will accept the mixture at the plant or at the site with respect to gradation (P-8 and P-200) and asphalt binder content ( $P_b$ ). The mixture will be accepted on the roadway with respect to density. The Engineer will sample and test the material as described in 334-6.3.1. The Engineer will randomly obtain at least one set of samples per day. Assure that the asphalt content,

gradation and density test results meet the criteria in Table 334-3. Material failing to meet these acceptance criteria will be addressed as directed by the Engineer.

334-6.4.1 Acceptance Testing Exceptions: When the total quantity of any mix type in the Project is less than 200 tons, or on Asphalt Work Category 1 construction, the Engineer will accept the mix on the basis of visual inspection. The Engineer may run independent tests to determine the acceptability of the material.

Density testing for acceptance will not be performed on widening strips or shoulders with a width of 5 feet or less, variable thickness overbuild courses, leveling courses, first lift of asphalt base course placed on subgrade, miscellaneous asphalt pavement, or any course with a specified thickness less than 1 inch or a specified spread rate less than 100 lbs/sy. In addition, density testing for acceptance may not be performed on the following areas when they are less than 100 feet in length: crossovers, intersections, turning lanes, acceleration lanes, deceleration lanes, or ramps. Compact these courses in accordance with a standard rolling procedure approved by the Engineer. In the event that the rolling procedure deviates from the approved procedure, placement of the mix will be stopped.

#### 334-7 Method of Measurement.

For the work specified under this Section, the quantity to be paid for will be the weight of the mixture, in tons.

The bid price for the asphalt mix will include the cost of the liquid asphalt or the asphalt recycling agent and the tack coat application as specified in 334-5.5.4. There will be no separate payment or unit price adjustment for the asphalt binder material in the asphalt mix.

#### 334-8 Basis of Payment.

334-8.1 General: Price and payment will be full compensation for all the work specified under this Section.

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## SECTION 17 - LAWN REPLACEMENT AND SODDING

### W-17.01 General

The Contractor shall replace all lawn areas which have been removed or damaged due to construction. Lawn replacement includes fine grading the areas to be restored and furnishing and placing topsoil, fertilizer, sod, sprigs, seeding, and maintaining all areas. Grassing and mulching or sodding lawn areas will be required as directed. Grassing shall be accomplished by seeding.

Sod shall be Argentine Bahia, St. Augustine, or other approved native grass sod, and shall be well matted with grass roots. It shall be sufficiently thick to secure a dense stand of live grass, with a minimum thickness of 2 inches. The sod shall be live, fresh and uninjured, and shall contain sufficient moisture at the time of planting to induce growth. The type and quality of sod shall be approved by the Engineer before placing.

Grass seed shall be Argentine Bahia, 60 #/acre from March 1 to November 1; 50 #/acre with 20 #/acre of rye grass seed from November 1 to March 1. Argentine Bahia seed shall be a scarified seed having a minimum active germination of 40% and total of 85%.

Mulch material shall be free of weeds and shall be oat straw or rye, Pangola, peanut, Coastal Bermuda or Bahia grass hay.

### W-17.02 Topsoil

Where areas are to be restored by sodding, topsoil shall be placed to a minimum compacted depth of 2 inches over the subgrade. Where areas are to be restored by grassing, topsoil shall be placed to a minimum compacted depth of 4 inches over the subgrade. All topsoil shall be suitable excavated topsoil which has been segregated or other topsoil material approved by the Engineer. Topsoil shall be free from stones, roots, sticks, or other foreign substances.

### W-17.03 Water

The Contractor shall furnish at his own expense all water required for lawn replacement and maintenance of the work until final acceptance.

### W-17.04 Construction Methods

Prior to sodding or grassing, the Contractor shall fine grade the subgrade to 4 inches below finished grade. Topsoil shall be spread over the subgrade to a uniform depth and density. Topsoil shall be uniformly compacted by a light hand roller weighing between 250 and 750 pounds to the specified depths for sodding or grassing.

Immediately before sodding, 14-4-14 or 15-0-15 fertilizer shall be applied at the rate of approximately 600 pounds per acre, either in the furrows or by broadcasting and raking, into the planting area. After the surface has been properly prepared, the sod shall be placed and firmly embedded by light tamping. Additionally, dolomite (lime) shall be applied at a rate of 2 tons per acre.

Immediately after the sod has been planted, if the soil does not contain sufficient moisture to ensure growth, water shall be applied twice daily for the first week, once in the morning or late evening and once at approximately 2:00 P.M. Water shall then be applied once a day over the next 2 weeks and alternating days for an additional 2 weeks. If rooting has not taken place by the end of the third week, 1 daily watering shall continue until sod is firmly rooted.

One week after the sod has been planted, a complete fertilizer with minor elements shall be applied weekly at the rate of 1# nitrogen per 1,000 square foot in a 2-1-2 or 4-1-2 formula for a period of 4 weeks, and thereafter every 2 weeks for an additional 30 days. The ground shall not be wet when the fertilizer is applied but will be immediately watered after application of the fertilizer to remove it from the leaf area.

Prior to grassing, 14-4-14 or 15-0-15 fertilizer shall be applied to the soil at the rate of approximately 300 pounds per acre. Grass seed at the specified rate per acre shall then be raked into the soil and covered with mulching material. The area shall then be thoroughly rolled with approved equipment.

After the grass has been planted, if the soil does not contain sufficient moisture to ensure growth, water shall be applied as directed by the Engineer. After the grass has started growing, fertilizer shall be applied uniformly over the area weekly, at a rate of 0.5# nitrogen and potash per 1,000 square feet, until turf cover the area. The fertilizer shall not be applied unless the surface of the ground or sod is sufficiently moist to quickly dissolve the fertilizer.

#### W-17.05 Caretaking

The Contractor shall keep all replaced lawn areas in good, healthy, insect free, moist condition by watering, replanting or resodding, weeding, fertilizing, and cutting as specified, and directed by the Engineer.

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## SECTION 18 - LEAKAGE TESTS

### W-18.01 General

All pipelines will be tested and inspected for infiltration or leakage by the Engineer with the assistance of the Contractor prior to final acceptance of the work. All tests and inspections will be conducted in a manner to minimize as much as possible any interference with the Contractor's work or progress.

The Contractor shall notify the Engineer when the work is ready for testing and inspecting, and tests and inspections shall be made as soon thereafter as practicable under the direction of the Engineer. Personnel for reading meters, gauges, or other measuring devices will be furnished by the Engineer. The Contractor shall furnish all other labor, materials, services, and equipment, including power, fuel, meters and gauges, pumps, bulkheads, backflow preventers, water, and other items and apparatus necessary for making leakage tests, preparing pipelines for testing, assembling, placing, and removing testing equipment, and placing pipelines in service, all to the satisfaction of the Engineer. Only City water shall be used for testing unless otherwise approved by the Engineer. The water shall be obtained and metered from sources approved by the Engineer. After testing, the water shall be disposed of by the Contractor into storm sewers or drainage courses approved by the Engineer.

### W-18.02 Tests of Sewer - General

All sewers shall be tested for infiltration or leakage after completion of backfilling. All wyes, house connections, and stubs shall be suitably plugged or bulkheaded to the satisfaction of the Engineer prior to testing. All sewers shall be cleaned and pumped out as necessary prior to testing.

Sewer shall be tested for infiltration, unless otherwise ordered by the Engineer. If the Engineer determines that groundwater conditions are not suitable for infiltration testing, sewers shall be tested for leakage. Sewers may be tested for leakage by measuring leakage out of the sewer or by air testing. The length of sewer to be tested shall be subject to prior approval of the Engineer.

The length of house connections, if any, will be included in the total length of sewer under test when computing infiltration or leakage. All testing equipment and the arrangement of such equipment shall be subject to the prior approval of the Engineer. Sections of sewers under test shall be arranged to prevent the internal pressure on any joint from exceeding 10 psi.

Refer to Section 11 - PVC Pipe Gravity for specific requirements for infiltration and leakage testing for PVC gravity pipe.

### W-18.03 Infiltration Test of Sewers

Infiltration tests shall be performed when the groundwater level is a minimum of 2 feet above the crown of the sewer at the highest point in the test section. No such tests shall be started until the infiltration conditions are established in the work to be tested. The Contractor shall provide suitable observation wells along the line of the work or other approved means to determine the groundwater level.

Infiltration tests will be made by measuring the infiltrated flow of water over a measuring weir set up in the invert of the sewer a distance, as approved by the Engineer, from a temporary bulkhead or other limiting point of infiltration. Testing shall be for a minimum period of 4 hours. The quantity of infiltration for any section of the sewer shall not exceed 50 gallons/mile/day/inch of pipe diameter.

#### W-18.04 Leakage Test of Sewers

Leakage tests shall be performed by bulkheading the section of sewer under test at the manhole, at the lower end, and filling the sewer with clear water until the water level is up a minimum of 2 feet above the crown of the sewer or a minimum of 2 feet above the groundwater level, whichever is greater, in the manhole at the highest point in the section. Leakage will be the measured amount of water added to maintain the level in the higher end manhole. Tests shall be carried on a minimum of 4 hours with readings at 30-minute intervals. The quantity of leakage for any section of the sewer shall not exceed the limits specified for infiltration in the subsection headed "Infiltration Test of Sewers."

#### W-18.05 Air Leakage Test of Sewers

Air pressure leakage tests shall be limited to sewers 30 inches in diameter and smaller. The maximum allowable air leakage is based on prewetted pipe walls. The contractor may, therefore, fill the pipe with clear water and then empty the pipe prior to air testing. When pipe walls are prewetted, air leakage tests shall be completed within 24 hours after filling the sewer section to be tested.

Air pressure tests shall be made by placing the sewer under 3.0 psig air pressure and measuring the volume of air required to maintain this pressure. The rate of air leakage shall be determined when the system reaches an equilibrium state and air flow shall be read by means of an approved rotameter.

The maximum rate of air loss shall be 0.003 cfm per square foot of interior pipe surface, and the maximum air flow shall not exceed 2.0 cfm when the total pressure on the sewer is maintained at 3.0 psig. When the groundwater level is above the invert of the sewer, but below a level adequate for infiltration testing, the maximum air loss shall be reduced 6 percent for each foot of groundwater above the sewer invert.

Air testing equipment shall be arranged so that compressors, valving, gauges, and other test

devices are located at the ground surface. Air testing equipment shall have an approved air relief arrangement to prevent the sewer from being pressurized to greater than 10.0 psig.

#### W-18.06 Leakage Tests of Force Mains

For Directional drilled pipe, see Section W-13 for additional testing requirements.

Force mains shall be tested as a whole or in sections valved or bulkheaded at the ends. The mains shall be tested under an average hydrostatic pressure of not less than 100 pounds per square inch, unless otherwise indicated in the Specific Provisions. The pressure shall be applied to the pipeline through a tap in the pipe by means of a hand pump or other method and shall be maintained for a minimum of 2 hours. Air shall not be used for testing force mains.

The leakage for all force mains, as determined by the above test, shall not exceed the allowable leakage for iron water mains as given by the following formula in Section 4.2.2. of AWWA Specification C605-05:

$$L = \frac{SD\sqrt{P}}{148,000}$$

in which L is the allowable leakage, in gallons per hour, S is the length of force main tested in feet, D is the nominal diameter of the pipe in inches, and P is the average test pressure in psi gauge.

During the test, each valve shall be operated through several complete cycles of closing and opening. In addition, each valve, when in the closed position, shall have the test pressure applied to one end of the valve only. Each end of the valve shall be tested in this manner. There shall be no visible leakage through the valves, and the valves shall not show any evidence of structural distress.

All harnessed sections of the buried force main shall be completely backfilled before such sections are tested.

#### W-18.07 Repairing Leaks

When infiltration or leakage occurs in excess of the specified amount, defective manholes, pipe, pipe joints, or other appurtenances shall be located and repaired at the expense of the Contractor. If the defective portions cannot be located, the Contractor, at his own expense, shall remove and reconstruct as much of the original work as necessary to obtain a sewer or force main within the allowable infiltration or leakage limits upon such retesting as necessary and directed by the Engineer.

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## SECTION 20 - MAINTAINING EXISTING SANITARY SEWER IN OPERATION

### W-20.01 General

It shall be the Contractor's responsibility to preserve all existing sanitary sewer services without interruption while performing the work included in this project. The Contractor shall furnish all labor, materials, and equipment required to bypass wastewater flow around the working area to an acceptable point of discharge. Also, if deemed necessary by the engineer, the contractor will be responsible to provide necessary noise suppression devices to minimize bypass pump noise.

The Contractor shall not be permitted to pump or otherwise direct the flow of sanitary sewage into storm sewers, streams, or other open channels or onto streets or alleys at any time during the course of the work.

All bypass pumping systems shall be in accordance with SP-64 Bypass Pumping and specification section W-20 Maintaining Existing Sanitary Sewer in Operation.

### W-20.02 Bypass Pumping

The Contractor shall submit the proposed plan to the Engineer for approval prior to proceeding with the work. All required agency approvals and permits shall be the responsibility of the Contractor. The hydraulic design of the bypass pumping arrangement shall be the sole responsibility of the Contractor.

Pumping equipment shall be of a type suitable for pumping raw unscreened sewage over an indefinite period without clogging or requiring shutdown for routine maintenance. Bypass pumping shall be continuous during the entire length of time each portion of the work is being accomplished. The Contractor shall submit drawings and equipment specifications, detailing the proposed pumping equipment and the method of installation, to the Engineer for approval.

The Contractor shall possess at least one (1) backup pump, no smaller than the largest pump in use, on site for every 1 to 3 bypass pumps in operation. An additional backup pump shall be required on site for each increment of 3 pumps in operation as illustrated on the following table:

<u>Operating Bypass Pumps</u>	<u>Required Backup Pumps On Site</u>
1 - 3	1
4 - 6	2
7 - 9	3

### W-20.03 Connections

All house laterals and connections to lateral sewers shall be maintained in operation without leakage or backup during the work.

#### W-20.04 Street Closures

The Contractor shall be responsible for coordination of maintenance of traffic and all street closures with the City of Tampa, Department of Public Works; Hillsborough County, Superintendent of Maintenance; and the State of Florida, Department of Transportation.

#### W-20.05 Cleanup

When the repair or reconstruction has been completed, all temporary connections and bulkheads shall be removed. Sewers shall be cleaned of all settled solids.

\* \* \*

## SECTION 24 - PVC PIPE - FORCE MAIN

### W-24.01 General

All pipe and fittings, 4"-48" nominal diameter, shall be solid wall polyvinyl chloride (PVC) pipe manufactured to standards as outlined in the following sections.

Only 1 pipe manufacturer will be allowed for the entire project.

### W-24.02 Pipe standards

For PVC force mains, 4" through 12", the pipe shall be AWWA C900, DR-18 (class 150). For PVC force mains 14" through 48", the pipe shall conform to AWWA C905, DR-25. The outside diameter dimensions shall be identical to ductile iron pipe dimensions. The pipe shall have integral bell push on type joints conforming to ASTM D3139. Bell ends shall be equipped with elastomeric gaskets meeting the requirements of ASTM F477. The color shall be green and the nominal laying length per pipe section shall be 20 ft.

### W-24.03 Pre-Installation Tests, Reports, Markings and Submittals

All pipe and fittings shall be marked per Section 2.6 "Marking Requirements" of AWWA C900.

**PRIOR TO SHIPMENT** of the pipe and fittings to the project site, the Contractor shall submit to the Engineer test reports and certifications as described below, duly certified by the manufacturer's testing facility or an independent certified testing laboratory demonstrating full compliance with AWWA C900 or C905. Certification from the supplier is not acceptable.

An original, plus four (4) copies of the following, shall be submitted to the Engineer.

1. The name, address, and phone number of the pipe and fittings manufacturer and the location of the plant at which they will be manufactured.
2. **CERTIFICATION AND CERTIFIED TEST REPORTS** that each **LOT** of pipe and fittings has been manufactured, sampled, and tested per AWWA C900 or C-905. The City shall be provided in writing with the means to cross-reference the markings with the certification and test reports (i.e. date of manufacturer, lot number and shift number etc.). If this information is marked on the pipe in a code, the markings shall be decoded in writing.

### W-24.04 Bedding Requirements

Unless otherwise indicated on the Plans, the PVCP force main shall be installed with Class "C" bedding as shown on the plans. If suitable fill material is not excavated at the project site, it shall be imported. Compaction requirements are described in subsection W-24.12 "Bedding Placement for Pipelines". In no cases shall a concrete cradle be used. In the event the Contractor opts to install crushed stone, it shall be **NO GREATER THAN A #57 STONE**.

## W-24.05 Fittings

Both PVC and ductile iron fittings are acceptable unless the plans specifically call for PVC fittings. For standard angles, in sizes 4" through 8", fittings shall be injection molded in accordance with AWWA C907 and CSA B137.2. For larger sizes (10" and greater) and for non-standard angles, fittings shall conform to the requirements of CSA B137.3 and shall be fabricated in a factory from AWWA C900/905 pipe.

Injection molded fittings shall have a dimensional ratio of 18 (DR18) and fabricated fittings shall have a dimensional ratio equal to that of the pipe they are being installed on. All injection molded fittings shall conform to AWWA C907, CSA B137.2 and fabricated fittings shall conform to CSA B137.3

All PVC fittings shall incorporate integral elastomeric gasket bell joints push on type.

Materials used in the manufacture of PVC fittings shall equal or exceed cell class 12454 (ASTM 1784) with a hydrostatic design basis of 27.58 Mpa at 23°C as outlined in AWWA C900 and C905, and CSA B137.3.

Fabricated fittings shall be manufactured from segments of PVC pipe to the requirements of AWWA C900 and C905, and CSA B137.3. Segments shall be bonded together and over wrapped with fiberglass-reinforced polyester. All bends, up to and including 45°, shall be constructed from a single section of PVC pipe, without joints, bonding or fiberglass-reinforced polyester wrapping.

The pressure rating of the fittings shall be equal to the pressure rating of the pipe they are being installed on.

The manufacturer shall meet all the qualification test requirements as outlined in CSA B137.3

All fittings shall be marked with the following identifications:

- Nominal size, CIOD
- Manufacturers name or trademark
- AWWA pressure rating/pressure class and standard number to which the fitting is made
- CSA Standard number
- Proper handling label

## W-24.06 Harnessing

Joint restraint devices for all pipes and fittings shall meet requirements as specified under the "RESTRAINING DEVICES" specification. Thrust blocks shall not be allowed.

All wedge devices assemblies and related parts shall be processed through a phosphate wash, rinse and drying operation prior to coating application. The coating shall consist of a minimum of two coats of liquid Xylan fluoropolymer coating with heat cure to follow each coat.

All casting bodies shall be surface pretreated with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact and UV resistance.

The coating system shall be Mega-Bond as manufactured by EBAA Iron, Inc., Eastland, Texas, or approved equal.

#### W-24.07 Marking and Locating

Two strands of #12 gauge green insulated copper tracing wires shall be attached to the pipe with duct tape at regular intervals in the 10 and 2 o' clock position. The wires shall be looped around each bell. See Section W-13 "Directional Drilling HDPE Pipe" requirements for directional drilled pipe. Wire insulation must be suitable for buried service such as HDPE or HMWPE. Nylon insulation is not acceptable. Wires must be spliced together with wire connectors suitable for buried service such as DBR Kit by 3M, Snakebite by Copperhead Industries or equal. Twisting wires together and sealing with electrical tape is not acceptable. No payment will be made for pipe that does not pass a continuity test through the wires after installation. See standard details for additional requirements.

The locating wire shall terminate at the top of each valve box, air release valve box and manhole and must be capable of extending 24" above the top of the box (or manhole) in such a manner so as not to interfere with the valve operation.

#### W-24.08 Installation

Installation of PVCP force mains shall comply with the requirements of AWWA Standard C605 "Underground Installation Of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings For Water".

Pipe bending shall not be allowed.

Joint deflections up to a maximum of 1 degree will be permitted at integral bell and spigot joints. Deflections larger than 3 degrees may be accomplished with factory molded or fabricated standard angle fittings; or, a standard deflection shall be accomplished with a factory fabricated fitting of the proper angle. Refer to Section W-24.05.

Air release valves shall use service saddles to attach the corporation stop connection to the PVC pipe. The service saddle body shall be sized exactly to the outside diameter of the pipe, with double straps anchored with a minimum of a four bolt pattern. The service saddle body shall be ductile iron, the sealing gasket shall be BUNA-N rubber and the straps shall be corrosion resistant alloy steel.

#### W-24.09 Testing

Testing of PVCP force mains shall comply with the requirements of AWWA Standard C605 "Underground Installation Of Polyvinyl Chloride (PVC) Pressure Pipe And Fittings For Water" Section 7 (less references to disinfecting). The hydrostatic and leakage testing may be performed simultaneously. The average hydrostatic test pressure shall be 100 psi.

Air pressure testing of installed pressure pipe is expressly prohibited due to the catastrophic nature of failure should failure occur.

#### W-24.10 Storage of PVC Pipe

Pipe shall be stored at the job site in unit packages provided by the manufacturer. Caution shall be exercised to avoid compression, damage, or deformation to bell ends of the pipe. When unit packages of PVC pipe are stacked, the Contractor ensure that the weight of upper units does not cause deformation to pipe in lower units.

PVC pipe unit packages shall be supported by racks or dunnage to prevent damage to the bottom during storage. Supports shall be spaced to prevent pipe bending.

PVC pipe shall not be stored close to heat sources or hot objects such as heaters, boilers, steam line, engine exhaust, etc.

When unit packages of PVC pipe are stacked, ensure that the height of the stack does not result in instability which could cause stack collapse, pipe damage, bodily injury, and property damage.

The interior as well as all sealing surfaces of pipe, fittings, and other accessories shall be kept free from dirt and foreign matter.

Gaskets shall be protected from excessive exposure to heat, direct sunlight, ozone, oil and grease.

#### W-24.11 Handling of PVC Pipe - Standard Procedures

When using fork lifts or other handling equipment, prevent damage to PVC pipe.

When handling PVC pipe, avoid severe impact blows, abrasion damage and gouging or cutting by metal surfaces or rocks. Avoid stressing bell joints and damage of bevel ends.

Pipe shall be lowered, not dropped, from trucks and into trenches.

In preparation for pipe installation, placement (stringing) of pipe shall be as close to the trench as practical and on the opposite side from excavated earth. Bell ends shall point in the direction of work progress.

The Engineer may reject any pipe that shows visible signs of damage resulting from poor storage and handling practices.

#### W-24.12 Bedding Placement for Pipelines

Select fill material, used as pipe bedding, shall be placed by hand, in uniform layers not greater than 6 inches in loose thickness and thoroughly compacted in place. Select fill material pipe bedding shall extend to one foot over the top of the pipe.

Each layer of select fill shall be thoroughly tamped and compacted in place by hand or with suitable mechanical or pneumatic tools to a dry density not less than 95 percent of the maximum dry density as determined by AASHTO Des: T-180. No stone larger than 4 inches in diameter shall be placed closer than two feet to any point on any pipe.

#### W-24.13 Trench Backfill

Trench backfilling work shall be done in a manner to prevent dropping of material directly on top of any conduit or pipe from a vertical distance greater than 5 feet. In no case shall backfilling material from a bucket be allowed to fall directly on a structure or pipe and in all cases, the bucket shall be lowered so that the shock of falling earth will not cause damage.

Lumps shall be broken up and if there are any stones, pieces of crushed rock or lumps which cannot be readily broken up, they shall be distributed throughout the mass so that all interstices are solidly filled with fine material.

#### W-24.14 Backfill for Short Tunnel

Where pipelines are placed in short tunnels, the annular space between the outside of the pipe wall and the tunnel wall shall be completely filled with select fill material or suitable excavated material. Pipelines in short tunnels shall be suitably supported, to permit placing backfill which shall be suitably tamped in place.

#### W-24.15 Inspection and Testing of Backfilling

All backfill shall be subject to test by the Engineer.

\* \* \*

## SECTION 26 - FILLING OF EXISTING SANITARY OR STORM SEWER SYSTEM

### W-26.01 General

All void spaces in sewers, manholes, and structures designated to be filled shall be completely filled and closed. The Contractor shall submit to the Engineer for approval a complete description of the equipment, methods, and materials proposed to be employed in demolishing and filling sewers and appurtenances. The Contractor shall be solely responsible for the protection of all utilities, structures and trees, and for the safety of his workmen and the public during the course of the work. All damage to existing utilities, structures, and trees caused by the Contractor's operations shall be promptly repaired by the Contractor to the satisfaction of the Engineer. If, in the opinion of the Engineer, the equipment, methods, and materials proposed by the Contractor may result in damage to nearby structures and utilities or may not assure complete filling of all voids in the sewer and appurtenances to be filled, the Contractor shall alter the equipment, methods, and materials to the satisfaction of the Engineer.

### W-26.02 Filling Existing Sewers

Where existing sewers and appurtenances are designated to be filled, the Contractor shall completely fill all sewers, manholes, and other structures with concrete. The concrete shall have a minimum 28-day compressive strength of 500 psi. Fly ash and admixtures, including water reducing agents, plasticizers, and air-entraining agents will be permitted in the mix design for the concrete. No sand will be permitted in the mix design. The concrete mix shall be designed to facilitate flow for long distances by pumping (only) with minimum separation of materials.

Before beginning the grouting operation, the Contractor shall pump clean water through each run of pipe to ensure that there are no obstructions and that the intake/discharge/vent tube system is functional. Prior to and during filling of existing sewers with concrete, the Contractor shall pump or drain water from the storm sewers being filled to other storm sewers, and shall pump or drain water and sewage from the sanitary sewers being filled to other sanitary sewers, as directed by the Engineer to prevent dilution of the fill concrete. Sediment in existing sewers may remain in place.

The Contractor shall fill the sewers with concrete by pumping (only) through vertical pipes passing through bulkheads, all installed by the Contractor and penetrating the pipe to be filled. All intake, discharge, and intermediate vent pipes shall be, at minimum, 4 inches in diameter and installed at regular intervals close enough to ensure complete filling. Filling shall be accomplished in stages as directed by the Engineer. While filling is in progress through one manhole or fill-pipe, the Engineer will observe the level of concrete in the adjacent manhole(s) or pipe(s). If, in the opinion of the Engineer, complete filling of all voids in the sewers and appurtenances is not assured, the Contractor shall install additional fill-pipes or alter his methods of filling, or both, as directed by the Engineer. If, in the opinion of the Engineer, complete filling is still not assured, the Contractor shall excavate and open the top of the pipe at regular intervals as directed by the Engineer to confirm that the entire run is completely filled.

Manhole frames and covers and all other castings and appurtenances shall be removed and conveyed by the Contractor to his own place of disposal unless otherwise directed by the Engineer. The top 2 feet of the manholes shall be removed. Where the manholes are located in grassed areas,



2 feet of top soil shall be placed and the area sodded. Where the manholes are located in the street, the top 2 feet shall be filled with base material or asphalt. All fill-pipes shall be withdrawn and the holes completely filled with concrete. The surface at each manhole and fill-pipe location shall be restored to match the adjacent undisturbed surface to the satisfaction of the Engineer.

Prior to commencing any filling operations, the Contractor shall submit his proposed plan for filling and the proposed concrete mix design for approval by the Engineer. The plan shall show the proposed locations of all fill pipes as well as the location of all existing manholes and structures along the sewer. The plan and mix design shall be revised by the Contractor as considered necessary by the Engineer.

#### W-26.03 Television Inspection

Prior to grouting of any line, the Contractor shall inspect the pipe by use of a radial view, closed circuit television cameras and shall make a DVD video of the pipe to be grouted so as to identify areas that may have voids in the soil outside of the pipe.

\* \* \*

## SECTION 27 - DEMOLITION

### W-27.01 General

Demolition includes all work necessary for the removal and disposal of masonry, steel, reinforced concrete, plain concrete, wastewater equipment, piping, electrical facilities, roofing materials and any other material or equipment shown or specified to be removed. Dust control shall be provided and provision made for safety.

Demolition shall be carried out in such a manner that adjacent structures, which are to remain, shall not be endangered. The work shall be scheduled so as not to interfere with the day to day operation of the existing facilities, all in accordance with the Sequence of Operations specified in the Specific Provisions. Doorways or passageways in existing facilities shall not be blocked.

Care shall be taken to assure that concrete shall be broken and removed in reasonably small masses. Where only parts of a structure are to be removed, the concrete shall be cut along limiting lines with a specially designed saw so that damage to the remaining structure is held to a minimum.

### W-27.02 Requirements Prior to Demolition

The Contractor shall visit the site and inspect all existing structures. Special care shall be taken to observe and record any defects, which may exist in buildings or structures adjacent to but not directly affected by the demolition work. Prior to commencing the demolition, the Contractor shall provide the Engineer with a copy of this inspection.

Drawings of existing structures and equipment will be available for inspection by the Contractor at the office of the Engineer and Owner.

Warning signs, protection barriers and red warning lights shall be provided as necessary adjacent to the work as approved by the Engineer and shall be maintained during the demolition period.

Demolition work shall not be undertaken until all mechanical and electrical services affected by the work have been properly disconnected. Interconnecting piping or electrical services that are to remain in service either permanently or temporarily shall be capped, rerouted or reconnected in a manner that will not interfere with the operation of the remaining facilities.

Where the presence of hazardous chemicals, gases, flammable materials or other dangerous substances is apparent or suspected, testing and purging shall be performed and the hazard eliminated before demolition is started.

### W-27.03 Requirements During Demolition

The use of explosives will not be permitted.

All mechanical and electrical equipment shall be carefully protected against dust and debris.

All debris shall be removed from the structures during demolition and not allowed to

accumulate in piles.

Safe access to and egress from all working areas shall be provided at all times with adequate protection from falling material.

Adequate scaffolding, shoring, bracing and protective covering shall be provided during demolition to protect personnel and equipment against injury or damage. Floor openings not used for material drops shall be covered with material substantial enough to support any loads placed on it. The covers shall be properly secured to prevent accidental movement.

Adequate lighting shall be provided at all times during demolition.

Areas below demolition work shall be closed to workmen while removal is in progress.

No material shall be dropped to any point lying outside the exterior walls of the structure unless the area is effectively protected.

No workmen shall stand on any wall to remove material except when adequate staging or scaffold protection is provided at a distance not exceeding 12 feet below the top of such walls and other reasonable precautions are taken. Whenever a workman is required to work at a height of more than 12 feet above a floor, platform, scaffold or the ground, he shall be equipped with a safety belt with a life line attached.

#### W-27.04 Disposal of Materials

All debris, rubbish, scrap pieces, equipment, and materials resulting from the demolition shall become the property of the Contractor and shall be removed from the site, except for the items designated by the Engineer to be salvaged.

\* \* \*

## SECTION 30 - MISCELLANEOUS PIPE AND FITTINGS

### W-30.01 General

Miscellaneous pipe and fittings include polyvinyl chloride (PVC) pipe, copper pipe, steel pipe, and plastic tubing.

### W-30.02 Polyvinyl Chloride Pipe

Polyvinyl chloride (PVC) pipe shall be Schedule 80 minimum (unless otherwise specified) meeting the requirements of ASTM Des: D 1785, 1254B. All joints and fittings shall be threaded except where flanged joints are shown or required for connection to other piping. Threaded PVC fittings shall be socket-welding type, 150-pound class, conforming to ASTM Des: D 2467 and D 2657.

### W-30.03 Copper Pipe

Copper pipe shall be Type K or L hard-drawn copper tubing and shall meet the requirements of ASTM Des: B 88.

Fittings shall be of the streamlined, solder joint type, and shall meet the requirements of ANSI Specifications B16.22.

### W-30.04 Steel Pipe

Steel pipe shall be galvanized, meet the requirements of ASTM Des: A 53 and shall not be less than Schedule 40. Dimensions of steel pipe shall conform to ANSI B36.10.

Fittings for steel pipe shall be galvanized and shall be made to standard dimensions or as shown. Fittings used in pipelines 20 inches in diameter or smaller shall be of the screwed pattern and shall be of malleable iron meeting the requirements of ASTM Des: A 197. The fittings shall conform to ANSI B 16.3. Where galvanized fittings are shown or specified, galvanizing shall meet the requirements of ASTM Des: A 120. Steel flange fittings shall meet the requirements of ANSI B 16.5 for 150-pound standard, except that the flanges shall be plain faced.

All flanges for steel pipe, except blind flanges, shall be of the slip-on welding type with hubs meeting the requirements of AWWA C207 Class B, D, or E suitable for the size of pipe and test pressures specified, and conforming to the requirements of ASTM Des: A 181, Class 1. The flanges shall be attached to the barrel of the pipe with two continuous fillet welds. The flanges shall be attached to the barrel of the pipe with two continuous fillet welds. Blind flanges shall be plain faced and shall conform to ANSI B 16.5, Class 150. All flanges shall be covered and protected during delivery and storage.

Flanged joints shall be made with bolts or bolt studs with a nut on each end. Bolts, stud bolts, and nuts shall meet the requirements of ASTM Des: A 307, Grade B and ANSI B 16.1 unless noted otherwise on the Plans.

Except where otherwise directed by the Engineer, gaskets for flanged joints shall be of the full-face type, meeting the requirements of ANSI B16.21. Gaskets shall be Nitrile rubber, also known as Buna-N and NBR, as made by the American Seal & Packing Company, Garlock of EnPro Industries, U.S. Rubber Supply Company, or equal.

Zinc for galvanizing, zinc coating, and plating shall meet the requirements of ASTM Des: B 6 and shall be at least equal to the grade designated as "Prime Western."

Wrought metals and castings shall be sandblasted or ground smooth. When a smooth coat is required, castings shall be tumbled and all high spots ground flush. Castings shall be normalized to prevent cracking.

Base metal shall be thoroughly cleaned, using only approved solvents and wire brushes, after which it shall be pickled.

Products to be galvanized shall be safeguarded against embrittlement in accordance with ASTM Des: A 143 and against warpage and distortion in accordance with ASTM Des: A 384.

Galvanizing shall be done by the hot-dip process after fabrication, unless otherwise specified in conformance with the appropriate ASTM and American Hot Dip Galvanizers Association, Inc. specifications. The dipping shall not come in contact with or rest upon the dross during the operation.

Galvanizing and coating shall be done in a plant having sufficient facilities to produce the quality of coatings herein specified and ample capacity for the volume of work required. Galvanized material shall be shipped and handled in a manner which will avoid damage to the zinc coating.

Galvanizing shall meet the requirements of ASTM Des: A 120.

#### W-30.05 Plastic Tubing

Plastic tubing for the air supply line shall be clear vinyl instrument grade tubing with an inside diameter of 3/8 inch and a minimum wall thickness of 0.062 inch. The tubing shall be FAST & TIGHT, Formula PV-2 as manufactured by Parker Hannifin, Kent, Ohio, or equal.

#### W-30.06 Workmanship

Working drawings, delivery, erection, testing, insulation, and disinfection of miscellaneous pipe and fittings shall meet the applicable portions of similar requirements for ductile iron pipe specified under the respective sections of Workmanship and Materials.

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## SECTION 31 - HANGERS AND SUPPORTS

### W-31.01 General

Hangers and supports shall include all hanging and supporting devices of metallic construction shown, specified, or required for pipelines, apparatus, and equipment other than electrical equipment. The Contractor's working drawings, as required by the General Provisions hereof, shall show the quantity, type, design, and location of all hangers and supports required.

### W-31.02 Materials

Hangers and supports material shall be stainless steel.

### W-31.03 Design

Hangers and supports not detailed on the Drawings shall be adequate to maintain the pipelines, apparatus, and equipment in proper position and alignment under all operating conditions with due allowance for expansion and contraction, and shall have springs where necessary. Hangers and supports shall be of standard design where possible, and be best suited for the service required, as approved by the Engineer. Where required, they shall be screw adjustable after installation.

Supporting devices shall be designed in accordance with the best practice and shall not be unnecessarily heavy. Sufficient hangers and supports shall be installed to provide a working safety factor of not less than five for each hanger.

All supporting devices shall be designed as to minimize interference with access and movement. The injury hazard shall be considered and minimized in all protruding supporting devices.

On pipes which are covered with heating insulation, hangers and supports shall include proper pipe protection saddles.

Overhead hangers shall be supported by threaded rods properly fastened in place by suitable screws, clamps, inserts, or bolts, or by welding.

Brackets for the support of piping from walls and columns shall be made of welded steel and shall be designed for three maximum loads classified as follows:

Light . . . . .	750 pounds
Medium .....	1,500 pounds
Heavy.....	3,000 pounds

When medium or heavy brackets are bolted to walls, backplates of adequate size and thickness shall be furnished and installed to distribute the load against the wall. When the use of backplates is not practicable, the brackets shall be fastened to the wall in such a manner that the safe bearing strength of the wall will not be exceeded.

Pipe rolls or chairs shall be of the cast-iron type. Pipe rolls shall be provided with threaded nuts or with sockets to take threaded rods.

Saddle stands shall be of the adjustable type. Each stand shall consist of a length of steel pipe fitted at the base with a standard threaded cast-iron flange and at the top with an adjustable saddle or roll. The base flanges shall be bolted to the floor foundation or concrete base.

Stanchions shall be of similar construction to the saddle stand, except that they shall be fitted at the top with cast-iron pipe saddle supports or with pipe stanchion saddles with yokes and nuts.

Where adjustable supporting devices are not required, pipelines 3 inches in diameter and smaller may be supported on cast-iron, malleable iron, or steel hook, hook plates, rings, or ring plates.

#### W-31.04 Anchors

Anchors shall be furnished and installed when specified, shown, or required for holding the pipelines and equipment in position or alignment. Anchors shall be designed for rigid fastening to the structures, either directly or through brackets. The design of all anchors shall be subject to approval by the Engineer.

Anchors for piping shall be of the cast-iron chair type with steel straps, except where anchors form an integral part of pipe fittings or where an anchor of special design is required.

#### W-31.05 Inserts

Inserts for concrete shall be galvanized and shall be installed in the concrete structures where required for fastening supporting devices. They shall be designed to permit the rods to be adjusted horizontally in one place and to lock the rod nut or head automatically. Inserts shall be recessed near the upper flange to receive reinforcing rods. Inserts shall be so designed that they may be held in position during concrete placing operations. Inserts shall be designed by the rod which they engage.

#### W-31.06 Painting

Hangers, supports, anchors, and similar devices shall be painted in accordance with the Workmanship and Materials section headed "Painting."

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## SECTION 32 - VALVES

### W-32.01 General

This section includes all valves to be used on City maintained force mains, City owned pump stations and the Howard F. Curren Advanced Wastewater Treatment Plant. Requirements of this section apply to all valves unless exceptions are shown or stated on the plans or specific provisions.

Plug valves for buried applications shall be provided with mechanical joints. Plug valves for above-ground applications shall be provided with flanged connections.

All force main valves shall be plug valves meeting the requirements of the sub-section "Eccentric Plug Valves."

Valves 2 inches in diameter and smaller shall be all brass or bronze, except the handwheel, and shall have screwed ends. Valves 2-1/2 inches in diameter and larger shall be iron body, bronze mounted with flanged ends, except that in the smaller sizes, valves may be all bronze at the Contractor's option.

All gate, globe, and angle valves shall have rising stems, unless otherwise specified, and shall open when the nut or handwheel is turned counterclockwise. Each handwheel shall be marked with an arrow and the word "Open." Each nut shall be marked with an arrow and shall not be greater than 24 inches in depth below finished grade.

All references to "stainless steel" or "SS" shall mean 316 stainless steel.

All valves of the same type shall be from a single manufacturer. Parts of valves of the same type and size shall be interchangeable.

All valves shall be carefully erected in their respective positions, free from all distortion and strain, and shall be packed and left in satisfactory operating condition.

### W-32.02 Submittals

The Contractor shall prepare and submit for approval a complete detail drawing of all valves in accordance with the requirements of the General Provisions. At minimum the submittal shall show all proposed material types to be used as well as proposed interior and exterior coating manufacturer, coating type and proposed minimum dry film thickness.

### W-32.03 Flanges

Flanges shall be cast solid and faced accurately at right angles to the axis of the casting. Flanges shall be faced and drilled and shop coated with a rust preventive compound before shipment.

Dimensions and drillings of flanges shall meet the requirements of ANSI B16.1 for working pressures of 125 pounds per square inch. Special drillings shall be provided where required.

### W-32.04 Gate Valves



Except as otherwise specified, gate valves shall meet the requirements of Fed. Spec. WW-V-54, Class A, 125 pounds.

Gate valves shall have standard stuffing box seals. Bonnet bolts, studs, and nuts shall be cadmium plated. Wedging devices shall be bronze to iron or bronze to bronze as specified. Glands shall be bronze bushed; gland bolts and nuts shall be bronze.

Gate valves 2-1/2-inch diameter and larger shall be of the double disc type. Gate valves 2-inch diameter and smaller may be of the double disc or solid wedge type.

Valves with operating nuts or wheels 7 feet or more above the floor shall be provided with chains and chain wheels.

#### W-32.05 Globe and Angle Valves

Except as otherwise specified herein, globe and angle valves shall meet the requirements of Fed. Spec. WW-V-51, Class A, 125 pounds.

#### W-32.06 Hose Valves

Hose valves shall be globe or angle valves with rising stems, and rubber composition discs for cold water pressures up to 200 psi, nonshock.

Hose valves shall be all bronze or brass, except the handwheel which shall be of malleable iron. Hose threads shall conform to ANSI B2.4.

#### W-32.07 Check Valves

Check valves, unless otherwise specified, shall be APCO Series 100 of the horizontal, swing type designed to allow full diameter passage and to operate with a minimum loss of pressure. A Letter of Standardization has been executed for this valve. The letter states that no other valve shall be considered an "or equal" in accordance with the City's standardization program. The "or equal" clause applies to all other equipment, unless specifically excluded by a Single Source Certificate or Letter of Standardization.

Check valves shall have body and body cover of heavily constructed cast iron meeting requirements of ASTM A48, Class 30. Check valve body shall have integrally cast-on end flanges. The flapper shall be rubber and have an "O" ring seating edge and be internally reinforced with steel. The flapper shall be easily replaced while the valve remains in place.

The exterior of the check valve shall be factory coated with an approved interior and exterior corrosion resistance coating. The exterior of the check valve shall receive a field coat as indicated for "Steel Pipe and Fittings" in the Workmanship & Materials Section titled "Painting".

#### W-32.08 Pump-Check Eccentric Plug Valve

Pump-check valves, unless otherwise specified, shall meet the requirements of the sub-section for "Eccentric Plug Valves".

The valve shall be equipped with a G-Series rotary cylinder pneumatic actuator that is properly sized for the existing compressed air system within the pump station.

Plug valves shall be Dezurik PEF (100% Port) eccentric plug valve or approved equal.

#### W-32.09 Eccentric Plug Valves

Plug valves shall be of the eccentric valve design and shall meet or exceed the requirements of AWWA C517 and shall be designed for 175 PSI 3'-12" and 150 PSI 14"-36". Manufacturer's Name shall be cast in body and Valve shall be serialized for future parts identification. Port area shall be 100% of standard pipe area. The Plug shall be Rectangular with associated Rectangular Port and shall provide dead tight shutoff when seated in the closed position. Body material shall be Cast Iron ASTM A126 Class B, Seats shall be 1/8" thick 95% Nickel and 1/2" wide for proper plug seating. Plug shall be Ductile Iron ASTM A536 and Chloroprene Faced. Bearings shall be sintered, oil impregnated permanently lubricated type 316 stainless steel, include upper and lower grit excluders to prevent grit and foreign solids from entering the bearings. Shaft seals shall be multiple V-ring type and shall be externally adjustable via an air gap and re-packable under pressure without removing the actuator or bonnet from the valve. Valves shall have interior and exterior epoxy.

Plug valves shall be nut operated (1/4 turn) 4" to 8" and gear operated 10" and larger. Both nut and gear operated valves shall have a 2-inch square nut for operation. On pump stations where the valve is 7 feet or more above the floor level, a chain and wheel shall be provided for operation.

Plug valves shall be Dezurik PEF (100% Port) eccentric plug valve or approved equal.

#### W-32.10 Knife Gate Valves

Valves shall be bonnetless wafer knife gate type with cast single-piece body construction. Lugged ends shall have threaded holes in accordance with ANSI B16.1 125/150 pound standards. Working pressure rating shall be 150 psi in sizes 2"-24". Valve body and gate shall be stainless steel type 316 or as specified. Stem shall be type 304 stainless steel. Valve shall have a round port equal to 100% of the connecting pipe. Valves shall be chloroprene resilient seated or as specified.

The body design shall have no pockets or grooves in the flow port where media can settle and adversely affect closure. The gate shall be polished to provide low thrust requirements and long packing life. The leading edge of the gate shall be beveled to assist in closure. The stem shall be outside of the body and will not contact the flowing media. Valves shall have multi-layer square packing with adjustable packing gland bolting.

All valve bodies shall be tested with water at 150% of rated pressure with no visible leakage. Assembled valves shall be tested for seat leakage with water at 40 psi applied to the back of the gate (pressure in the normal flow direction) and allowable leakage shall be as per MSS SP-81 specifications.

Valves shall be provided with a manually operated direct-mounted handwheel as specified or shown on the construction drawings. Floor stands and extensions shall be provided if specified.

Valve superstructures shall be designed to allow easy field interchangeability between manual and pneumatic actuators. New superstructures shall not be required for conversion between manual and pneumatic operators.

Metal surfaces other than stainless steel shall receive a field coat as indicated for “Steel Pipe and Fittings” in the Workmanship & Materials Section titled “Painting”.

Valves shall be model GKU by DeZURIK, Inc, or approved equal.

#### W-32.11 Multiport Valves

Three-way and four-way valves, unless otherwise specified, shall meet the requirements of the subsection for eccentric plug valves.

#### W-32.12 Solenoid Valves

Solenoid valves, unless otherwise shown or specified, shall be normally closed packless type with full area ports. The body and bonnet shall be forged brass and the solenoid core shall be stainless steel. The diaphragm shall be of synthetic rubber assuring long service life. The coils shall be designed for 115-volt, 60-hertz operation and shall be embedded in molded plastic in NEMA Type I general purpose enclosure.

#### W-32.13 Ball Valves for CPVC Piping

Manually operated ball valves for CPVC piping shall be CPVC ball valves having renewable Teflon ball seats and EPDM seals. Ball valves shall block in both seating directions, leaving full pressure on the opposite end of the valve. The CPVC ball valves shall be rated at not less than 150 psi working pressure at 75 degrees F, self-lubricating, and shall have socket end connectors. The ball valves shall be of true union design to allow for inspection or removal. CPVC ball valves shall be as manufactured by Hayward Industrial Products, Inc., or equal.

#### W-32.14 Ball Check Valves for CPVC Piping

Ball check valves for CPVC piping shall be constructed of solid CPVC and shall have a CPVC ball. The check valve shall have EPDM O-rings and shall be capable of operating either horizontally or vertically. The check valve shall have a full flow design that provides a free open area that is equivalent to the connecting pipe size. The check valves shall have socket end connectors and shall be of the true union design to allow for inspection and removal of the valve. Ball valves for CPVC piping shall be as manufactured by Hayward Industrial Products, or equal.

#### W-32.15 Testing

All valves shall be given hydrostatic shop pressure tests at twice the working pressure specified. The valves shall be tested, first by applying the hydrostatic pressure with the valve open and then with the valve closed. The valves shall be tight and secure under the test pressure.

Valves shall be tested in place by the Contractor, as far as practicable, and any defects in valves or connections shall be corrected to the satisfaction of the Engineer.

### W-32.16 Painting and Coating

Plug valves shall receive a factory interior and exterior coating of Tnemec Series 141 (4 mils thick).

All other valves shall receive a factory interior and exterior coating of an approved system.

Metal surfaces other than stainless steel shall receive a field coat as indicated for “Machinery and Equipment” in the Workmanship & Materials Section titled “Painting”.

Chain wheels shall be coated by galvanizing or electroplating with zinc or cadmium. The chain shall be coated by electroplating with zinc or cadmium. Zinc electroplating shall meet the requirements of Fed. Spec. QQ-Z-325, Type II, Class 2; and cadmium electroplating shall meet the requirements of Fed. Spec. QQ-P-416, Type II, Class 2.

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## SECTION 33 - LEAKAGE TESTS - PUMPING STATIONS

### W-33.01 General

All pipelines and structures required to be watertight shall be tested for leakage by the Contractor under the direction of the Engineer. Air and gas lines shall be tested with compressed air and all other pipelines shall be tested with water under the pressures specified herein.

All tests shall be conducted in a manner to minimize as much as possible any interference with the Contractor's work or progress.

The Contractor shall notify the Engineer when the work is ready for testing, and tests shall be made as soon thereafter as possible. Personnel for reading meters, gauges, or other measuring devices, will be furnished by the Engineer, but all other labor, equipment, air, water, and materials, including meters, gauges, smoke producers, blower, fuel, bulkheads, and accessory equipment, shall be furnished by the Contractor.

### W-33.02 Pressure Tests

Pressure tests of pipelines shall be made by maintaining the fluid in the pipe at the specified pressure for a period of 30 minutes. The pipelines shall show no leakage.

Test pressures for the various pipelines shall be as follows:

<u>Type of Pipeline</u>	<u>Test Pressure psi</u>
Sewage (Pump Suctions)	5
Sewage (Pressure) - Pump Discharge	100
Water	125
Sump pump discharge	25
Compressed air	200
Drains	5

### W-33.03 Tests of Structures

Leakage tests of wet wells and similar purpose structures shall be made before backfilling by filling the structure with water to the overflow height and observing the water surface level for the following 24 hours. Inspection for leakage will be made of the exterior surface of the structure, especially in the area around the construction joints.

Leakage will be accepted as within the allowable limits for structures from which there are no visible leaks and in which the water surface drops not more than 1/2 inch during the 24 hour test.

If visible leaks appear, the structure shall be repaired by removing and replacing the leakage portions of the structure, waterproofing the inside, or by other methods approved by the Engineer.

Water for the initial filling of the structure will be supplied by the City. Water for subsequent fillings, if required, shall be at the expense of the Contractor.

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## SECTION 36 - PAINTING

### W-36.01 General

Painting includes furnishing all labor, materials, scaffolding, booms, safety equipment, and services to paint all structures and equipment specified in this contract. Requirements of completing the work include, but are not limited to, preparation of surfaces, painting piping and structures, conduit, ductwork and equipment as specified, and the marking of piping and electrical conduit. The work shall include furnishing samples of paints and color charts. The Contractor shall employ a NACE Level III Coating Inspector as noted below.

Paint and other materials shall be of the type and quality of the manufacturer on which the coating schedule is based. All coats of paint for any particular surface and thinners used shall be from the same manufacturer. The treatment of the surface to be painted and the application of paint shall be in accordance with the instructions of the manufacturer and as approved by the Engineer. The colors of paints shall be as approved by the Engineer. Specimens, approximately 8 by 10 inches in size, shall be prepared and submitted to the Engineer. The minimum number of specimen custom mixed colors submitted shall be 6 not including color coding colors. Only paint of approved manufacturers shall be delivered and stored at the site.

All painting shall be in accordance with the schedules included in this specification. A supplementary schedule of paint products shall be submitted, with mil thickness, to cover all paint applied. The schedule shall be in accordance with the recommendations of the manufacturer of the paint. The total mil thickness of all coatings shall be not less than the schedule included in this section.

### W-36.02 Delivery and Storage

Paints, stains, varnish, or ingredients of paints to be mixed on the job shall be prepared, packed and labeled, and guaranteed by an approved manufacturer. All material shall be delivered to the site in original, unbroken containers.

The manner of and place for storing the painting materials at the site shall be as approved by the Engineer or Project Representative. The storage space shall be kept clean at all times. Every precaution shall be taken to eliminate fire hazards.

### W-36.03 Surface Preparation

Prior to painting, all surfaces shall be prepared and cleaned in strict accordance with the paint manufacturer's recommendations. Surfaces shall be dry before any paint is applied. Special surface preparation work shall be as directed by the manufacturer of the paint specified to be applied to the surface. Contractor is responsible for 100% containment of blasting materials and debris. The Contractor shall provide protection for all motors, compressors, belts, gauges, ports, equipment signage, etc. These items shall be kept protected at all times during the blasting and painting activities detailed in this specification.

#### Metal Surfaces:

This includes all exterior and interior steel surfaces and all nonferrous metals. This applies to structural and miscellaneous steel, motors, designated housings and protective guards, piping, valves, stairs, and in general, all surfaces to be painted as designated in these specifications.

All surfaces shall be pressure cleaned (5000 psi) in accordance with Steel Structures Painting Council standards SSPC - SP1 Solvent Cleaning: Removal of all detrimental foreign matter such as oil, grease, dirt, soil, salts, drawing and cutting compounds, and other contaminants from steel surfaces by the use of solvents, emulsions, cleaning compounds, steam or other similar materials and methods which involve a solvent or cleaning action. This standard allows for pressure washing, detergent cleaning, etc. Additional rust, loose paint, loose mill scale, etc., shall be removed in accordance with SSPC - SP3 Power Tool Cleaning. As necessary, SSPC – SP5 shall be employed with either sand blasting or ultra high pressure jetting (over 25,000 psi).

All welds, beads, blisters or protuberances, other than identification markings shall be ground smooth. Pits and dents shall be filled with a suitable product as approved by the Engineer, and other imperfections shall be removed. Painted edges shall be sanded smooth with adjacent bare metal surfaces.

Where aluminum surfaces come in contact with incompatible metals, lime, mortar, concrete or other masonry materials, these areas shall be given two coats of Interseal 670HS Black Epoxy, or equal.

The topcoat shall be free of runs, drips, voids, spatters, or any other defects. The contractor shall use a dry film thickness gauge to ensure that the coating is being applied to the manufacturer's specification.

#### Concrete and Wood Surfaces:

Surface preparation of all exterior concrete and wood surfaces shall be pressure washed to remove cobwebs, dirt, dust, and other surface contaminations. Mildew shall be treated with a 22% chlorine solution or otherwise by mixing equal parts solution bleach and water to the affected area. Loose paint and other defects shall be removed by hand; brushing, sanding, chipping or other hand tools or by power; brushes, impact tools, grinders, sanders or other power tools or by any combination thereof. Painted edges shall be sanded smooth to match adjacent bare surfaces.

All interior concrete and wood surfaces including ceilings, walls, and floors shall be cleaned similar to SSPC - SP1 Solvent Cleaning standards. Loose paint and other defects shall be removed by hand; brushing, sanding, scraping, chipping or other hand tools or by power; brushes, impact tools, grinders, sanders or other power tools or by any combination thereof. Painted edges shall be sanded smooth to match adjacent bare surfaces.

Priming shall be performed with Porterlock PP898 Pigmented Bonding Coat, or equal. Concrete, concrete masonry, and wood shall be thoroughly dry prior to painting. Concrete and masonry should be at least 7 days old with a 6-13 PH.

#### W-36.04 Coatings

All paints and similar materials shall be mixed in galvanized iron pans or pails or other approved containers of adequate capacity. All paint shall be stirred thoroughly before being taken from the containers, shall be kept stirred while using, and all ready-mixed paint shall be applied exactly as received from the manufacturer without addition of any kind of drier or thinner, except as specified or as permitted or directed by the Engineer. Successive coats of paint shall be tinted to make various coats easily distinguishable. Undercoats of paint shall be tinted to the approximate shade of the final coat of paint. The paint shall be a minimum temperature of 60 degrees F before application.

Only skilled painters shall be used on the work, and specialists shall be employed where required. Paint shall be applied by brush or roller in accordance with the manufacturer's recommendation. No spray painting is allowed. Finished surfaces shall not show brush marks or other irregularities. Top and bottom edges of doors shall be painted. Undercoats on hollow metal work shall be thoroughly and uniformly sanded with No. 00 sandpaper or equal abrasive to remove all surface defects and provide a smooth, even surface.

Painting shall be a continuous and orderly operation to facilitate adequate inspection. All paint application methods shall be in accordance with the instructions of the paint manufacturer and as approved by the Engineer. Access panels, pipes, pipe covering, ducts, and other building appurtenances built into or adjoining walls to be painted shall be painted the same color as adjacent walls, unless otherwise directed by the Engineer. Hardware and accessories, fixtures, and similar items placed prior to painting shall be removed or protected during painting and replaced on completion of painting. All wall surfaces to be concealed by equipment shall be painted before installation of the equipment.

Areas under and adjacent to painted work shall be fully protected at all times and dripped or splattered paint shall be promptly removed. Painting shall not be done when the temperature is below 60 degrees F, or in dust-laden air, or until moisture on the surface has completely disappeared. If necessary, sufficient heating and ventilation shall be provided to keep the atmosphere and all surfaces to be painted dry and warm until each coat of paint has hardened. Any painting found defective shall be removed and repainted or touched up as directed by the Engineer.

Coatings must be allowed to cure before being recoated or placed into service. Drying time requirements recommended by the manufacturer should be followed exactly.

The final colors shall be determined during the pre-construction meeting.

Coverage shall be complete. When color on undercoats shows through the final coat of paint, the work shall be covered by additional coats until the paint is of uniform color and appearance and coverage is complete, at no additional cost.

Rooms or areas being painted shall be supplied with sufficient temporary ventilation during painting operations to keep the atmosphere safe from harmful or dangerous fumes and harmful dust levels for personnel.

All application tools and equipment shall be in good working order and suitable for proper applications. It shall be the Contractor's responsibility to ensure that no paint mist or spatter falls or blows to other objects, vehicles, equipment, buildings, etc.

The topcoat shall be free of runs, drips, voids, spatters, or any other defects. The contractor shall use a dry film thickness gauge to ensure that the coating is being applied to the manufacturer's specification.

Coating Schedule:

All painting shall be in accordance with the following schedule, unless specified otherwise. The number of coats shall not be less than the number shown on the schedule.

<b>COATING SCHEDULE</b>	
	<b>Coats</b>



<b>Class of Work - Metal Surfaces</b>	<b>Pretreatment</b>	<b>Primer</b>	<b>1<sup>ST</sup></b>	<b>2<sup>ND</sup></b>	<b>3<sup>RD</sup></b>
Aluminum	A	C	C	H	
Copper Piping			G	H	
Electrical Conduit	A	C	C	H	
Steel Pipe, Valves, and Fittings		C	G	H	
Galvanized Steel	A	I	G	H	
Ductile Iron Pipe, Valves, and Fittings			C	C	
Miscellaneous Steel and Ironwork		C	G	H	
Machinery, Interior, and Nonsubmerged		B	B	F	

The designations in the following list are given solely for the purpose of indicating the type and quality of materials desired. Approved equivalent material of other manufacturers may be substituted. All coats of paint for any particular surface shall be from the same manufacturer.

<b>ALPHABETICAL DESIGNATIONS OF PRODUCTS</b>		
<b>Symbol</b>	<b>Product Name and Number</b>	<b>Minimum Dry Film Thickness Mils per Coat</b>
A	Alumiprep 33 or Galvaprep 5	N/A
B	Fast Dry 35 (95-908 series PPG)	3.0
C	PITT-GUARD® 95-245 series	7.0
D	Porter Pigmented Bonding Coat 898 with Thinner	N/A
E	PITT-TECH® Plus (90-1310 series)	2.0
F	FAST DRY 35 (95-912 series)	2.0
G	PITT-GUARD® 95-245 series	5.0
H	AQUAPON® 35 (95-1 series)	2.0
I	METALHIDE® (97-676 series)	1.5

#### W-36.05 Color and Markings

Paint color shall be determined by the Engineer during the pre-construction meeting from submitted color charts. The contents and direction of flow shall be stenciled on all piping in a contrasting color in accordance with ASME A13.1.

#### W-36.06 Safety

The Contractor shall be responsible for exercising all necessary precautions to ensure that no accidents or damage to personnel, equipment, or buildings shall occur. The Contractor shall further determine any special operations which could influence the safe workmanship of his personnel with respect to electrical, mechanical, or chemical fumes or fire hazard situations.

When painting in confined areas or otherwise in areas where explosive fumes or gases need to be ventilated, the Contractor shall use suction type fans designated specifically for the safe removal of explosive fumes or gases, and all equipment involved shall meet all OSHA (Occupational Safety Hazard Act) requirements and MSHA (Mine Safety and Health Administration) approved. The Contractor shall be responsible in all respects for the safe conduct of his personnel when using any of the rigging or equipment involved in the accomplishment of the work specified herein.

Any blasting equipment and all items to be blasted shall be properly grounded. All materials necessary to properly ground these items shall be provided by the Contractor.

#### W-36.07 Cleaning

The Contractor shall touch up and restore any damaged finish. Paint or other finishes spilled, splashed, or splattered shall be removed from all surfaces. Care shall be taken not to mar any surface finish or item being cleaned.

#### W-36.08 Tests, Inspections, and Reports

The Contractor shall hire a National Association of Corrosion Engineers' (NACE) Level III Coating Inspector to confirm all of the following tests and inspections when specified in the plans:

- Removal of all detrimental foreign matter such as oil, grease, dirt, soil, salts, drawing and cutting compounds, and other contaminants from steel surfaces by the use of solvents, emulsions, cleaning compounds, steam or other similar materials and methods which involve a solvent or cleaning action.
- Coating Adhesion ASTM D4541 Testing Standard: Adhesion tests shall be performed for each of the different substrates that are to be coated.
- Confirmation of abrasive blast cleanliness standard has been met and maintained at the point of coating application.
- Dry Film Thickness Testing (DFT): Coating thickness shall be determined by the use of a properly calibrated dry mill thickness gauge. The Contractor shall keep a properly calibrated dry film thickness gauge on the job site at all times. DFT measurements shall be taken frequently to maintain good control of film thickness.
- DFT measurements of applied primer coat to confirm proper application within minimum/maximum specification requirements.
- DFT measurements of brush applied intermediate coating to confirm proper application within total minimum/maximum specification requirements.
- DFT measurements of the applied final coating to confirm proper application of both final coat and intermediate coatings within minimum/maximum specification requirements.

The Contractor shall provide an inspection schedule to the Engineer at the pre-construction meeting. A written inspection report shall be submitted to the Engineer within 48-hours of all inspections by the NACE Level III Coating Inspector. The Contractor shall be responsible for all costs associated with the coating inspector. Each of the following is to be inspected: site preparation, prime coat, intermediate coat, and final coat. The inspector shall provide 24-hour notification to the Engineer of all inspections.

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## SECTION 38 - SEWAGE PUMPING EQUIPMENT

### W-38.01 General

Sewage pumping equipment shall include the installing of totally submersible, electrically operated sewage pumps complete with all accessories and appurtenances necessary for a complete installation in the pumping station.

Each pump shall be an ITT Flygt, Pump, and shall comply with the drawings and specifications for this project. A single source certificate of conditions and circumstances was executed for this pump. The certificate states that no other pump shall be considered an "or equal" for this project in accordance with the City's standardization program. The "or equal" clause applies to all other equipment in this project, unless specifically excluded by a single source certificate or letter of standardization.

Each pump shall have a substantial guide bracket to permit vertical sliding along not less than two unthreaded stainless steel guide rails from an automatic pump discharge connection at the bottom of the wet pit to the wet pit access cover for inspection, maintenance, and removal of the pump without requiring personnel to enter the wet pit. The pump shall be easily removable from the guide rails and shall require no bolts, nuts, or other fasteners to be disconnected. The guide brackets shall be of stainless steel and shall be an integral part of the pumps. The guide rails shall be Type 304, Schedule 40 stainless steel pipe and shall be connected to the automatic pump discharge connection at the bottom and supported at the top by substantial stainless steel brackets bolted to the concrete sides of the wet pit access opening. The automatic pump discharge connection shall be cast-iron, flanged by plain-end, 90 degree vertical bend with an integral cast-iron support. The support shall be bolted to the floor with not less than four, 3/4-inch diameter stainless steel anchor bolts cast into the concrete. The pump volute discharge shall have a machined flange, which when the pump is lowered into pumping position will automatically and firmly mate with the plain-end of the discharge connection without the need of adjustment, fasteners, clamps, or similar devices. No motion other than vertical shall be required to seat the mating flange of the pump volute to the discharge connection. Sealing of the discharge interface shall be accomplished by only metal contact and the use of a diaphragm, O-ring, or other device will not be permitted. The pump, with its appurtenances, shall be capable of continuous submergence under water without loss of watertight integrity to a depth of 65 feet. No portion of the pump shall bear directly on the floor of the wet pit. Each pump shall be fitted with a tall stainless steel lifting handle and a stainless steel welded link chain of adequate length to permit the raising and lowering of the pump for inspection and removal.

### W-38.02 Pump Characteristics

**SEE SPECIFIC PROVISIONS**

### W-38.03 Construction

The stator casing, oil casing, sliding bracket, volute, and impeller of each pump shall be of hard, close grained gray cast iron. All surfaces coming into contact with sewage shall be protected by a coat of Nylon-II, heat fused to the metal. All external bolts and nuts shall be of stainless steel.

The impeller of each pump shall be of non-clog design capable of passing a 3-inch spherical solid, fibrous material, and heavy sludge and shall be constructed with long throughlet without acute turns. The impeller shall be statically and dynamically balanced. Static and dynamic balancing operations shall not deform or weaken the impeller. The impeller shall be firmly secured to the shaft by a stainless steel key and lock nut in such a way that it cannot unscrew or become loosened due to torque resulting from rotation in either direction.

A renewable Buna-N rubber wearing ring shall be installed at the inlet of each pump to provide protection against wear to the impeller.

Each pump shaft shall be of stainless steel conforming to ASTM Des: A 582, Type 416. The shaft shall be accurately machined and polished and of sufficient diameter to carry the maximum load imposed, to assure rigid support of the impeller and to prevent excessive vibration at all operating speeds. The shaft shall be provided with two guide bearings of the ball type of ample size to carry the loads imposed under continuous service without overheating.

Each pump shall be provided with a tandem double mechanical seal running in an oil reservoir having separate, constantly hydro-dynamically lubricated lapped seal faces. The lower seal unit between the pump and oil chamber shall contain one stationary and one positively driven rotating tungsten-carbide ring. The upper seal unit between the oil sump and motor housing shall contain one stationary tungsten-carbide ring and one positively driven rotating carbon ring. Each interface shall be held in contact by its own spring system supplemented by external liquid pressures. The seals shall require neither maintenance nor adjustment, but shall be easily inspected and replaceable. Shaft seals without positively driven rotating members or conventional double mechanical seals with a common single or double spring acting between the upper and lower units, requiring a pressure differential to offset external pressure and effect sealing shall not be considered acceptable nor equal to the dual independent seal system specified. The shaft sealing system shall be capable of operating submerged to depths of or pressures equivalent to 65 feet. No seal damage shall result from operating the pumping unit out of its liquid environment. The seal system shall not rely upon the pumped media for lubrication.

The pump motors shall be housed in an air-filled watertight casing and shall have Class F moisture resistant insulation. The temperature at any point in the windings shall not exceed 155 degrees C at any load which could be imposed by the pump at any point on its curve. The motors shall be 230-volt, 3-phase, 60-hertz, squirrel-cage induction motors. Each motor shall have a minimum full load efficiency of 85 percent and a minimum full load power factor of 80 percent. Each motor shall be U.L., Inc. or Factory Mutual Engineering Corporation listed for installation and operation in a Class I, Division 2, Group C and D hazardous locations. Each motor shall have a facility for winding high temperature alarm. Each motor shall be provided with a leakage sensor to provide an alarm indication prior to liquid reaching the stator coils. The pumps shall not load the motor beyond its nominal (nameplate) rating at any point on the pump curve. Each pump motor shall be furnished with a minimum service factor of 1.15 or the horsepower rating of the motor shall be a minimum of 15 percent greater than the maximum BHP required over the full range of the pump curve. Electrically and mechanically each pumping unit (pump and motor) shall be capable of a minimum of ten (10) starts per hour.

The motor cable entry water seal shall be such that precludes specific target requirements to ensure watertight and submersible seal. Epoxies, silicones, or other secondary sealing systems shall not be required or used. The cable entry junction box and motor shall be separated by a stator lead

sealing gland or terminal board which shall isolate the motor interior from foreign materials gaining access through the pump top. The pump motor cable shall be suitable for submersible pump applications, and this shall be indicated by a code or legend permanently embossed on the cable. Cable sizing shall conform to NEC specifications for pump motors and shall be adequate size to allow motor voltage conversion without replacing the cable.

All mating surfaces of major parts shall be machined and fitted with nitrile O-rings where watertight sealing is required. Machining and fitting shall be such that sealing is accomplished by automatic compression in two planes and O-ring contact made on four surfaces, without the requirement of specific torque limits to affect this. Rectangular cross sectioned gaskets requiring specific torque limits to achieve compression shall not be considered adequate or equal. Tolerances of all parts shall be such that allows replacement of any part without additional machining required to ensure sealing as described above. No secondary sealing compounds, greases, or other devices shall be used.

Each unit shall be provided with an adequately designed cooling system. Thermal radiators integral to the stator housing, cast in one unit, are acceptable. Where water jackets alone or in conjunction with radiators are used, separate circulation shall be provided. Cooling media channels and ports shall be non-clogging by virtue of their dimensions.

#### W-38.04 Field Tests

After installation of the pumping units, control equipment, and all appurtenances, each pumping unit will be subjected to a field running test of not less than 24 hours duration under actual operating conditions. The field test shall be made by the Contractor in the presence of and as directed by the Engineer. The field test shall demonstrate that under all conditions of operation, each unit:

1. Had not been damaged by transportation or installation.
2. Has been properly installed.
3. Has no mechanical defects.
4. Is in proper alignment.
5. Has been properly connected.
6. Is free of overheating of any parts.
7. Is free of all objectionable vibration.
8. Is free of overloading of any parts.

The tests shall also demonstrate that the control systems perform as specified and meet all operating criteria.

Any defects in the equipment or operating controls or failure to meet the requirements of the Specifications shall be promptly corrected by the Contractor.

#### W-38.05 Service

Authorized service facilities must be available in Florida. The pump supplier will stock at the facility one set of recommended spare parts as described below for the pumps specified in this Contract.

Inspection Plug Washers  
Impeller Bolt  
Impeller Key  
Upper Bearing  
Lower Bearing  
Upper Mechanical Seal  
Lower Mechanical Seal  
Wear Rings  
Motor Cable  
Cable Entry Washer/Grommet  
Complete Set of O-rings

#### W 38-.06 Mix-Flush Valves

The Contractor shall supply one of the two pumps with a mix-flush valve installed on the volute. The volute shall have an integral mounting pad on which to mount the mix-flush valve. The mounting of the valve shall not void the pump manufacturer's warranty. The valve shall be mounted by the valve manufacturer or agent to assure proper installation and operation.

The mix-flush (or flush) valve shall be hydraulically activated and shall not contain any electromechanical components. The mix-flush system shall be intrinsically safe and suitable for pumps used in hazardous locations Class 1, Division 1, Groups C and D. The flush valve shall be fully automatic and shall operate each time the equipped sewage pump cycles into running mode. The length of time for the flushing action shall be adjustable to a period of between 20 and 50 seconds. A means of adjustment shall be provided on the outside of the valve to obtain the desired flushing period.

The mix-flush valve shall be a standard production item of the pump manufacturer and warranted by the pump manufacturer for a period of 15 months from date of substantial completion. The warranty station shall be within 100 miles of the installation and replacement units shall be kept in stock at all times.

Each new pump shall be provided with a volute plug along with the mix-flush valves. Only one pump shall be installed with the mix flush valve, due to wet well size limitations. The other mix flush valve shall be provided as a spare.

#### W-38.07 Spare Parts

One complete set of mechanical seals shall be furnished for each different model of pump furnished in this Contract (unless otherwise specified on the Plans).

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## SECTION 42 - VITRIFIED BRICK PAVEMENT REPLACEMENT

### W-42.01 Preparation

Existing bricks shall be cleaned, stored, and secured by the Contractor.

Existing bricks shall be removed, cleaned, stored, and secured in right-of-way adjacent to work area.

Base shall be provided and shaped to match level, kind and thickness (4" min.) of adjoining base. The base material shall be compacted to meet the City of Tampa's density standards. 4" 2500 PSI concrete base may be used for irregular patches and where compaction is otherwise impractical. Concrete shall be properly placed, consolidated and cured. One and a half inches of sand, free from clay, loam or other foreign matter shall be used for cushion to hold the bricks in place. The sand shall be shaped to a true surface parallel to required finished pavement surface.

### W-42.02 Reinstallation of Bricks

The bricks shall be installed in rows, better face upward, sorted by size with joints staggered, then rolled daily with a static tandem wheel roller. Additional bricks, if required, will be supplied by the City. City Personnel shall inspect work daily. After inspection, the bricks shall be sprayed with a solution of lime and water, using 26 lbs. of lime to 55 gallons of water. Asphalt steep 7330 or equal shall be used for joint filler. The steep shall be heated until fluid and poured over bricks and removed when cool with square pointed shovels dipped in lime water. Removed asphalt may be reused. If adjoining bricks are grouted, new filler shall be grout (8:1, builders sand:cement).

### W-42.03 Acceptance

Upon completion of the work, and before acceptance and final payment, the Contractor shall remove all falsework, equipment, rubbish, surplus, and discarded materials. The Contractor shall restore in an acceptable manner all property, both public and private, damaged during the prosecution of the work. The Contractor shall leave the roadway in a neat and presentable condition each day.

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## SECTION 45 – ELECTRICAL

### W-45.01 Scope of Electrical Work

The work in this section consists of furnishing all labor, materials, equipment and transportation, and performing all operations required to support the installation and commissioning of the electrical portion of the proposed Virginia Pumping Station Rehabilitation including, but not limited to, the following:

1. Submit working drawings, parts schedules, and cut-sheets to the Engineer.
2. Furnish and install all electrical equipment, controls, and instrumentation as shown on the Plans and described in the Specifications. This installation includes:

#### Scope of Work

1. The contractor shall coordinate electrical service requirements with Tampa Electric Company (TECO). The city will make preliminary arrangements with teco and compensate the utility directly for any contribution in aid of construction (CIAC) required for TECO to install a handhole at the base of the existing TECO pole. The proposed service voltage shall remain 120/240 vac, 3 ph, 4w open delta.
2. Remove the existing meter socket, lightning arrestor, control panel, concrete pedestal, and all associated conduit and conductors, as shown on plans.
3. Carefully remove the existing DCR SCADA RTU cabinet mounted on the antenna mast located near the existing pump controls and deliver to the City for maintenance inventory. The antenna mast shall also be removed.
4. Any salvageable materials, as determined by the engineer, shall be delivered, by the contractor, to the Howard F. Curren AWTP. The contractor shall properly dispose of all other removed equipment.
5. Provide and install a new electrical meter socket, lightning arrestor and grounding, as shown on plans.
6. Prepare the site for the installation of the proposed control equipment.
7. Provide and install a new duplex pump control panel & remote control panel. The pump control panel shall contain local and remote control components, indicator lights, and SCADA, RTU, as shown on plans and detailed in specifications.
8. Provide and install NEMA 4x wet well isolation junction box for pump motor connections.
9. Provide and install a new duplex motor control panel. The motor control panel shall contain circuit breakers and motor starters, as shown on plans and detailed in specifications.



10. Provide and install NEMA 4x wet well isolation box for instrumentation and control connections.
11. Provide and install a NEMA 4x, service entrance rated, fused double throw switch, as shown on plans.
12. Provide and install a NEMA 4x, emergency power connector, as shown on plans.
13. Provide and install area lights, as shown on plans.
14. Calibrate and adjust setpoints for all sensing devices, alarm devices, and timers. Calibration and setpoints shall be provided in accordance with manufacturer's recommendations.
15. Provide for proper grounding as shown, specified, and required.
16. Provide and install all necessary conduits and conductors, as shown, specified and required.
17. Plans are designed in accordance with the 7th edition 2020 of the Florida Building Code, the 2017 edition of the national electrical code and chapter 5 of the City of Tampa code and shall be inspected by City of Tampa/Hillsborough county electrical inspectors as applicable. Contractor shall ensure that all electrical work performed shall adhere to the same accordance and all applicable local ordinances.
18. Refer to civil/mechanical sheets for bypass pumping requirements. If electrically driven bypass pumps are utilized, the contractor shall coordinate all temporary electrical service requirements with TECO. Any costs associated with temporary electric power are to be included in the lump sum price and no separate payment will be made.

#### W-45.02 General Requirements

1. Codes

Any conflicts between the Specifications and Drawings or with the regulations of local codes, public utility company, or the National Electrical Code or the National Electrical Safety Code shall be promptly brought to the attention of the Engineer for clarification. All materials and work shall be in accordance with said standards.

2. Contract Documents

The drawings are generally diagrammatic not necessarily showing in detail all of the minor items and it shall not be interpreted to mean that any minor item required may be omitted. The Contractor shall make use of all the data in all of the Contract Documents and shall verify all information at the site, which may influence his proposal. The Contractor shall obtain all necessary shop drawings and shall consult

manufacturer's representatives during installation start-up as needed.

3. Tests

The Contractor shall provide all necessary instruments and special apparatus to conduct any test that may be required to ensure that the system is free of all improper grounds and short circuits. These tests shall be conducted in the presence of the Engineer prior to final acceptance.

4. Guarantee

The Contractor shall submit a written guarantee to the City that all electrical work and material provided under this Contract is free from defects for a period of one year after final acceptance of the job. There will be no additional charge to the City to repair or replace any such work, which is found to be defective within the guarantee period.

5. Materials and Equipment

All materials and equipment shall be new and shall bear the manufacturer's name, date of manufacture, trade name, and the UL label. Equipment and materials shall be delivered to the site and stored in original containers, suitably sheltered from the elements, but readily accessible for inspection.

6. Operation and Maintenance Manuals

See Specific Provisions section of the Specifications.

7. Test Documentation

Test all equipment and document tests.

W-45.03 Execution of Work

All work shall be executed in a neat and workmanlike manner by experienced and capable electricians so as to present a neat installation upon completion.

Electrical work shall be coordinated so as not to interfere with or delay other construction operations.

The ends of all conduits shall be carefully reamed free from burrs after threading and before installation. All cuts shall be made square. All joints shall be made up tight. Care shall be taken to see that all control and power conduits are grounded as required by the NEC and Chapter 5 of the City of Tampa Code, Building and Construction Regulations.

## SECTION 46 - CONTROLS

### W-46.01 General

Control components shall comply with the latest ANSI, IEEE, and NEMA standards where applicable.

Maximum control voltage shall be 120 VAC, 60 Hz.

Control devices shall be of industrial grade, heavy-duty design, utilizing modular construction to increase flexibility.

### W-46.02 Control Enclosures and Panels

The control enclosures shall be rated NEMA 3, gasketed, and be constructed of minimum 14 gauge, 304 stainless steel. The door shall have a handle with padlock provisions and three-point latch mechanism. The door shall be provided with a positive stop mechanism to prevent it from closing while controls are being serviced. Stiffeners shall be provided on the enclosure and door as necessary to provide rigidity. The closing surfaces shall have rolled lips. The outside of enclosure shall be finished with a durable RAL 9003 white powder coat to reduce solar heat gain. All hardware shall be heavy-duty, stainless steel. A print pocket shall be provided on the inside of the door. The enclosure dimensions shall be as shown or required.

The panel shall be 12 gauge steel and sized to be accommodated by the enclosure. The periphery of the panel shall be formed to provide a 0.75 inch stiffener frame. The panel shall be primed, painted with white enamel and baked, after forming.

The enclosure and panel shall be as manufactured by Quality Metals, Hoffman Engineering, or equal.

### **Motor Control Panel**

The motor control panel shall be as defined in Sections W-46.01 General, W-46.02 Control Enclosures and Panels and shall contain, but not limited to the components listed in the sections W-46.03 thru W-46.10:

### W-46.03 Motor Starter

#### A. Full Voltage Starter

The motor starter shall be 3-pole polyphase, and have a NEMA rated contactor with a minimum Size 2 rating. It shall be designed for full voltage, non-reversing service.

Motor starter contacts shall be silver alloy, double break; and shall be easily replaceable, with standard tools, without removing the starter from the enclosure; or removing the line, load, or control wiring from the starter.

Contactor coil shall be of the encapsulated type; and shall be easily replaceable, with standard tools, without removing the starter from the enclosure, or removing the line or load

wiring from the starter.

The motor starter shall be provided with a solid-state overload relay. The overload shall feature a 3 to 1 adjustment for trip current, phase loss and unbalance protection. The overload shall be ambient insensitive and self-powered. The overload shall be provided with switch selectable trip class; Class II ground fault detection and an electrical remote reset option.

The motor starter shall have a 120VAC, 60Hz contactor coil and control circuit.

A minimum of one (1) N.O. holding contact shall be provided. The capability shall exist to install additional contacts in the field.

The motor starter shall be as manufactured by Square D, Cutler-Hammer, General Electric, Allen Bradley, or equal.

#### W-46.04 Circuit Breakers

Circuit breakers shall be of the molded case, air-break type designed for 600 volt, 60 Hz service or as shown on the Drawings. They shall have both thermal and magnetic elements on all three poles. These elements will actuate a common tripping bar to open all poles when an overload or short circuit occurs.

The circuit breakers shall have an AIC rating greater than the available fault current at the panel.

The equipment shall be as manufactured by Square D, General Electric, or equal.

#### W-46.05 Surge Protective (SPD-1)

The SPD shall be able to suppress lightning induced voltage surges three times greater than the industry standards. The rated line voltage for SPD shall be 120/240V 3-phase, 4-wire delta. The maximum single impulse current shall be 100kA per phase.

1. The SPD shall have a 10-YEAR warranty. Under that warranty, the SPD shall be replaced if it is destroyed by lightning or other impulses.
2. The SPD shall have an LED failure indicator on all three phases.
3. The clamp voltages for the SPD shall be the following:

Line to neutral – 400 – 700 volts (Normal Legs)  
Line to neutral – 700 - 1200 volts (High Leg)  
Line to ground – 400 – 700 volts (Normal Legs)  
Line to ground – 700 – 1200 volts (High Leg)  
Neutral to ground – 600 volts  
Line to line – 1000 - 2000 volts

The Surge Protection Device shall be ASCO model 430240HP10ACSJ1, or equal.

#### W-46.06 Seal Leak Detector

The seal leak detector shall be compatible with the submersible pump supplied and be Underwriters Laboratories (U.L) listed for use in sewage pumping applications. The Contractor shall coordinate with pump manufacturer to determine specific hardware required for stator temperature and seal-leak detection. The detector shall have the following features:

- 1.) The unit shall employ low voltage, low current, conductivity probe type liquid level detection.
- 2.) 120 VAC, 60 Hz, operating voltage.
- 3.) The alarm output shall be an SPDT 10 amp, 250 VAC relay contact with a minimum 2000 VAC isolation to probe.
- 4.) Probe supply characteristics - sensitivity, 4.7K to 100K OHM, adjustable; voltage, 24 VAC, 60 Hz; current, 2mA maximum.
- 5.) Eight pin octal-type plug (provide matching screw terminal sockets).
- 6.) The unit shall be housed in a high-impact plastic dust cover.

The seal leak detector shall be MINI-CAS for Flygt pumps and Crouzet model PNRU110A or equal for other manufacturers.

#### W-46.07 Panel Mount Fuse Holder and Fuse

Panel mount fuse holders shall be rated for a minimum of 15 amps, 250 VAC. They shall accommodate 0.25 by 1.25-inch glass fuses and have a bayonet type knob. Terminations shall be by 0.25-inch Quick-Connect. Fuse holders shall be Bussman HKP, or equal.

Fuses shall be 0.25 by 1.25-inch slow blow, dual element, glass body with ratings as shown or required. Fuses shall be Bussman MDL series, or equal.

#### W-46.08 Power Phase Monitors

Phase Monitors shall be provided and installed as shown on the Drawings and specified herein. The unit shall have the following features:

- 1.) Adjustable in voltage
- 2.) input— 240 volt, 3-phase, 60Hz, 4-wire delta, utility service
- 3.) adjustable voltage range control
- 4.) SPDT relay operation and LED indication shall be triggered by phase loss, low voltage, power failure, or improper phase sequence.
- 5.) LED indication shall be on when voltage is normal— off with fault
- 6.) relay shall operate if fault lasts more than 2.0 seconds.
- 7.) relay shall release after voltage is normal for 5.0 seconds
- 8.) relay contact rating— 10 Amps
- 9.) mounting— 8-pin plug-in— provide socket for DIN rail

Phase Monitor PM2, PM3, and PM4 shall be model SLA-230-ASA as manufactured by ATC Diversified Electronics, or equal.

#### W-46.09 Phase Monitor Fuse Holders and Fuses

The Fuse Holders shall be three-pole, 600V rated units suitable for use with Class CC, rejection type fuses. They shall be UL listed for branch circuit protection, and have a fuse withstand rating of 200 kA. The handle shall isolate the fuse from the circuit when installing or removing fuses— no special tools shall be required to insert or remove fuses. The fuse holder shall be provided with a blown fuse indicator to allow for easy troubleshooting. The fuse holder shall mount on a standard DIN rail.

The Fuse Holder shall be model 1492-FB3C30-L as manufactured by Allen Bradley, or equal. The fuses shall be Bussmann Limitron fast acting model KTK-R or equal, with the ampacity shown on the Drawings.

#### W-46.10 AC Current Sensor

The AC Current Sensor shall be a split core transducer used to convert a monitored AC current to a proportional 4-20mA output. The sensor shall comprise a current transformer, power circuit, precision rectifier, high-gain servo amplifier, and span and zero adjustments in one UL listed package. The sensor shall have three user selectable amp ranges, 0 to 10 Amps, 0 to 12 Amps, and 0 to 50 Amps. The two-wire loop powered 4-20mA output shall be available on two 6-32 screw terminals. The sensor shall meet the following performance parameters:

- 1.) operating temperature— -55 to +65°C.
- 2.) accuracy— +/- 0.5% of full scale
- 3.) repeatability— +/- 0.1% of full scale
- 4.) frequency— flat from 20-100 Hz
- 5.) response time— 100 msec (10 to 90%)
- 6.) ripple— less than 10 millivolts
- 7.) voltage supply— 21 to 40VDC

The AC Current Sensor shall be model SC200-1 with three selectable ranges (0-10A, 0-20A, and 0-50A) as manufactured by Enercorp Instrument Ltd, or equal.

#### **Pump Control Panel**

The pump control panel shall be as defined in Sections W-46.01 General, W-46.02 Control Enclosures and Panels and shall contain, but not limited to the components listed in the sections W-46.11 thru W-46.25:

#### W-46.11 Switches and Push Buttons

Switches and push buttons shall be heavy-duty, oil-tight, watertight, NEMA Type 4X, corrosion resistant units intended for industrial applications. The operator shall mount in a 1.20-inch diameter opening and be provided with the proper legend plate.

Switches and push buttons shall be as manufactured by Square D, General Electric, Allen Bradley, or equal.

#### W-46.12 Pilot Lights

Pilot lights shall be heavy-duty, oil-tight, NEMA Type 4X, corrosion resistant, push to test,

light emitting diode (LED) type, rated for 120VAC, and intended for industrial applications. The operator shall mount in a 1.20-inch diameter opening and be provided with the proper legend plate and lens color.

Pilot lights shall be as manufactured by Square D, General Electric, Allen Bradley, or equal.

#### W-46.13 Control Relays

- a. Multicontact- Unless otherwise noted, relays shall have a minimum of two (2) form C contacts rated at 10 amps, 120 VAC. They shall be of the type, which utilizes the circular plug system with hold down springs. Each relay shall be provided with an indicator lamp to show its status. The covers shall be dustproof, and manufactured of a clear polycarbonate material. The relays shall be Model KRPA as manufactured by Potter & Brumfield, Struthers Dunn, Square D, or equal.
- b. Timing relays shall have DPDT, 10 amp, 120 VAC contacts. Timers shall be solid-state and adjustable as required. They shall utilize a plug in base mounting system. Timing relays shall be Model 328 as manufactured by ATC, Potter & Brumfield or equal.
- c. NEMA Type Relays shall have two (2) normally open, 10 amp, 600 VAC, convertible instantaneous contacts. They shall have plug-in contact cartridges for easy contact conversion and replacement. Contact conversion shall be capable without removing terminal screws or wires. Coil voltage shall be as shown on the drawings or as required. NEMA Type Relays shall be Model X as manufactured Square D or equal.

#### W-46.14 Instrumentation Signal Multicontact Relays

Relays for switching instrumentation level signals shall have the following features: 120VAC coil; 4PDT Ag-Pd alloy bifurcated crossbar contacts; socket mount; sealed plastic cover; and hold-down spring.

The contact ratings shall exceed the requirements for the application, and shall be no less than 1 Amp at 120VAC. The expected life shall be a minimum of 200,000 operations at rated load.

The socket shall be of the surface or rail-mount design with screw terminals to facilitate circuit connections.

The relay shall be Idec model RY42, with model SY4S-05 socket, or equal.

#### W-46.15 Elapsed Time Meters

Elapsed time meters shall be furnished and installed where shown. Time meters shall register up to 9999.9 hours, be non-resettable, have square cases suitable for panel mounting, and have coils for 120 volt, 60 Hz operation. The units shall be as manufactured by Eagle Signal, Crammer, or equal.

#### W-46.16 Sewage Pump Controller / SCADA / Radio (PCSR)

The Sewage Pump Controller / SCADA / Radio subassembly comprises a programmable logic controller (PLC) based system engineered to provide duplex pump control, supervisory control and data acquisition (SCADA), and radio telemetry in one assembled package. The components shall be mounted on an aluminum sub-panel and be fully wired, tested, and ready for field connections via conveniently located interface terminals. The subassembly shall operate on a 120 Volt, 60 Hz, single-phase power supply and shall have integral transient voltage protection.

The PCSR shall be a Motorola ACE3600 package as distributed by Star Controls, Automated Controls, Curry Controls, Rocha Controls or Cayzo Consulting Inc. The Contractor shall coordinate his efforts with Star Controls, Automated Controls, Curry Controls, Rocha Controls or Cayzo Consulting Inc. to ensure system compatibility, performance, and security. The Contractor shall provide and install a complete control system package as programmed Star Controls, Automated Controls, Curry Controls, Rocha Controls or Cayzo Consulting Inc. The existing Pump Station DCR controls shall revert to the City as a spare.

The following is a partial list of PCSR features:

1. Motorola ACE3600 remote terminal unit (RTU) with surge / lightning protection for power line and antenna shall be provided.
2. One Mixed I/O modules shall be provided.
3. A MOTOTRBO XPR5350 radio UHF R1 (430-470) MHz, shall be provided.
4. Provide one mixed signal auxiliary input/output interface board # ACE-V245-AUX-I/O with DC to DC plug in power supply# ACE-AUX-DCPS.
5. The pump controller shall operate independently of the SCADA / telemetry system in the event of communications loss.
6. DC power circuits derived from the RTU and feeding external loads shall be individually fused as required. Fuses shall have indicator LEDs to indicate fuse has blown.
7. A back-up pump controller shall be provided to facilitate emergency overflow protection in the event of RTU failure.
8. Interposing control relays shall be provided as required.
9. Terminal blocks shall be arranged, and separated as follows: main power distribution block; 120VAC power; 24VDC power; RTU DC power bus.
10. All wires shall be permanently identified using a computer generated labeling system. All terminal numbers and identifying nomenclature shall correspond to and be shown on the electrical diagrams and schematics.
11. All external wiring shall terminate on terminal blocks.
12. The RTU shall provide both digital and analog inputs for use in monitoring and control. 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).
13. Battery back-up power shall be provided for the RTU so that monitoring is maintained during Utility power failures. The battery shall have the capacity of operating the RTU for a minimum of four hours. The power supply shall keep the batteries at float charge. The RTU shall contain a low battery cutout circuit, and the batteries shall not be damaged by deep discharges.
14. Local manual pump control is provided by Hand-Off-Auto (HOA) 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 or OFF positions.
15. The capability to remotely override or disable individual pumps shall be provided (local switches must be in the AUTO position).
  16. The RTU shall have the capability to test the back-up pump controller by creating a high level condition and verifying that the back-up controller functions properly. In the event of a controller failure, the RTU will send an alarm to the Central HMI.
  17. Capability shall be provided to configure from two to four pumps.
  18. Individual pump run status shall be reported to the Central HMI.
  19. The following pump failures shall be reported to the Central HMI: fail to start; fail to stop; premature stop; drive fault; and stator over temperature.
  20. RTU configuration parameters shall be adjustable locally and remotely from the Central HMI.
  21. A fail-safe input shall be provided indicating cabinet intrusion.
  22. The RTU shall have the latest RTU SCADA application license compatible with the existing Central HMI configuration.
  23. The following spare shall be provided:
    1. One (1) Motorola ACE 3600 RTU
    2. One (1) AC Power Supply
    3. Two (2) Mixed I/O
    4. Two (2) SCADA Interface Boards

#### W-46.17 Wet Well Level Monitoring System

The wet well level monitoring system shall be of the ultrasonic type. It shall consist of a transducer element and a transmitter/electronics package.

The transducer shall use a PZT ceramic element with a nominal operating frequency of 50kHz. The transducer shall have a range of 1 to 32.8 ft. The transducer shall convert a 24-volt input from the electronics package to a 3,000-volt peak-to-peak echo pulse. The transducer shall be Factory Mutual (FM) approved for use in a Class I, Div.1, group A, B, C, & D location. The transducer shall be rated intrinsically safe for zone 0. The transducer cable length shall be as required to provide a splice-free mechanization.

The transmitter/electronics package shall operate from 115Vac, 60Hz or 10 to 28Vdc power source. The unit will automatically switch to the dc source when Utility power is lost. The transmitter shall be compatible with a full line of transducers. The unit shall be simple to program via a hand-held programmer or laptop computer. Basic set-up and advanced echo analysis and diagnostics software shall be provided. A 4-20 mA output and two alarm relays shall be provided. A flashing LED shall indicate healthy status. An integral keypad and LCD display shall be provided. The accuracy shall be 0.25% of measured range and the resolution 0.1% of measured range. The unit shall be tropicalized and be housed in a NEMA 4X enclosure.

The wet well monitoring system shall be as manufactured by Pulsar, Inc., or equal (Transducer— dB10; Transmitter— Blackbox130, Part #: 130D110000X4-X0P).

#### W-46.18 Single-Phase (SPD-2)

The SPD shall be able to suppress lightning induced voltage surges three times greater than the industry standards. The rated line voltage for SPD shall be 120 VAC single-phase, 3-wire (line, neutral, and ground). The maximum single impulse current shall be 2.5 kA.

- 1.) The clamp voltages for the SPD shall be the following:
  - Line to neutral – 620 volts
  - Line to ground – 850 volts
  - Neutral to ground- 850 volts

The Surge Protection Device shall be Phoenix Contact PT 2-PE/S-120AC/FM model 2856812, or equal.

#### W-46.19 Panel Mount Terminal Blocks

Control terminal blocks shall be single pole units constructed of a polyamide plastic base with wire clamp terminals attached. The terminals shall be rated for 30 amps, 600 volts. The terminals shall accommodate #24 to #10 AWG conductors. The block shall mount on an aluminum DIN rail.

The terminal blocks shall be style UK5N, as manufactured by Phoenix Contact, or equal.

#### W-46.20 Control Panel Intrusion Sensors

The control panel intrusion sensors shall be of the inductive proximity type, with an 18mm diameter cylindrical, short barrel body. The supply voltage rating shall be 12-24 VDC. The interface circuitry shall be standard 3-wire, PNP, shielded, and rated for a maximum load of 200mA, 600Hz. The output shall be normally open (N.O.) with short circuit protection. The unit shall have a temperature range of –13 to 158 degrees F. The detecting distance shall be 5mm, with a LED indicator.

The proximity sensor shall be Omron, model E2F-X5F1 (Grainger # 1EA77) with Square D mounting hardware model XSZB118 (Grainger 5B233), or equal.

#### W-46.21 Control Transformers

The control transformer shall be an individual output type for primary and secondary voltages as shown. The secondary shall be grounded and circuit breaker protected. The control transformer shall have sufficient capacity to provide the energy demands for all connected control components including relays, solenoids, and other indicated items.

The electrical performance shall exceed the requirements of ANSI/NEMA ST-1. The transformers shall be as manufactured by Square D, General Electric, Westinghouse, or equal.

#### W-46.22 Back-Up Pump Controller and High-Level Alarm Float Switch

The Back-Up Pump Controller shall be designed to run one or two pumps for a fixed time interval, set by the user, when the primary wet well level controls fail. The unit shall monitor the status of the High-Level Alarm Float Switch in the wet well and start up to two pumps when

high water level closes the switch. When the switch closes, the back-up unit closes a relay that starts Pump #1 and starts an internal Timer #1. When Timer #1 reaches its set time, and the level-alarm float switch is still closed, Pump #2 is started. Pump #1 and Pump #2 will run until the level-alarm float switch opens. When the switch opens, Timer #2 is started and both pumps continue to run until Timer #2 reaches its set time.

The Back-Up Pump Controller shall be Wilkerson model DR1920, or equal.

The float shall be SPDT mercury switch with polypropylene casing, built in weight, and 30' cord length, as manufactured by Anchor Scientific Roto-Float, Type S, or equal.

#### W-46.23 Level Monitor Backup

The Level Monitor Backup shall consist of output connections to the Auxiliary inputs of the PCSR ACE Power Supply.

#### W-46.24 Process Meter

The Process Meter shall indicate the wet well level (in feet) as received from the station's proposed level detection system.

The process meter shall include 4-20 mA input and a 4-20 mA output with the following:

- 1.) 4-Digit 1.20" (30.5 mm) display
- 2.) Max/Min display
- 3.) Type 4X, NEMA 4X, IP65 front
- 4.) Universal power supply 85-265 VAC
- 5.) 24 VDC @ 200 mA transmitter power supply
- 6.) Shallow depth case 3.6" behind panel
- 7.) Sunlight readable display

#### W-46.25 Area Light Switch

General: Provide toggle switch of specification grade rated 20-amperes, 120-277 volts ac conforming to Fed. Spec. WS 896 and UL Standard 20. Switch shall be provided with back and side wired binding screw type terminals, one-piece spring contact arm and terminal plate with silver alloy contacts, one-piece steel mounting strap with an assured grounding clip. Provide ivory toggle.

The Area Light Switch shall be single-pole switch, Hubbel model HBL1221, or equal.

#### Miscellaneous

An emergency receptacle, lightning arrester, meter socket, and line-side phase monitor shall be installed and as defined in sections W-46.26 Emergency Receptacle, W-46.27 Lightning Arrester, W-46.28 Meter Socket, W-46.29 Line-Side Phase Monitor, W-46.30 Junction Boxes and W-46-31 SCADA Antenna.

#### W-46.26 Emergency Receptacle

The emergency receptacle shall be of the heavy-duty, circuit breaking type with a weatherproof aluminum housing. The current rating shall be as shown with an operating voltage of 600 VAC. The receptacle assembly shall include a wiring box and angle adapter. The receptacle shall be equipped with a 4-pole exposed contact interior (reversed contacts). The receptacle shall be provided with a spring-loaded cap to cover the contacts when the receptacle is not in use.

The emergency receptacle shall be Crouse-Hinds Arktite w/ AJA6 angle adapter, model AREA 10415-S22, 600V 100A with back box, angle adapter, 1-1/2" hub and spring cover, or equal.

#### W-46.27 Lightning Arrester

The lightning arrester shall be suitable for use in a four wire grounded service and have a rating of 650 VAC phase to ground maximum. The unit shall have a 2300 - 3800 volt impulse sparkover and an 800 - 1600 volt rms 60 Hz sparkover. Provisions for mounting shall be as shown or required and shall be supplied by the same manufacturer as the arrester. The lightning arrester shall be as manufactured by Square D, General Electric, or equal.

#### W-46.28 Meter Socket

The meter socket shall be of ringless aluminum construction with a large closing plate and quadplex ground. The meter socket shall contain a 3-phase, 4 wire and a lever bypass.

The meter socket shall be Milbank, model UAP3506-XL-TG-HSP, 600 VAC, 125 AMPS.

#### W-46.29 Line-Side Phase Monitor

A Phase Monitor, PM1, shall be provided and installed on the line-side of the utility main as shown on the Drawings and specified herein. See section W-46.08 Power Phase Monitors for features.

#### W-46.30 Junction Boxes

A pump motor junction box and instrumentation junction box shall be provided and installed as shown on the drawings and specified herein. Junction boxes shall be NEMA 4X, stainless steel with hinged doors and a stainless steel louver plate kit.

The junction box shall be Wiegmann or equal.

#### W-46.31 SCADA Antenna

The SCADA antenna shall be a UHF Yagi-Uda of 360-degree fully welded gold anodized construction. The antenna frequency shall be 450-470 MHz, 3 elements, 7.1 dBd gain, 17 dB front-back ratio with 20-3/16" boom length and 7/8" boom diameter.

The SCADA Antenna shall be Laird Technologies, model Y4503, or equal.

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## SECTION 48 – HEAVY-DUTY DOUBLE THROW FUSIBLE SWITCH

### W-48 GENERAL

Furnish and install a Heavy-Duty Double Throw Fusible Switch (DTFS) having the ratings, features / accessories and enclosures as specified herein and as shown on the Contract Drawings.

#### 1. REFERENCES

- A. The double throw switch and all components shall be designed, manufactured and tested in accordance with the latest applicable standards of UL and NEMA as follows:
  - 1. UL 98
  - 2. NEMA KS-1

#### 2. SUBMITTALS – FOR REVIEW/APPROVAL

- A. The following information shall be submitted to the Engineer:
  - 1. Dimensioned outline drawing
  - 2. Conduit entry/exit locations
  - 3. Switch ratings including:
    - a. Short-circuit rating
    - b. Voltage
    - c. Continuous current
  - 4. Fuse ratings and type
  - 5. Cable terminal sizes
  - 6. Product data sheets

#### 3. SUBMITTALS – FOR CONSTRUCTION

- A. The following information shall be submitted for record purposes:
  - 1. Final as-built drawings and information for items listed in section 2, and shall incorporate all changes made during the manufacturing process.

#### 4. QUALIFICATIONS

- A. The manufacturer of the assembly shall be the manufacturer of the major components within the assembly.
- B. For the equipment specified herein, the manufacturer shall be ISO 9001 or 9002 certified.
- C. The manufacturer of this equipment shall have produced similar electrical equipment for a minimum period of five (5) years. When requested by the Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

5. RATINGS

- A. Provide safety switch as shown on drawings with the following ratings:
  - 1. 30 to 800 amperes
  - 2. 600 Volts AC
  - 3. 3 pole
  - 4. Upper utility switch shall be: fusible
  - 5. Lower emergency switch shall be: fusible
  - 6. Mechanical lugs suitable for aluminum or copper conductors.

6. CONSTRUCTION

- A. Switch blades and jaws shall be visible and tin plated copper,
- B. The switch shall have a red handle that is easily pad-lockable with three 3/8-inch shank locks in the OFF position. The handle shall also be pad-lockable (with one lock) in the two remaining positions.
- C. Switches shall be of double throw design such that both switches may not be closed simultaneously. Handle operation shall have an “off” position between the two on positions,
- D. Switches shall have deionizing arc chutes,
- E. Switches shall have factory-installed ground lug kit.
- F. Switch assembly and operating handle shall be an integral part of the enclosure base.
- G. Switch blades shall be readily visible in the “ON” and “OFF” position,
- H. Switch operating mechanism shall be non-teasable, positive quick-make/quick-break type. Bail type mechanisms are not acceptable,
- I. Fusible switches shall be labeled as suitable for service entrance equipment,
- J. Switches shall have a solid or switched neutral as shown on the drawings,
- K. Switches shall have line terminal shields,
- L. Switches shall be suitable for systems capable of 100 kA at 600 V,
- M. Embossed or engraved ON-OFF indication shall be provided,
- N. Double-make, double-break switch blade feature shall be provided,
- O. Renewal parts data shall be shown on the inside of the door.

7. ENCLOSURE

- A. Enclosure shall be NEMA 4X
- B. Paint color shall be ANSI 61 gray
- C. 600 and 800 amp enclosures shall include a “Z” mounting channel on the back for assistance in mounting.
- D. 600 and 800 amp switches shall be equipped with lifting eyes.

8. ACCESSORIES
  - A. The following accessories shall be provided:
    1. Factory installed neutral kit
    2. Factory installed ground lug kit
    3. Factory installed Class R fuse clips
9. SPARE PARTS.

The Contractor shall furnish two complete sets of each fuse type as spare parts.
10. FACTORY TESTING
  - A. The following standard factory tests shall be performed on the equipment provided under this section. All tests shall be in accordance with the latest version of UL and NEMA standards.
    1. Insulation check to ensure the integrity of insulation and continuity of the entire system
    2. Visual inspection to ensure that the switch matches the specification requirements and to verify that the fit and finish meet quality standards
    3. Mechanical tests to verify that the switch's power sections are free of mechanical hindrances
    4. Electrical tests to verify the complete electrical operation of the switch and to set up time delays and voltage sensing settings of the logic.
  - B. The manufacturer shall provide three (3) certified copies of factory test reports.
11. INSTALLATION
  - A. The contractor shall install all equipment per the manufacturer's recommendations and the contract drawings.
  - B. All necessary hardware to secure the assembly in place shall be provided by the Contractor.
  - C. The equipment shall be installed and checked in accordance with the manufacturer's recommendations.
12. FIELD SERVICE
  - A. The manufacturer of the DTFS shall also have a national service organization that is available throughout the contiguous United States and is available on call 24 hours a day, 365 days a year.
13. MANUFACTURER
  - A. The DTFS shall be a DT323FWK Eaton as specified on plans, or equal.

\* \* \*

## SECTION 49 - GRAVITY SEWER REHABILITATION BY CURED-IN-PLACE PIPE (C.I.P.P.)

### W-49.01 Scope of Work

This specification covers the materials and method of application for the rehabilitation of gravity sewers through the use of C.I.P.P.

The proposed location for gravity sewer rehabilitation by C.I.P.P. is as shown on the Plans.

The Contractor shall furnish all labor, materials, and special equipment required to accomplish the work in accordance with these specifications. The installation shall affect the complete interior relining of the existing sanitary sewer piping and shall result in a smooth, hard, strong, and chemically inert interior finish closely following the contours of the existing piping. The Contractor shall provide a completed system with trunk sewer and all lateral connections in operational condition.

The Contractor shall provide all necessary television monitoring and cutting equipment and perform all work required to cut out unnecessary liner material at the locations of all existing lateral pipes and reestablish service to all laterals entering the trunk sewer. **All television inspection videos to be provided to the City shall be on DVD or USB and a Microsoft Access Database (MDB) file.**

The actual sizes, lengths, and materials of the pipes to be relined shall be as indicated in the contract documents, subject to verification by the Contractor prior to commencing the lining installation.

The Contractor shall provide all water, piping, hoses, valves, or connections necessary to complete the lining process.

### W-49.02 ASTM Standards

The proposed rehabilitation by CIPP shall be in accordance with these specifications and the applicable reference standards from the American Society for Testing and Materials, such as: ASTM F1216 (Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube), ASTM F1743 (Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)), ASTM D5813 (Cured-in-Place Thermosetting Resin Sewer Pipe), ASTM D790 (Test Methods for Flexural Properties of Un-reinforced and Reinforced Plastics and Electrical Insulating Materials), and D2990 (Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics) which are made a part hereof by such reference and shall be the latest edition and revision thereof. In case of conflicting requirements between this specification and these referenced documents, this specification will govern.

### W-49.03 Qualification of Pipelining Contractor



The prospective Contractor must be approved, in writing, by the Engineer prior to the award of the contract. The Contractor shall provide any information or documentation which the Engineer may require as proof of the Contractor's competency to perform work of the type herein specified.

Minimum requirements for approval by the Engineer shall be as follows:

- (1) The Contractor shall have been engaged in the business of furnishing and installing the C.I.P.P., and shall have been performing work of similar type, magnitude, and difficulty for a period not less than 5 years and shall also have successfully installed at least 1,000,000 feet of a cured-in-place product in wastewater collection systems. Work performed in non-wastewater systems will not be accepted.
- (2) The Contractor shall submit a resume' and list of projects of similar complexity in wastewater collection systems only, which have been successfully completed by him in the past.
- (3) The Contractor shall be capable of providing test data supporting the long-term strength, corrosion resistance, and 50-year design life of the liner. These tests shall be based on the following standards:
  - a) Material tested shall be identical to those proposed for installation and from samples of material in final resting place after the trauma of installation and/or reforming of the product. Testing shall be in accordance with applicable ASTM standards. Laboratory samples will not be acceptable.
  - b) Short-term tests can be extrapolated using actual short-term test data and applicable ASTM standards for plastic pipe.
  - c) All test data (whether theoretically extrapolated or actual) must be validated by an independent third party qualified in these testing procedures.
- (4) The Contractor shall be responsible for providing one (1) restrained CIPP sample test at a frequency of 1 test per every 5,000 ft lined or 1 test per every work order issued, or as directed by the Engineer, at the Contractors own expense.

The test shall be based on the following standards:

- a) The physical properties and thickness shall be tested in accordance with applicable ASTM standards and the report shall be submitted for review by the Engineer. The restrained sample shall be a minimum of 8-inches in length and full diameter of the pipe size being lined.
- b) If any test sample results are unsatisfactory, the City reserves the right to increase the testing frequency at no additional cost.
- c) The sample test must be validated by an independent third party qualified in these testing procedures such as Specialty Testing Services, Birmingham,

Alabama or equal. If the minimum thickness and physical properties are not met as set forth in the contract documents the contractor shall repair or replace the liner. The proposed repair method shall be submitted to the Engineer for approval.

#### W-49.04 Accuracy of the Plans

To the greatest practical extent, the Plans will depict the details of the work, including the locations and numbers of all manholes, distances between manholes, locations of junctions, pipe sizes, manhole depths, etc. However, the Contractor shall verify all dimensions, including lengths between manholes by field measurement. The Contractor shall also be aware that minor variations in pipe diameter and circumference will occur, and that it is not intended that such minor variations be indicated on the Plans.

#### W-49.05 Inspections

Prior to commencing the C.I.P.P. installation, the Contractor shall thoroughly clean all piping to be relined and shall inspect the piping utilizing closed circuit television. All television inspection shall utilize a radial view (pan and tilt) closed-circuit color television camera capable of viewing the entire circumference of the pipe. DVD(s) or USB(s) and a Microsoft Access Database (MDB) file of the piping to be lined shall be made available to the City for inspection before proceeding with the work. Only certified trained personnel of the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) shall perform the inspection.

The Contractor shall prevent sand or debris from becoming trapped between the existing pipe and its finished liner, or infiltration caused by damage done during the cleaning process. Grouting of laterals or cracks may be required to prevent infiltration and the sand or debris entrapment. If grouting is required, it shall be considered incidental to the lining procedure, and no additional payment shall be made therefor. The grouting of damaged pipelines is required within 48 hours of discovery.

The City reserves the right to inspect the manufacturing of materials. The Contractor shall give appropriate prior notice in order that the City inspector may be on hand to observe the various processes.

No work shall be performed by the Contractor except in the presence of the City of Tampa Inspector unless otherwise approved by the Engineer. The Contractor shall coordinate his work schedule and give timely prior notice regarding his intentions to perform any and/or all parts of the work, in order that the Department's inspector may be on hand. The Contractor shall provide a work schedule a minimum of 2 weeks in advance of starting work to allow for public notification letters to be distributed by the Department. Any work performed in the absence of the Department's inspector is subject to removal and replacement at the Contractor's expense.

Upon substantial completion of the work, the Contractor shall, in the presence of the Department's inspector, inspect the line using a radial view, closed circuit television. The DVD or USB drive thus produced shall be accompanied by a simultaneously produced, narrated sound. The

sound narration shall draw attention to all recognizable defects, imperfections, etc., and the location along the length of the piping shall be accurately noted. In addition, the Contractor shall provide a condition assessment inspection report following the latest version of NASSCO PACP coding and scoring. Also, the locations and all pertinent details regarding the entrance of service laterals into the main trunk sewer shall be accurately noted on the DVD or USB and inspection report. One copy of the DVD or USB and a Microsoft Access Database (MDB) file and inspection report shall become the property of the City.

W-49.06 Materials

All materials used in the lining and in the insertion process shall be of the best respective kinds and shall be as approved in advance by the City. Any materials not approved by the City prior to insertion into the piping shall be rejected and shall be removed and replaced with approved materials at the Contractor's expense.

The finished C.I.P.P. shall generally consist of a polyester or epoxy resin impregnated, needle interlocked, terylene felt thoroughly bonded to the internal circumference of the existing pipe, and an internal polyurethane membrane integrally bonded to the internal circumference of the felt, thus forming a smooth, chemically inert internal flow surface.

Felt Content: The liner felt content shall be determined by the Contractor to ensure a cured thickness of liner as indicated on the Plans. The thickness of the cured liner is to be as specified and shall not include the thickness of the polyurethane inner liner.

Resin Content: The resin content of the liner shall be 10-15% by volume greater than the volume of felt in the liner bag.

Liner Sizing: The liner shall be fabricated to a size that when installed will neatly fit the internal circumference of the pipe to be lined. Allowance for longitudinal and circumferential stretching of the liner during insertion shall be made by the Contractor.

Length: The length of the liner shall be that deemed necessary by the Contractor to effectively carry out the insertion and seal the liner at the inlet and outlet of the manhole. Individual inversion runs may be made over one or more manhole to manhole sections as determined.

Because the actual strength and characteristics of the finished liner will vary considerably, depending on the types and mixing proportions of the resin and hardener used, the type of felt used, the type and amount of filler material used, and the degree of cure, it shall be the sole responsibility of the Contractor to control these variables and to provide a finished liner possessing the following minimum properties:

<u>Design Parameter</u>	<u>Unit</u>	<u>ASTM Test Method</u>	<u>Minimum Value</u>
Tensile strength at yield-20°C	psi	D638	3,000
Flexural Modulus	psi	D790	250,000
Flexural strength	psi	D790	4,500

The Contractor shall provide a liner exhibiting the above minimum properties. Prior approval of shop drawings related to any or all materials or methods of installation shall not relieve the Contractor of this responsibility.

The Contractor shall provide a finished liner which exhibits excellent resistance to those chemicals, liquids, and gases normally found in raw sewage, in particular, hydrogen sulfide gas.

The resin to be used shall be an epoxy or polyester resin with characteristics compatible with the required mechanical and chemical properties previously specified. A sample of each batch shall be made available to the City for testing.

#### W-49.07 Execution

##### Manufacture

It will be necessary for the Contractor to obtain the City's prior approval for all materials or processes and the City shall have the power at any time to order the Contractor to modify or discontinue any practice. All such orders shall be given in writing.

The liner shall be vacuum impregnated with resin not more than 24 hours before the proposed time of installation and stored out of direct sunlight at a temperature of less than 4°C, unless otherwise approved by the Engineer. The Contractor shall designate a location where the CIPP will be vacuum impregnated prior to installation.

The Contractor shall provide all appropriate transport, handling, and protection equipment including refrigerated, or otherwise suitably cooled, transport equipment.

All fabricating and Contractor testing shall be carried out under cover and no materials shall be exposed to the weather until they are ready to be inserted. All materials should be protected from the weather and exposure to ultra-violet light as far as practicable during the manufacture and installation process.

Each liner shall be accompanied by suitable documentation such as a wet out report, indicating time and date of manufacture, felt thickness, number of layers, length of liner, resin types, resin content, catalyst, relevant batch numbers, etc and provided to the City of Tampa inspector for approval prior to installation.

#### W-49.08 Installation

The City shall notify the Contractor upon approval of the line cleaning and inspection report, at which time the Contractor may proceed with operations on the site. The Contractor shall coordinate his schedule for impregnation and insertion of the liner bag with the City, and with due regard for site and weather conditions prevailing at the time.

On the event of insertion being delayed after impregnation by unexpected site conditions but prior to the start of the insertion process, the Contractor shall store the liner, at his own cost, for a further period below 4°C for use when conditions allow.

Prior to beginning insertion of the liner bag, the Contractor shall inspect the cleaned line by use of radial view, closed circuit television cameras, and shall confirm to his own, and the City's, satisfaction that the lines are adequately cleaned. No sewage shall flow through the cleaned line between final acceptance of the cleaned line and insertion of the liner bag. If, however, sewage does flow through the clean line prior to the insertion of the liner, then the Contractor shall, at minimum, reinspect the line by use of a radial view, closed circuit television camera in order to evaluate whether further cleaning is warranted. The decision whether or not to employ additional cleaning operations will be made by the Engineer. Insertion of the bag by the Contractor shall serve as evidence of his acceptance of the condition of the piping.

The liner shall be inverted into the pipeline from a suitable platform located above the manhole or other approved point of inversion. The free open end of the liner bag shall be firmly secured to the inversion platform and the folded liner passed down a suitably reinforced column to a shute or bend leading to the opening of the pipe to be lined. Clean water at ambient temperature shall be supplied to the inversion platform at a rate sufficient to cause controlled inversion of the liner into the pipeline.

Alternatively, the liner may also be pulled into position through a manhole or other entry point with the aid of a power winch that is equipped with a device to monitor the force and prevent excessive tension and liner elongation. Extreme care shall be taken during the installation to prevent damage to the liner. After the liner is in place, the calibration hose shall then be securely attached to the standpipe and clean water at ambient temperature shall be supplied to cause a controlled inversion inside the liner.

By either method, the installation forces exerted on the liner shall be limited so as not to stretch the liner longitudinally by more than 5 percent of the original length.

Rehabilitation by fold and form pipe into existing pipes will not be approved on this contract.

The Contractor shall supply a suitable heat source and water recirculation equipment capable of delivering hot water to the far end of the liner to quickly and uniformly raise the water temperature in the entire liner, once inverted in the pipeline, above the temperature required to commence the exothermic reaction of the resin as determined by the catalyst system employed.

The heat source shall be fitted with suitable monitors to gauge the temperature of the incoming and outgoing water supply to determine when uniform temperature is achieved throughout the length of the liner. Liner installation and curing utilizing steam is considered an acceptable alternative for certain applications and therefore must be approved by the Engineer on a case by case basis.

The finished pipelining shall be continuous over the entire length of an insertion run between two manholes or structures and be as free as commercially practicable from visual defects such as foreign inclusions, dry spots, air bubbles, pinholes, dimples, and delamination. The lining shall be impervious and free of any leakage from the pipe to the surrounding ground or from the ground to the inside of the lined pipe.

The polyurethane inflation bag, permanently bonded and attached to the felt bag, shall remain as an inner liner. This bag shall not be considered as contributing to any of the specified properties required of the liner.

Any defects which, in the judgement of the Engineer, will affect the integrity or strength of the lining, shall be repaired or the liner replaced at the Contractor's expense. Prior to proceeding with any repair work, the Contractor shall recommend the proposed plan to the Engineer for his approval.

End sections, where cut or terminated within manholes, shall be repaired with City-approved products, cut flush with the face of the manhole, and suitably sealed with "Hydro-Tite" waterstops, as manufactured by Gundle Lining Construction Company, Houston, TX, or equal.

All defective work shall be removed and replaced with new material to the full satisfaction of the City.

#### W49.09 Service Connection

The existing service connections shall be reconnected after the curing process has been completed. A radial view television camera-guided cutting device, in conjunction with the service locator log from pre-lining inspection, shall be used to identify and restore the service connections to not less than 90% capacity. A smoothing device shall be utilized to smooth all rough edges after re-establishment. A locator log shall be provided to the City which identifies the location of the lateral connection and which connections were re-established. This work shall be done without excavation.

#### W 49.10 Back-up Equipment

It shall be the Contractors responsibility that all critical equipment necessary to complete the installation of the CIPP liner shall be in good working condition prior to starting construction. Critical equipment shall include service cutting device, brushing tools, CCTV camera, and cleaning equipment. The Contractor shall be required to have one working back-up CCTV camera and cutter and all appurtenances necessary onsite prior to starting construction.

#### W 49.11 Warranty

All C.I.P.P. will be warranted to be free from defects in materials and workmanship for a period of one year from the date of rehabilitation. Should a defect occur during this one year period that is attributable to the C.I.P.P. installation, then this defect shall be repaired at no additional cost to the City within 30 days.

\* \* \*

## SECTION 52 - MANHOLE AND STRUCTURE REHABILITATION

### W-52.01 General

It is the intent of this specification to provide for the rehabilitation of the existing brick and concrete manholes, junction chambers and structures shown on the drawings, specified and directed by the Engineer. The rehabilitation shall consist of a spray applied 100% solids epoxy system, or urethane resin system, as specified herein. All aspects of the rehabilitation shall be done in strict accordance to the manufacturer's instructions.

It is the Contractor's responsibility to comply with OSHA standards and all regulations pertaining to work in confined space entry.

### W-52.02 Submittals

Prior to the commencement of any rehabilitation work, the Contractor shall submit the following to the Engineer for approval:

- 1) A rehabilitation plan detailing the methods, materials and procedures proposed for the rehabilitation of all manholes and junction chambers.
- 2) Mortar and hydraulic cement mix designs detailing the compressive strengths, cement/water ratios, slump, etc.
- 3) Written certification by the protective coating manufacturer stating that the proposed repair material is compatible and acceptable as a substrate for the protective coating to be applied.
- 4) Detailed method of complete containment of debris.
- 5) Description of all the equipment to be used for the rehabilitation.
- 6) Safety plan describing all safety equipment to be utilized in compliance with OSHA standards pertaining to work in confined space entry.

### W-52.03 Surface Preparation

Surface preparation shall be in strict accordance with the approved coating manufacturer's instructions. All surfaces to be coated shall be cleaned with a high pressure water spray (minimum 5000 psi). The use of acid for cleaning purposes will not be allowed. All deteriorated concrete and loose or protruding brick and mortar shall be removed from the wall and benches in order to obtain a smooth and even substrate suitable for the proposed coating system. Surfaces shall be cleaned and abraded to produce a sound and uncontaminated surface with adequate profile and porosity to provide a strong bond between the proposed material and the substrate. All corroded materials shall be disposed of at an off-site location in accordance with all Federal, State, and local regulations. All infiltration shall be stopped with hydraulic cement or other approved means before installation of the coating system. Any voids in the manhole walls shall be sealed with hydraulic cement.

Repair materials shall be applied in strict accordance with the manufacturer's instructions and shall be finished as recommended by the protective coating manufacturer. At minimum, the repair material shall be troweled or brushed to provide a smooth surface with an average profile equivalent to coarse sandpaper to optimally receive the protective coating.

The Contractor shall install bulkheads or plugs in order to prevent extraneous material from entering the sewer lines.

W – 52.05 Epoxy Coating System

The sprayed applied epoxy coating system shall be as manufactured by Raven Lining Systems, Broken Arrow, Oklahoma, or equal. The product shall be a 100% solids, solvent-free ultra high-build epoxy. The finished epoxy shall be resistant to sulfuric acid attack associated with domestic sewage. The epoxy shall be manually sprayed onto the structures or manholes to provide a uniform smooth and even surface.

The minimum finished thickness shall be as specified on the plans. The coating system shall be capable of being applied over wet surfaces without degrading the final product.

The existing manhole and junction chambers shall be prepared for the application of the epoxy system by cleaning and stoppage of infiltration as specified above. Prior to applying the epoxy liner, the entire manhole surface and benches shall be patched and grouted to the extent needed to provide a smooth and even surface to which the liner will adhere.

The cured epoxy system shall conform to the minimum physical standards, as listed below:

CURED EPOXY	STANDARD	LONG-TERM DATA
TENSILE STRENGTH	ASTM D-638	7,500 psi
FLEXURAL MODULUS	ASTM D-790	600,000 psi
FLEXURAL STRESS	ASTM D-790	13,000 psi
COMPRESSIVE STRENGTH	ASTM D-695	18,000 psi

The Contractor shall provide certified independent, third party test results verifying the minimum physical properties listed above. The tests shall be in conformance with the ASTM specifications listed.

The finished liner shall be cured in strict accordance with the manufacturer's instructions.

Composite systems containing layers of different materials or cured-in-place resin systems that are inflated in the manholes will not be considered as equal.

W- 52.06 Epoxy Paste (Fast Curing and Moisture Tolerant Coating)

The epoxy paste shall be a two-component moisture tolerant, high adhesive 100% solid strength epoxy paste. The epoxy paste shall be a Concrete Polymer Paste (CPP) as manufactured



by EpoxyTec or approved equal. The coating shall be capable of curing underwater and shall be trowel applied up to 1.5-inches thick without sag.

Concrete surfaces shall be prepared for the application of the epoxy paste by cleaning and stoppage of infiltration as specified above. Prior to applying the epoxy paste, concrete surfaces shall be repaired to the extent needed to provide a smooth and even surface to which the liner will adhere.

The epoxy paste shall conform to the minimum physical standards, as listed below:

CURED RESIN	STANDARD	LONG-TERM DATA
TENSILE STRENGTH	ASTM D-638	8,900 psi
FLEXURAL STRESS	ASTM D-790	8,020 psi
FLEXURAL MODULUS	ASTM D-790	720,000 psi

The tensile bond to wet concrete shall be a minimum 525 psi. The Contractor shall provide certified independent, third party test results verifying the minimum physical properties listed above. The tests shall be in conformance with the ASTM specifications listed.

The finished liner shall be cured in strict accordance with the manufacturer's instructions.

#### W-52.07 Urethane Resin System

The sprayed applied urethane resin system shall be SprayWall as manufactured by Sprayroq, Inc, Birmingham, Alabama or equal. The finished urethane shall be resistant to sulfuric acid attack associated with domestic sewage. The urethane shall be manually sprayed onto the structures or manholes to provide a uniform smooth surface. The minimum finished thickness shall be as specified on the plans. The coating system shall be capable of being applied over wet surfaces without degrading the final product.

The existing manhole and junction chambers shall be prepared for the application of the urethane system by cleaning and stoppage of infiltration as specified above. Prior to applying the urethane liner, the entire manhole surface and benches shall be patched and grouted to the extent needed to provide a smooth and even surface to which the liner will adhere.

The cured urethane system shall conform to the minimum physical standards, as listed below:

CURED URETHANE	STANDARD	LONG-TERM DATA
TENSILE STRENGTH	ASTM D-638	5,000 psi
FLEXURAL STRESS	ASTM D-790	10,000 psi
FLEXURAL MODULUS	ASTM D-790	550,000 psi

The Contractor shall provide certified independent, third party test results verifying the minimum physical properties listed above. The tests shall be in conformance with the ASTM specifications listed.

The finished liner shall be cured in strict accordance with the manufacturer's instructions.

Composite systems containing layers of different materials or cured-in-place resin systems that are inflated in the manholes will not be considered as equal.

#### W-52.08 Contractor Qualifications

The manufacturer and installer of the rehabilitation system shall be specialized in the design and installation of the rehabilitation system for at least 5 years. The installer shall be approved and certified in writing by the manufacturer and shall be completely trained in leak repair, surface preparation, and installation of the rehabilitation system. References shall be provided upon request to demonstrate that the installer has successfully used the rehabilitation system in Florida on a minimum of 5 projects, one of which must be at least 5 years old.

#### W-52.09 Thickness Verification and Inspection

The Contractor shall provide a method of verifying the actual coating thickness installed to ensure it meets or exceeds the minimum values specified. The proposed liner thickness verification method shall be submitted to the Engineer for approval.

The Contractor may utilize a wet film thickness gage meeting ASTM D4414 to ensure monolithic coating and uniform thickness during application. A minimum of three readings per 200 square foot area shall be recorded. Documentation on thickness readings shall be conveyed to the Inspector on a daily basis when the coating application occurs.

All phases of the manhole rehabilitations such as surface preparation, bench reconstruction, liner installation, annulus sealing, grouting, curing, testing, etc., will be inspected by the Department's Field Engineering personnel for conformance to the specifications, construction drawings, and liner manufacturer's instructions. The Contractor shall, therefore, coordinate his schedule for the installation of the structural coating system with the field office, and with due regard for site and weather conditions prevailing at the time.

The final manholes shall be completely free of defects.

The Contractor shall inspect all rehabilitated manholes utilizing closed circuit television 24 hours after coating system is complete. The intent of the inspection is to find any deficiencies to the finished liner. Contractor shall repair deficiencies within 1 week of notification. All television inspection videos to be provided to the City shall be in DVD format. One copy of the DVD shall become the property of the City.

#### W-52.10 Rehabilitated Manhole Re-Inspection

The Contractor shall be required to assist in re-inspection of all manholes 10 months after rehabilitation has been completed. The re-inspection shall be completed with but not limited to Maintenance of traffic, surface cleaning, video with a CCTV pole camera, hand tools, as necessary for inspection as required by the Engineer to ensure no system failures have occurred as listed in the Workmanship and Materials Section W-52.11 Warranty. All surfaces to be re-inspected shall be cleaned with a high-pressure water spray (minimum 5000 psi) prior to video with the CCTV pole

camera. The Contractor shall repair deficiencies within 1 week of notification. Re-Inspection shall be completed at no additional cost to the City.

W-52.11 Spark Testing

The coating system shall be spark tested prior to acceptance. The holiday testing shall be in strict accordance with NACE SPO188. After the coating has set hard to touch, it shall be inspected with high-voltage holiday detection equipment. An induced holiday shall be made onto the coated concrete surface and will serve to determine the minimum/maximum voltage to be used to test the coating for holidays at that particular area. The spark tester shall be initially set at 100 volts per 1 mil (25 microns) of minimum specified (not average) film thickness applied but may be increased if it is insufficient to detect the induced holiday. All detected holidays shall be marked and repaired per the manufacturer's recommendations. All costs associated with the testing shall be born by the Contractor. Testing equipment shall be in good working condition and evidence of certified calibration within the last year shall be provided before the detection test equipment shall be used.

W-52.12 Warranty

The Manhole Rehabilitation Contractor shall furnish the City of Tampa with an unconditional 5-year warranty for materials and workmanship. This warranty shall be a guarantee against failure for the warranty period. Failure shall be defined to occur if the rehabilitation system fails to:

1. Prevent the internal damage or corrosion of the structure.
2. Prevent groundwater infiltration.
3. Adhere to existing structure wall.

If any failures occur within the specified warranty period after final acceptance, the Contractor shall repair or restore the structure to its previously accepted state including all materials, labor, and at no additional cost to the City. Repair shall be completed within 30 days of written notification of the failure.

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## SECTION 68 - MISCELLANEOUS PIPE AND FITTINGS

### W-68.01 General

Miscellaneous pipe and fittings include all aluminum, copper, brass, plastic, cast iron soil pipe and fittings. Such pipelines shall be provided where shown or specified.

Completely detailed working drawings shall be submitted by the Contractor for approval by the Engineer in conformance with the requirements of the General Provisions. Such drawings shall show the piping layouts and contain schedules of all pipe, fittings, valves, expansion joints, flexible couplings, hangars and supports, and other appurtenances. When any of the work is of special design, such work shall be shown in large detail and shall be completely described and dimensioned.

Miscellaneous pipelines which are shown in diagram on the Plans shall be arranged clear of other pipelines and equipment and be fitted and installed in a neat and workmanlike manner in accordance with approved shop drawings. An adequate number of unions shall be provided in main pipe and branch pipe runs to facilitate dismantling or removal of pipeline sections without disturbing adjacent branch or connecting lines.

Where connections between pipelines or equipment of corrosion-causing dissimilar metals are required, the junction of the two dissimilar metals shall be made through a dielectric insulating coupling, union, or other approved dielectric insulating device. Dielectric insulating fittings shall be those manufactured by Walter Vallett Company, Detroit, MI; EPCO, Inc., Cleveland, OH; or equal.

Couplings will be permitted only to join standard lengths of pipe and as required to complete a straight run of pipe. Joining by couplings, of random lengths of pipe and cuttings from standard lengths to form a required run, will not be permitted.

Reduced fittings shall be used for all changes in pipe size. Bushings will not be permitted.

### W-68.02 Aluminum Pipe and Fittings

Aluminum pipe shall be ANSI B36.10, Schedule 40, Alloy AA No. 6061-T6 conforming to ASTM B 241. Fittings shall be aluminum forged welding fittings or cast threaded fittings conforming to ASTM B 26 or B 108. Joints shall be flanged or made with aluminum mechanical couplings for use with grooved, flared, or plain end pipe. When grooved couplings are used, the grooves shall be rolled into the pipe in conformance with the coupling manufacturer's specifications. Cut grooves will not be permitted. Fittings and couplings shall be carefully assembled with an approved lubricating compound to prevent seizing of the connection and overstressing of the pipe. For pipelines subject to internal pressure, the lubricating compound shall provide lubrication and sealing.

Supports for aluminum pipelines shall be aluminum, hot-dipped galvanized steel or other approved type painted with a minimum of two coats of high quality aluminum paint before erection.

Where aluminum pipelines are specified to be hot bituminous coated and wrapped, the work

shall conform with the requirements of the Workmanship and Materials section headed "Steel Pipe and Fittings," except that the reinforcing wrap used in conjunction with the coating shall be of borosilicate-type glass fiber.

Plastic tape wrapping may be used for aluminum pipelines in lieu of hot bituminous coating and wrapping. Plastic tape shall be 14 mils minimum thickness Polyken 900 or 980 as manufactured by the Kendal Company; Trantext E-20 as manufactured by Johns-Manville; or equal. The tape shall be applied over the manufacturer's primer and in strict accordance with the manufacturer's instructions. Plastic tape wrapping on pipelines shall be tested using high voltage type detection equipment to signal a holiday across a gap twice as great as the tape thickness.

Where aluminum pipelines are encased in concrete, all pipe and fittings in contact with concrete shall be given 4 coats of asphalt varnish meeting the requirements of Fed. Spec. TT-V-51.

Aluminum pipelines to be painted shall conform to the requirements of the Workmanship and Materials section headed "Painting."

Connections to equipment shall be made with screwed connections or flexible pipe as shown on the Plans. Flexible piping shall be of the same nominal size as that of the connected pipe with a strength adequate for the pipeline pressures specified. Pipe ends shall be securely anchored where connected to flexible piping. Flexible piping shall be helically corrugated metal hose with screwed connections and shall be Series 300, bronze braided, as made by Flexonics, Inc., Bartlett, IL. or equal.

#### W-68.03 Brass Pipe and Fittings

Brass pipe shall be red brass pipe meeting the requirements of ASTM B 43. Pipe sizes, wall thickness, and dimensions shall meet the requirements of ASTM B 251 Table I for regular pipe. Brass pipe fittings shall be screwed and malleable iron pattern meeting the requirements of ANSI B 16.15. They shall be finished rough, unless otherwise specified. Unions shall be of all brass or bronze with ground joints and shall be left semi-finished. Fittings shall be rated for steam working pressures up to 125 psi. Joints shall be screwed type with threads clean cut, tapered and smooth meeting the requirements of ANSI B2.1.

#### W-68.04 Plastic Pipe and Fittings

Plastic pipe and fittings shall be Schedule 80 PVC pipe meeting the requirements of ASTM D 1785 Type 1, Grade 1, normal impact.

Chlorinated polyvinyl chloride (CPVC) shall meet the requirements of ASTM F 441. Plastic fittings shall be solvent welding socket type meeting the requirements of ASTM D 2467 for PVC and F 439 for CPVC unless shown or specified otherwise. Solvent cement for PVC and CPVC plastic pipe and fittings shall meet the requirements of ASTM D 2564. Adequate provision shall be made for pipe expansion.

#### W-68.05 Cast-Iron Soil Pipe and Fittings

Cast-iron soil pipe and fittings shall be extra heavy and shall meet the requirements of

Commercial Standard CS 188 published by the United States Department of Commerce. Pipe and fittings which will not be exposed in the finished work shall have a bituminous lining and coating meeting the requirements of ANSI A21.6. Pipe and fittings exposed in the finished work shall be painted on the outside as specified for cast-iron pipelines in the Workmanship and Materials section headed "Painting."

Joints shall be lead and oakum or rubber gasket compression type. Leaded joints shall be thoroughly caulked with packed oakum and molten lead. Twelve ounces of soft pig or bar lead shall be used in each joint for each 1-inch diameter pipe. The lead shall be poured in at one time. The face of lead joints shall be finished with the face of the hub and left without putty, paint, or cement. Rubber gasket joints shall have gaskets extending for the full depth of the bell and overlapping the face of the bell. All joints shall be leakproof and gastight. Joints made before setting pipe shall be remade after being placed in position.

#### W-68.06 Copper Pipe and Fittings

Copper pipe 3 inches in diameter and smaller shall be Type K hard drawn copper tubing and shall meet the requirements of ASTM B 88. Fittings for copper tubing shall be case-brass solder fittings. Joints shall be threaded or soldered.

Copper pipe larger than 3 inches in diameter shall be regular seamless copper pipe meeting the requirements of ASTM B 42. Fittings for copper pipe shall be solder type of the same material as the pipe. Joints shall be threaded or brazed.

#### W-68.07 Fiberglass Reinforced Plastic Pipe and Fittings

Fiberglass reinforced plastic (FRP) pipe and fittings shall be constructed by filament winding and custom contact molded techniques. The polyester resin used shall be corrosion resistant in the presence of sewage and sewage gases, shall be non-pigmented, and shall be ICI Americas ATLAC 400, Ashland Chemical ARAPOL 7240, or equal. FRP pipe shall be constructed in general in conformance with Voluntary Product Standard PS 15-69.

FRP pipe shall be free from all defects including indentations, delaminations, bubbles, pinholes, scratches, cracks, foreign inclusions, and resin-starved areas. The pipe shall be round and straight and the bore of the pipe shall be smooth and uniform.

The FRP pipe shall be a filament wound laminate with an inner corrosion barrier, a structural layer, and an out corrosion barrier. The inner layer shall be composed of "C" glass surface veil, 10 mils thick, and two layers of 1-1/2 ounce mat. This layer shall be hand rolled and allowed to harden.

The structural layer shall consist of alternate layers of filament wound roving, Type "E" glass, with a layer of 1-1/2 ounce mat embedded in the rovings at the mid-point of construction.

The outer layer shall consist of 1-1/2 ounce mat hand rolled. U.V. inhibitor shall be incorporated in the final coat of resin. The outer surface shall be relatively smooth with no exposed glass fibers.

Flanges shall be custom contact molded on pipe stubs with a liner of "C" glass and additional layers of 1-1/2 ounce mat. Flanges shall be designed for an internal pressure of 25 psi. The flange outside diameter, bolt circles, number of bolt holes, and bolt-hole diameters shall be in accordance with ANSI Class 150. All bolts shall be Type 304 stainless steel.

Cut edges shall be coated with the specified resin.

Mold release agents shall be removed prior to shipment.

FRP pipe and fittings shall be shipped horizontal on padded cradles. All tie-down straps shall have provisions for thermal expansion and shall be padded where in contact with the pipe or fittings. Flange faces shall be protected in shipment by covering with plywood or hardboard securely fastened.

#### W-68.08 Expansion and Flexible Couplings

Provisions for pipeline expansion shall be in accordance with the Workmanship and Materials section headed "Steel Pipe and Fittings."

#### W-68.09 Sleeves and Wall Castings

At all points where pipes must pass through walls or floors of structures where wall castings are not provided, the Contractor shall install suitable sleeves unless shown or specified otherwise. Sleeves inside buildings and between floors shall be of steel with a minimum thickness of Schedule 40 and the space between the pipe and the sleeve shall be caulked with lead and oakum. Sleeves through walls of structures shall be cast-iron solid sleeves meeting the requirements of AWWA C100 with caulked bell and spigot or mechanical joint ends, except as otherwise specified.

Sleeves through walls where piping materials, as scheduled and detailed on the Plans, are not suited for use with cast-iron solid sleeves as previously specified, shall be of steel with a minimum thickness of Schedule 40. Seals shall be modular mechanical type consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and the sleeve. The modular mechanical seals shall be Link Seal as manufactured by Thunderline Corp., Wayne, MI, or equal.

Piping and vents through roofs shall be provided with caulked sleeves and a 6-pound sheet lead flashing consisting of a 24- by 24-inch flat base with a tubular vertical sleeve surrounding the pipe. The tubular sleeve shall turn in at the top of the pipe or be attached to the pipe with a flashing ring, depending on the termination arrangement of the pipe or vent.

#### W-68.10 Cleanouts

Cleanouts shall be provided where shown or specified, and shall meet the requirements of the Workmanship and Materials section headed "Ductile Iron Pipe and Fittings," unless otherwise specified.

#### W-68.11 Laying and Jointing Buried Pipelines

Miscellaneous pipe shall be transported, delivered, and installed in accordance with the requirements of the Workmanship and Materials section headed "Laying and Jointing Buried Pipeline."

#### W-68.12 Erecting and Jointing Interior Piping

All miscellaneous pipelines shall be permanently erected and supporting devices shall be furnished and installed as specified in the Workmanship and Materials section headed "Erecting and Jointing Interior Piping."

#### W-68.13 Insulation

Miscellaneous pipelines shall be insulated where shown or specified and shall conform to the requirements of the Workmanship and Materials section headed "Insulation."

#### W-68.14 Drip Pans

The Contractor shall furnish and install 16-ounce copper polished reinforced drip pans under all metallic pipelines installed over electrical equipment. The drip pans shall be properly drained, tapped, and connected with 1/2-inch red brass pipe into the drainage system.

#### W-68.15 Soil and Waste Piping

All piping for soil or waste, and vent 3 inches in diameter and smaller shall be of copper as specified hereinbefore unless otherwise shown or required. All piping for soil, waste, vent or drain lines 4 inches in diameter and larger, shall be ductile-iron soil pipe as specified hereinbefore unless otherwise shown or required. Screwed cleanouts shall be provided at the ends of all drainage lines, at changes of direction, and at other points to make the entire drainage system accessible for rodding. Cleanouts shall be the same size as piping but not larger than 4-inch diameter and shall be closed gastight with cast-brass cleanout plugs. Cleanouts not accessible below the floor shall be extended to the floor level and provided with deck plate plugs.

Horizontal soil or waste drainage piping 2-1/2 inches in diameter and smaller shall be installed with a minimum uniform pitch of 1/4 inch per running foot. Horizontal soil or waste drainage piping 3 inches in diameter and larger shall be installed with a minimum uniform pitch of 1/8 inch per running foot. Offsets in piping shall be made at angles of 45 degrees or less. Horizontal vent piping shall be graded to prevent an accumulation of water.

Each vent pipe passing through a roof shall be provided with a 6-pound sheet lead flashing consisting of a 24- by 24-inch flat base with a tubular vertical sleeve surrounding the pipe. The tubular sleeve shall turn in at the top of the pipe or be attached to the pipe with a flashing ring, depending on the termination arrangement of the pipe or vent.

#### W-68.16 Hot and Cold City Water Piping

Water piping shall be installed to permit easy drainage of all parts of the system. Low points of water piping shall be provided with a 1/2-inch globe valve, nipple, and 3/4-inch hose coupling.



Swing joints or expansion loops shall be installed where necessary to allow for pipe expansion. Branches from hot water mains shall be provided with at least four fittings, including the tee in the main. Threaded fittings shall be used at swing joints.

All piping shall be sectionally controlled by shutoff valves to permit shutting off groups of fixtures without interrupting service to other parts of the system. All connections to equipment, fixtures, and apparatus shall be provided with shutoff valves. All valves shall be installed with stems on the horizontal or above the horizontal. Valves shall not be installed with stems below the horizontal plane.

Air chambers at least 12 inches long and the same pipe size as the water branch shall be provided at each plumbing fixture. All nipples shall be made of extra heavy pipe. Close nipples will not be permitted.

#### W-68.17 Drains

Piping for floor drains shall be ductile-iron soil pipe as specified hereinbefore. Floor drainage piping shall be pitched as shown or required to give complete drainage. Screwed cleanouts shall be provided at the ends of all drainage lines, at changes in direction, and at other points necessary to make the entire drainage system accessible for rodding. Cleanouts shall be the same size as piping but not larger than 4 inches, unless otherwise shown or specified. Equipment drains shall be 2 inches minimum or larger if required for approved equipment. Equipment drains are only generally located on the Plans. Final locations of equipment drains shall be as required to serve approved equipment.

In the following schedule of drainage appurtenances, catalog numbers refer to items manufactured by Josam or Neenah Foundry. Equal items by Wade, Zurn, or East Jordan Iron Works will be acceptable:

Roof Drains: Josam 4110, 4-inch minimum  
Floor Drains: Josam 3510, 4-inch unless otherwise shown  
Cleanouts: Josam 8310  
Equipment Drains: Josam 3510 with Model FF Funnel  
Gallery Drains: Neenah Model R-4941

#### W-68.18 Painting, Linings, Coatings

Painting shall conform to the requirements of the Workmanship and Materials section headed "Painting."

Linings and coatings, unless specified otherwise, shall be applied to all parts of the pipelines, including fittings, flanges, wall pipes, or castings.

Where buried piping connects to aboveground pipe, the coating or other protection for the buried pipe shall extend 6 inches above finish or other grade given by the Engineer.

#### W-68.19 Pipe Schedule

The following schedule of miscellaneous pipelines is given for information purposes only and should not be deemed to be complete. The schedule of miscellaneous pipelines shall be finally verified by the Contractor. Parts of wall casting sleeves, or piping which extend into a gallery or building shall be painted as specified for the attached pipelines.

The following abbreviations apply to the Schedule:

- AL - Aluminum
- BR - Brass
- CK - Copper - Type K or L
- CPVC - Chlorinated Polyvinyl Chloride
- PVC - Polyvinyl Chloride
- FL - Flanged Joint
- SC - Screwed
- SW - Solvent Welded
- W - Welded
- G - Grooved Coupling
- SD - Soldered
- CB - Cast Brass
- BWH - Hot Bituminous Coating and Wrapped
- PT - Plastic Tape Wrapping
- FX - Flexible Coupling
- EC - Encased in Concrete
- P - Painted
- I - Insulated
- A - Air test pressure, all other test pressures hydrostatic
- NIC - Not In Contact

Schedule of Miscellaneous Pipelines

Service & Location	Diameter Inches	Test		Joint Type	Fitting Type	Protection	
		Type	Pressure Psi			Inside	Outside
Inside Piping Screen & Grit Building #2							
Plant Air	1/4-2	CK	150	SD	CB	-	P
Effluent Water	1/4-1-1/2	CK	100	SD	CB	-	I,P
Plant Water	1-1/12	CK	120	SD	CB	-	I,P
Drains	NIC						

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## SECTION 73–RESTRAINING DEVICES

### W-73.01 General

Restraint devices for mechanical joint fittings and appurtenances conforming to either ANSI/AWWA C111/A21.11 or ANSI/AWWA C153/A21.53, shall conform to the following:

Restraint devices for nominal pipe sizes 3 inch through 36 inch shall consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10.

The devices shall have a working pressure rating equal to that of the pipe on which it is used but a minimum 100 psi. Ratings are for water pressure and must include a minimum safety factor of 2:1 in all sizes.

### W-73.02 Material

Gland body, wedges and wedge actuating components shall be cast from grade 65-45-12 ductile iron material in accordance with ASTM A536.

Ductile iron gripping wedges shall be heat treated within a range of 370 to 470 BHN.

Three (3) test bars shall be incrementally poured per production shift as per Underwriter's Laboratory (U.L.) specifications and ASTM A536. Testing for tensile, yield and elongation shall be done in accordance with ASTM E8.

Chemical and nodularity tests shall be performed as recommended by the Ductile Iron Society, on a per ladle basis.

### W-73.03 Gaskets

Mechanical joint gasket shall be of a design that causes the gasket to deflect approximately 30% during assembly of the mechanical joint. The gasket material shall conform to the requirements of ANSI/AWWA C111/A21.11, section 11-6.4, of the latest revision.

### W-73.04 Traceability

An identification number consisting of year, day, plant and shift (YYDDD) (plant designation) (Shift number), shall be cast into each gland body.

All physical and chemical test results shall be recorded such that they can be accessed via the identification number on the casting. These Material Traceability Records (MTR's) are to be made available, in hard copy, to the purchaser that requests such documentation and submits his gland body identification number.

Production pieces that are too small to accommodate individual numbering, such as fasteners and wedges, shall be controlled in segregate inventory until such time as all quality control tests are passed. These component parts may then be released to a general inventory for final assembly and packaging.

#### W-73.05 Installation

Mechanical joint restraint shall require conventional tools and installation procedures per AWWA C600, while retaining full mechanical joint deflection during assembly.

Proper actuation of the gripping wedges shall be ensured with torque limiting twist off nuts.

#### W-73.06 Approvals

Mechanical Joint Restraints shall be listed by Underwriters Laboratories in the 4 inch through 12 inch sizes.

Mechanical Joint Restraints shall be Factory Mutual Approved in the 4 inch through 12 inch sizes.

Mechanical Joint Restraints, 4 inch through 24 inch, shall meet or exceed the requirements of ASTM F1674 of the latest revision.

Mechanical joint restraint shall be Series 2000PV for PVC pipe and Series 1000 for DIP pipe produced by EBAA Iron Inc. or approved equal.

#### W-73.07 Coating System

Coating for restraint devices shall consist of the following:

All wedge assemblies and related parts shall be processed through a phosphate wash, rinse and drying operation prior to coating application. The coating shall consist of a minimum of two coats of liquid Xylan® fluoropolymer coating with heat cure to follow each coat.

All casting bodies shall be surface pretreated with a phosphate wash, rinse and sealer before drying. The coating shall be electrostatically applied and heat cured. The coating shall be a polyester based powder to provide corrosion, impact and UV resistance.

The coating system shall be MEGA-BOND by EBAA Iron, Inc. or approved equal. Requests for approved equal must submit coating material and process details for review.

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## SECTION 76 - CONDUIT, WIRE, AND GROUNDING

### W-76.01 General

Conduit, wire, and grounding includes furnishing and installing all conduits, underground ducts, bus ducts, wires, cables, and grounding systems as shown, specified, and required for a complete installation. The work includes the furnishing and installation of wires and cables in flexible and rigid conduits, underground ducts, all as required, shown, and specified.

Descriptive literature and technical information relative to conduits, wires, and grounding shall be submitted by the Contractor in conformance with the requirements of the General Provisions.

The Contractor shall, with reference to approved drawings of equipment being installed, prepare detailed plans showing the layout and size of all conduits, ducts, bus ducts, cables and wires, connections between the point of service connection and all utilizing equipment. These plans shall be in sufficient detail to serve as working drawings for the installing electricians. The drawings shall be to scale not less than the Plans and be prepared as the work develops with approval by the Engineer before major steps of work are undertaken.

During construction, careful notes shall be kept of all deviations or changes in the layout or connection diagrams. Upon completion of the work, all working drawings shall be corrected and then marked "Record Drawings". Four sets of final prints, along with an equal number of bound instruction manuals and parts lists shall be given to the Engineer at the end of the job.

Excavation, backfill, form work, concrete, and reinforcing shall be in accordance with the applicable Workmanship and Materials sections.

### W-76.02 Underground Ducts

In general, underground ducts for feeders and control wiring shall be plastic conduit. The plastic conduit shall be PVC, Schedule 80, and U.L. Inc. listed for direct burial, as manufactured by Carlon, Triangle, Allied Tube, or equal. The conduit shall be buried a minimum of 18 inches below grade. Manufactured fitted plastic duct spacers shall be used for installation spacing.

Ducts installed under streets, roads, alleys, driveways, and parking lots; and conduits leading from the wet well to junction boxes; shall be rigid aluminum conduit covered with no less than 40 mils of PVC, as manufactured by Plasti-Bond, Perma-Cote, KorKap, or equal. The PVC material shall conform to the applicable ASTM standards and UL 6A. The conduit shall be buried a minimum of 24 inches below grade unless otherwise noted or allowed by the NEC.

Each duct shall be carefully cleaned before and after installation. All inside surfaces shall be free from imperfections likely to injure the cable. After installation of complete duct runs in sizes 2 inches and larger, ducts shall be snaked with an approved tube cleaner equipped with an

approved cylindrical mandrel of a diameter not less than 85 percent of the nominal diameter of the duct. Ducts through which the mandrel will not pass shall not be incorporated in the work. After snaking, the ends of dead-ended ducts shall be protected with standard conduit caps to prevent the entrance of water or other foreign matter.

Where ducts enter buildings or at stub-ups to equipment, transitions to aluminum conduits shall be made as noted and detailed. Where it is not otherwise shown, all ducts entering buildings and structures shall have transitions to aluminum conduit at least 5 feet from the outermost edge of the pile cap or footing supporting the outermost vertical wall of the building or structure.

Transitions from above-grade rigid aluminum conduit to nonmetallic conduit shall be accomplished with a threaded adapter. Rigid aluminum conduit installed above grade and extending below grade shall include the first 90° elbow. All rigid aluminum conduits extending below grade shall be coated with two coats of an asphaltum-type paint along its entire length below grade and extending 6" above grade or above the top of the finished slab. The asphaltum-type paint shall conform to Fed. Spec. TT-V-51 and equivalent to Koppers Bitumastic Super Service Black.

#### W-76.03 Liquidtight Flexible Nonmetallic Conduit (Size 2 Inch or Less)

All flexible conduits size 2 inch or less in non-classified areas shall be nonmetallic, liquidtight, and have a circular cross section. The conduit shall be resistant to oil, water, heat, sunlight, corrosion, most acids, ozone, alkali, strains, abrasions, and crushing. The conduit shall be rated for continuous use at 140°F and be U.L. Inc. listed. Compatible liquidtight nonmetallic fittings shall be used for conduit installation. The flexible conduit and fittings shall be as manufactured by Carlon, Kellems, K-Flex, or equal.

#### W-76.03(a) Liquidtight Flexible Metallic Conduit (Greater Than 2 Inch)

All flexible conduits greater than 2 inch in non-classified areas shall be metallic, liquidtight, and have a circular cross section. The conduit shall be of a light-weight aluminum core, coupled with a PVC jacket. The conduit shall be resistant to sunlight, acid, and oil. The conduit shall be rated for a working temperature between -20°C to 80°C and U.L. Inc. listed. Compatible liquidtight metallic fittings shall be used for conduit installation. The flexible conduit and fittings shall be as manufactured by Thomas & Betts or equal.

#### W-76.04 Metallic Conduit and Boxes

All conduit shall comply with the requirements of the U.L. Inc. Standards. Conduit shall be delivered to the job site in standard bundles having each length suitably marked with the manufacturer's name or trademark and bearing the label of the U.L. Inc. inspection service. The minimum size conduit service shall be 3/4 inch.

All exposed conduit within buildings and exposed on outdoor structures shall be rigid heavy wall, 6063 alloy, T-1 temper, aluminum conduit. Aluminum conduit shall conform to Fed. Spec. WW-C-540 and ANSI C80.5.

All conduit encased in building structures, exposed in the screen room/wet well area, or otherwise noted, shall be rigid aluminum covered with not less than 40 mils of PVC outside, and 2 mils of urethane inside, as manufactured by Plasti-Bond, Perma-Cote, KorKap, or equal. The physical properties of the PVC and urethane materials shall conform to the applicable ASTM standards and UL 6A.

Cast copper-free aluminum shall be used for outlet boxes and fittings in aluminum conduit systems. Outlet and junction boxes shall be of proper dimensions for each application. Cast metal boxes shall have watertight gaskets and covers secured with stainless steel screws. Outlet boxes shall be Crouse-Hinds type FS, FD, or equal.

PVC coated boxes and fittings shall be used in PVC coated conduit systems.

Conduit fittings, such as elbows, tees, couplings, caps, bushings, nipples, and locknuts shall be constructed of the same material as the conduit and be threaded to provide watertight connections. Conduit bodies shall be copper-free cast aluminum with gasketed aluminum covers secured with stainless steel screws and be type Form 7 or Mark 9 as manufactured by Crouse-Hinds, or equal.

Where it is necessary to use electrical unions, Universal, Erikson, or equal conduit couplings shall be used.

#### W-76.05 Conduit Installation

All conduits shall be installed as required. The conduit system shall be installed complete with all accessories, fittings, and boxes, in an approved and workmanlike manner to provide proper raceways for electrical conductors.

The Contractor shall note that conduit runs shown are for the purpose of outlining the general method of routing the conduits to avoid interferences.

All other conduit shall be run exposed, except where shown otherwise.

Sizes not shown shall be one size larger than indicated in Tables 1 and 4, Chapter 9, of the NEC. Exposed conduit shall be run parallel to or at right angles from walls or beams and plumb on columns and on walls. Conduit shall not be run through beams except where approved by the Engineer or specifically detailed. Where possible, conduit shall be pitched slightly to drain to the outlet boxes or otherwise installed to avoid trapping of condensate. Where necessary to ensure drainage, Appleton Type ECD, Crouse-Hinds, or equal, 1/4-inch drain fitting shall be installed in the trapped conduit at low points.

Factory made bends or elbows shall be used wherever possible. Field bends shall be carefully made to prevent conduit damage or reduction in the internal area. The bending radius shall be not less than six times the nominal diameters of the conduit with carefully matched bends on parallel runs to present a neat appearance. The number of crossovers shall be kept to a minimum.

All conduit shall be reamed to remove burrs before installation. Aluminum conduit shall be cut with a saw to prevent reduction in internal area. To seal out air and moisture, lower electrical resistances, and prevent seizing and galling; aluminum conduit threads shall be given a coat of Aluma-Shield surface compound, as manufactured by Thomas & Betts, prior to assembly. All connections and joints in all conduit runs shall be watertight and ensure a low resistance ground path in the conduit system. All conduit runs shall be swabbed to remove foreign matter before wires are pulled in. Conduit terminations in boxes, panels, switchboards, motor control centers, and other sheet metal enclosures shall be bonded together for grounding and be fitted with insulating bushings, O.Z./Gedney Type A, Thomas and Betts, or equal. Where grounding bushings are required by code or shown, O.Z./Gedney Type SBLG, Thomas and Betts, or equal shall be furnished.

Conduit shall be neatly grouped where several lines follow a parallel course, and shall be well supported, using stainless steel clips or hangers of the ring or trapeze type. Clips, hangers, and support rods shall be held by self-drilling anchors, power-driven fasteners, or stainless steel channel insets in the concrete ceilings or walls. Perforated strap hangers will not be accepted.

Conduit runs that enter the building from outdoors, or that pass through refrigerated or air conditioned areas, are subject to moisture accumulation due to condensation. A pull box shall be provided in the conduit run near the point of temperature change to prevent trapping of moisture within the conduit system. A 1/4-inch weep hole shall be drilled in the bottom of the pull box. After the wires and cables are installed, the end of the conduit continuing into the warmer area shall be packed with a nonsetting sealing compound.

All PVC coated aluminum conduit shall be installed using specialized tools and equipment as recommended by manufacturer. The Contractor shall ensure those installing PVC coated aluminum conduit are certified by the manufacturer prior to beginning installation. Installation of PVC coated aluminum conduit shall not begin until a copy of an unexpired Certified Installer Card for each installer is submitted and approved by Engineer.

#### W-76.06 Conduit Connections to Equipment

The conduit system shall terminate at the terminal box or at the conduit connection point of electric motors, devices, and equipment. Terminations of conduits at such locations shall permit direct wire connections to the motors, devices, or equipment.

Conduit connections shall be made with rigid conduit if the equipment is fixed and not subject to adjustment, mechanical movement, or vibration. Myers water-tight /dust-tight hubs shall be used for outdoor, below grade, or wash down areas. Rigid conduit connections shall have union fittings to permit removal of equipment without cutting or breaking the conduit.

Conduit connections shall be made with approved flexible nonmetallic conduit if the equipment is subject to adjustment, mechanical movement, or vibration. Flexible conduit connections shall be watertight.



### W-76.07 Expansion Fittings

Expansion fittings shall be installed at all expansion joints and where required by codes. Conduit expansion fittings shall be Crouse-Hinds Type XD, O.Z./Gedney Type DX, or equal.

### W-76.08 Terminal, Junction, and Pull Boxes

Junction and pull boxes shall be installed as shown and as required.

Surface-mounted junction and pull boxes, unless specified otherwise herein, shall be of cast aluminum complete with mounting lugs, threaded entry bosses and flange or rabbeted gasketed covers.

Surface-mounted junction and pull boxes which would exceed 50 pounds weight if cast or which are shown as fabricated sheet metal boxes shall be made of 1/8-inch sheet aluminum, or equivalent stainless steel, with sides return channel flanged around the cover opening or with approved welded angle or channel supporting frames. Sheet aluminum boxes shall be provided with mounting lugs or channels and with conduit termination hubs. All seams in sheet aluminum boxes shall be continuously welded and ground smooth. All surface boxes larger than 6 inches square shall be mounted a minimum of 3/4 inch clear of the mounting surface by means of offset lugs or support channels.

Fabricated junction and pull boxes which are partially or fully encased in concrete shall be made of 10-gauge sheet stainless steel and fabricated in a similar manner to the sheet aluminum pull boxes specified herein, complete with mounting lugs or channels and conduit termination hubs. Cast aluminum boxes shall be provided in smaller sizes where required for full or partial encasement in concrete.

All junction and pull boxes shall be provided with covers or doors as shown or required. Covers and doors shall be fabricated of materials equal in weight, gauge, structure, and metallic composition as the basic box. All covers shall be gasketed and held in place with stainless steel captive knurled head screw slot bolts. All pull and junction boxes shall be provided with hinged doors. Doors shall have continuous hinges, and 3-point catches with external handles and hasps for padlocks. All doors shall be gasketed.

All boxes shall be provided with partitions as shown and as required.

Fabricated boxes shall be rated NEMA 12 for indoor, above grade areas; rated NEMA 4X for outdoor areas; and manufactured by Hoffman, Hope, or equal.

### W-76.09 Hazardous Areas

All conduit and equipment installed in or routed through hazardous areas, as well as other electrical appurtenances installed therein, shall be installed to conform in every respect to Chapter 5 of the NEC for Class I, Division 1, Group D hazardous locations. All material installed in

hazardous areas shall be listed as complying with the requirements of the U.L. Inc. for use in Class I, Group D atmospheres. Terminal Boxes and Enclosures mounted in Hazardous Areas shall be NEMA 7, cast aluminum.

Sealing shall be provided for all conduits within and leaving hazardous areas as required.

#### W-76.10 Grounding System

A complete grounding system shall be in accordance with applicable ANSI, IEEE, and NEC Standards and local codes.

All noncurrent-carrying metal parts of the electrical wiring system shall be grounded. The grounding system shall include, but not be limited to, the following:

1. Motor control center controllers, ground bus, and enclosures.
2. All motor frames.
3. All conduit systems.
4. All mechanical equipment and structures.
5. Distribution and lighting panelboards.
6. Control, relay, and instrumentation panels.
7. Lighting fixtures and receptacles.
8. Fans, blowers, pumps, and similar equipment.
9. Hoist beams, cranes, and similar items.

A grounding connection from the transformer to the City water pipe shall be provided. The wire and conduit shall be attached to the City water pipe with a U.L. Inc. listed cast bronze U-bolt connector with silicon bronze bolts and nuts.

Motor frames shall be grounded by means of stranded, 600-volt insulated copper cables installed within the motor feeder conduit system. The cable shall be lug bolted to the motor terminal box and the ground bus of the motor control center serving the motor.

An equipment grounding conductor shall be installed in all electrical raceways, and shall be sized in accordance with Article 250.95 of the National Electrical Code (NEC).

Exposed or buried ground conductors shall be bare copper wires or bars of the proper sizes.

All exposed ground cables or bars shall be firmly and neatly supported in place at proper intervals. Where subjected to mechanical abuse, protective enclosures shall be provided.

Grounding conductors run in conduits with circuit conductors shall be stranded cable with 600-volt green XHHW, TW, THW, or RHW Code insulation.

Stainless steel ground rods shall be 5/8-inch diameter with the length as required, and made up of a 10-foot section with 5-foot sections added as required. Rods shall be driven to permanently

moist soil.

Connections to ground rods, transformer case ground bus bars, case grounds, bare ground grid conductors, and the like, shall be made by an exothermic welding process or by clamps specifically designed for this application.

Ground conductor connections to ground bus bars in motor control centers, and the like, shall be cable lug bolted terminations equal to line conductor terminations specified hereinafter.

Welds embedded in the ground or concrete shall be cleaned and painted with an asphaltum base paint.

Tests shall be conducted by the Contractor and witnessed by the Engineer to determine the ground impedance for the entire system. The test shall be accomplished by using a ground loop impedance tester. The result shall not exceed 2 ohms at any point of test. If necessary, additional ground rods shall be installed at locations approved by the Engineer.

Care shall be exercised to ensure good electrical connections between the conduits and metallic enclosures of switchgear, control centers, and the like. Grounding jumpers shall be installed where necessary to accomplish this purpose.

#### W-76.11 Wires and Cables - General

Wires and cables required for all systems shall be complete, connecting all equipment and control components. Conductors shall be of ample size, with suitable insulation as specified hereinafter.

#### W-76.12 600-Volt Wire and Cable - Conductors

All ground conductors and power, control, and lighting conductors shall be soft-drawn or annealed stranded copper wire meeting the requirements of ASTM B 3 or B 33. For lighting fixture and convenience outlet wiring only, conductors No. 10 AWG and smaller may be solid conductor. Conductors shall be sized to limit the maximum conductor temperature to less than 75°C, except where specifically stated otherwise. Table 310.16 of the NEC shall be the guide in determining 600-volt conductor sizes. The minimum size of conductor for power and lighting wiring shall be No. 12 AWG.

#### W-76.13 600-Volt Power and Control Cable - Insulation

Low voltage circuits shall be wired with 600-volt insulated conductors, sized as shown, or as required by the actual load to be served, whichever is larger.

**Single Conductor:** Insulation for single 600-volt copper conductors shall be cross-linked polyethylene compound, U.L. Inc. listed, NEC Type XHHW-2, with surface print cable identification; as manufactured by Okonite, American, Southwire or equal.

**Multiconductor Cables:** Individual conductors shall be insulated with 15 mils of polyethylene or PVC and 4-mil nylon jacket. The bundle of conductors shall be wrapped with tape binder and an outer jacket of not less than 45 mils of PVC. Use ICEA Method 1 for color coding wires.

#### W-76.14 Instrumentation / Data Cables - Insulation

**4-20 mA Analog:** Shielded two-conductor No. 16 AWG cables for instrumentation shall be properly stranded 600-volt insulated copper wire twisted cables as shown. Conductor insulation shall be polyethylene. Shields shall be overlapped metalized tape providing 100% coverage with tinned copper drain wire. Cable outer jacketing shall be of polyvinyl chloride. Cables shall be Belden #8719, or equal.

**Three Conductor:** Stranded No. 16 wire, 600 volt polyethylene insulation, twisted conductors, tinned copper drain wire, overlapped metalized tape overall shield providing 100 percent shield coverage and outer jacket of PVC. Belden Cat. No. 8618.

**Category 5:** Provide cable having third party verification to TIA/EIA 568-A Category 5 requirements and constructed of four pair of stranded No. 24 AWG solid copper wire, polyethylene or polypropylene insulation, stranded No. 24 AWG tinned copper drain wire, overlapped metalized tape overall shield providing 100 percent shield coverage and outer jacket of gray PVC. Belden Cat. No. 1624R.

**Twinaxial (Data Highway):** Provide stranded No. 20 AWG tinned copper wire (9.5 ohms/mile), 78 ohm nominal impedance, 300 volt polyethylene insulation, tinned copper drain wire, overlapped metalized tape overall shield providing 100 percent shield coverage and 55 percent tinned copper braid shield (4.1 ohms/mile) and outer jacket of blue PVC. Belden Cat. No. 9463.

**1-1/2 Pair (RS-485):** Provide three stranded No. 22 AWG tinned copper wires with 300 volt FHDPE insulation, a tinned copper drain wire, overlapped metalized tape overall shield providing 100 percent shield coverage, 90 percent tinned copper braid shield and a PVC outer jacket. Insulated wires shall be configured as one twisted pair and one reference conductor— 120 Ohms characteristic impedance. Belden Cat. No. 3106A.

#### W-76.15 600-Volt Wire and Cable - Installation

The 600-volt wires and cables pulled into ducts and conduit shall be installed without the use of lubricants, except where such use is necessary and approved by the cable manufacturers and the Engineer. Wires and cables shall be carefully handled to avoid twists and kinks in the conductors or damage to the insulation. All trapped conduit and duct lines shall be swabbed to remove any accumulated moisture or debris before wires or cables are pulled in.

Cable reels shall be stored on concrete or other hard surface, or shall be lagged with 2 x 4 wood laggings providing 100% coverage.

No splicing will be permitted, except in junction boxes.

Lug bolting at terminals, devices, or bus bars shall be made up with a flat washer, a Belleville washer, and a locknut.

Lines of nylon or polypropylene, propelled by carbon dioxide or compressed air, shall be used to snake or pull wire and cable into conduits. Flat steel tapes or steel cables shall not be used.

#### W-76.16 600-Volt Wire and Cable - Splices and Terminations

Splices between copper conductors, size no. 10 AWG and smaller, shall be made up with compression type butt connections. Splices between copper conductors, size no. 8 AWG and larger, shall be made up with U.L. Inc. listed compression type tube connectors.

Stranded copper wire size no. 8 AWG and smaller for terminal block connections, shall be made with a ferrule to wire termination. The ferrule shall be insulated and extend from the stripped insulation, then compressed with a properly sized crimping tool. The ferrule shall be manufactured by Phoenix Contact, or equal.

Lug bolting at devices, bus bars or motors shall be made up with a flat washer, a Belleville washer, and a locknut. The length of the bolt shall not extend more than a couple of threads past the end of the locknut. Lugs shall have holes that match the size of the bolt. The minimum size for feeder lugs shall match the bolt size of lugs on motor wiring. If motor lugs do not match, lugs shall be changed to match size of bolt, using a proper crimping tool.

Splices and pigtail connections for lighting and receptacle wiring inside the buildings, no. 10 AWG and smaller, shall be made with a pre-insulated spring connectors, or equal.

Splices and lug terminations in 600-volt insulated cables shall be carefully taped and covered, using materials recommended by the cable manufacturer, to provide watertight insulation equal to that of the conductors.

Lug terminations at motor connections shall be insulated using three layers of tape. The first layer shall have a wrap of varnished cambric tape (Scotch 2520 or equal). As an alternative to varnished cambric tape, self-fusing silicon rubber tape (Scotch 70 or equal) or vinyl electrical tape (Scotch 33, 88 or equal) may be used. If vinyl electrical tape is used, the wrap shall be installed upside down. The second layer shall have a wrap of rubber splicing tape (Scotch 23, 130C, or equal). The third layer shall have a wrap of vinyl electrical tape (Scotch 33, 88, or equal).

Splices shall not be made within manholes unless specifically approved by the Engineer.

#### W-76.17 600-Volt Wire and Cable - Tests

The 600-volt insulated cables shall be factory tested prior to shipment in accordance with IPCEA standards for the insulation specified.

The following 600-volt wires and cable shall be tested after installation but before final

connections are made up:

1. All feeders from motor control centers to motors 30 horsepower and larger.
2. All feeders from variable speed drive units.
3. All feeders from motor control centers to lighting panels and dry-type transformers.

For the above listed cables, a test voltage of 1,500 volts AC shall be applied for a period of 1 minute between all conductors in the same conduit, and between each conductor and ground.

All tests shall be made at the Contractor's expense, and certification of the tests shall be submitted to the Engineer. If any failures occur during the tests, the Contractor shall replace the cable.

#### W-76.18 Identification of Circuits

All wires and cables shall be banded with an identifying number and color code at each end termination and at each splice point in junction boxes. The identifying number of each wire shall be determined at the point of circuit origin, and shall continue unchanged to the point of circuit termination. In each conduit system, the wire identifying numbers shall include the conduit designation with a numeral suffix. The numeral suffix shall start with No. 1 and continue as required.

Where conduits enter motor control centers, switchgear terminal cabinets, and the like, the identification tag shall be fastened to the wire bundle near the conduit termination. The tag shall be held by an adjustable, self-locking nylon "Ty-Rap" as manufactured by Thomas and Betts Co., or equal. The identifying tag shall be of aluminum, brass, rigid fiber, and shall be engraved, stamped, or painted with the scheduled conduit number.

The wire identifying numbers and color code shall be applied as PVC slip-on sleeves, properly fitted to the wire diameter. The sleeves shall be as manufactured by Brady Co., Thomas and Betts Co., or equal.

#### **Color Coding:**

<b>240/120 VOLTS</b>	<b>PHASE</b>	<b>480Y/277 VOLTS</b>
Black	A	Brown
Orange (High-Leg)	B	Orange
Blue	C	Yellow
White	Neutral	Gray or White
Green	Ground	Green

#### W-76.19 Wire and Cable Connections to Equipment

Electrical connections shall be made to all equipment in strict accordance with the manufacturer's approved wiring diagrams, the Plans, or as approved by the Engineer. The Contractor shall be responsible for the accuracy of his work, and shall repair any damage and replace any damaged equipment resulting from erroneous connections.

#### W-76.20 Painting

Conduit and boxes shall be painted in accordance with the Workmanship and Materials section headed "Painting."

Where aluminum surfaces such as boxes, conduit, or structural supports come in contact with incompatible metals, lime, mortar, concrete, or other masonry materials, the contact areas shall be given one field coat of Koppers Metal Passivator No. 40 and one coat of Koppers Bitumastic Super Service Black or two coats of asphalt varnish conforming to Fed. Spec. TT-V-51.

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## SECTION 105 - ROOT PRUNING

### W-105.01 General

The Contractor shall make provisions for tree protection to the satisfaction of the Engineer prior to any excavation. All applicable site inspections by the City of Tampa Parks Department, and permits, shall be obtained prior to commencing work.

The Contractor shall provide root pruning services as directed by the Engineer.

### W-105.02 Performance of Work

All root pruning shall be performed by a qualified, licensed tree professional as approved by the Engineer.

All roots designated to be removed shall be severed leaving a smooth, uniform section at the remaining root end to prevent root damage.

Root pruning shall be performed with a chain saw, Dosco root pruner, or equal, as approved by the Engineer. Root pruning shall not occur within 6 feet of the base of the tree without guidance from Parks Department staff, and no excavation shall occur inside the circumference of the root-pruned area.

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## SECTION 108 - DEWATERING

### 108.1 General.

108.1.1 Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.

1. Delegated Design: Design dewatering system, including comprehensive engineering analysis by a qualified, Florida-licensed professional engineer, using performance requirements and design criteria indicated.
2. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, that excavation does not flood, and that damage to subgrades and permanent structures is prevented.
3. Prevent surface water from entering excavations by grading, dikes, or other means.
4. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.
5. Remove dewatering system when no longer required for construction.

### 108.1.2 Submittals:

108.1.2.1 Shop Drawings (for dewatering system): Show arrangement, locations, and details of wells and well points; locations of risers, headers, filters, pumps, power units, and discharge lines; and means of discharge, control of sediment, and disposal of water.

1. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.
2. Include a written plan for dewatering operations including control procedures to be adopted if dewatering problems arise.

108.1.2.2 Delegated-Design Submittal: For dewatering system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

108.1.2.3 Qualification Data: For qualified installer and professional engineer.

108.1.2.4 Field Quality-Control Reports

108.1.2.5 Videotape: Show existing conditions (prior to, during, and after construction) of adjoining construction and site improvements that might be misconstrued as damage caused by dewatering operations.

### 108.1.3 Quality Assurance:

108.1.3.1 Installer qualifications: An experienced installer that has specialized in dewatering work.

108.1.3.2 Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with hauling and disposal regulations of authorities having jurisdiction.

108.1.3.3 Preinstallation Conference: Conduct conference at the project site. Review methods and procedures related to dewatering including, but not limited to, the following:

1. Inspection and discussion of condition of site to be dewatered including coordination with temporary erosion control measures and temporary controls and protections.
2. Geotechnical report.
3. Proposed site clearing and excavations.
4. Existing utilities and subsurface conditions.
5. Coordination for interruption, shutoff, capping, and continuation of utility services.
6. Construction schedule. Verify availability of installer's personnel, equipment, and facilities needed to make progress and avoid delays.
7. Testing and monitoring of dewatering system.

### 108.1.4 Project Conditions:

108.1.4.1 Interruption of Existing Utilities: Do not interrupt any utility serving facilities occupied by the City or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Notify the City and the utility owner no fewer than two (2) days in advance of proposed interruption of utility.
2. Do not proceed with interruption of utility without City's and utility owner's written permission.

108.1.4.2 Project Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of the geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by the geotechnical engineer. The City will not be responsible for interpretations or conclusions drawn from this data. Make additional test borings and conduct other exploratory operations necessary for dewatering.

108.1.4.3 Survey Work: Engage a qualified, Florida-licensed land surveyor to survey adjacent existing buildings, structures, and site improvements, establishing exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations. During dewatering, regularly resurvey benchmarks, maintaining an accurate log of surveyed elevations for comparison with original elevations. Promptly notify City if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

## 108.2 Execution.

### 108.2.1 Preparation:

108.2.1.1 Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site and surrounding area.
2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.

108.2.1.2 Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the City and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

108.2.1.3 Provide temporary grading to facilitate dewatering and control of surface water.

108.2.1.4 Monitor dewatering system continuously.

108.2.1.5 Promptly repair damages to adjacent facilities caused by dewatering.

108.2.1.6 Protect and maintain temporary erosion and sedimentation controls during dewatering operations.

### 108.2.2 Installation:

108.2.2.1 Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal and surface water controls. Space well points or wells at intervals required to provide sufficient dewatering. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

108.2.2.2 Before excavating below ground-water level, place system into operation to lower water to specified levels. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.

108.2.2.3 Provide an adequate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Install sufficient dewatering equipment to drain water-bearing strata above and below bottom off foundations, drains, sewers, and other excavations. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.

108.2.2.4 Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations. Maintain piezometric water level a minimum of 24 inches below surface of excavation.

108.2.2.5 Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction of completed. Dispose of water and sediment in a manner that avoids inconvenience to others. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

108.2.2.6 Provide standby equipment on site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails. If dewatering requirements are not satisfied due to inadequacy or failure of dewatering system, restore damaged structures and foundation soils at no additional expense to the City. Remove dewatering system from project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

108.2.2.7 Damages: Promptly repair damages to adjacent facilities caused by dewatering operations.

### 108.2.3 Field Quality Control

108.2.3.1 Observation Wells: Provide, take measurements, and maintain at least the minimum number of observation wells or piezometers indicated in the dewatering plan; additional observation wells may be required by authorities having jurisdiction.

1. Observe and record daily elevations of ground water and piezometric water levels in observation wells.
2. Repair or replace, within 24 hours, observation wells that become inactive, damaged, or destroyed. In areas where observation wells are not functioning properly, suspend construction activities until reliable observations can be made. Add or remove water from observation well risers to demonstrate that observation wells are functioning properly.
3. Fill observation wells, remove piezometers, and fill holes when dewatering is completed.

108.2.3.2 Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.

END OF SECTION 108

SECTION 110 - CLEARING AND GRUBBING  
AND WELL ABANDONMENT

110.1 Description.

Clear and grub within the areas of the roadway right-of-way and of borrow pits, sand-clay base material pits, lateral ditches, and any other areas shown in the plans to be cleared and grubbed. Remove and dispose of all trees, stumps, roots and other such protruding objects, buildings, structures, appurtenances, existing flexible asphalt pavement, existing concrete pavement, and other facilities necessary to prepare the area for the proposed construction. Remove and dispose of all product and debris not required to be salvaged or not required to complete the construction.

Also, perform certain miscellaneous work the Engineer considers necessary for the complete preparation of the overall project site, as follows:

- (a) Plug any water wells that are encountered within the right-of-way and that are to be abandoned.
- (b) Level the terrain outside the limits of construction for purposes of facilitating maintenance and other post-construction operations in accordance with 110.10.3.
- (c) Trim trees and shrubs within the project right-of-way that are identified in the Contract Documents.

Meet the requirements for such miscellaneous work as specified in 110.10.

110.2 Standard Clearing and Grubbing.

110.2.1 Work Included: Completely remove and dispose of all buildings, timber, brush, stumps, roots, rubbish, debris, and all other obstructions resting on or protruding through the surface of the existing ground and the surface of excavated areas, and all other structures and obstructions necessary to be removed and for which other items of the Contract do not specify the removal thereof, including septic tanks, building foundations, and pipes.

Perform Standard Clearing and Grubbing within the following areas:

- (a) All areas where excavation is to be done, including borrow pits, lateral ditches, right-of-way ditches, etc.
- (b) All areas where roadway embankments will be constructed.
- (c) All areas where structures will be constructed, including pipe culverts and other pipe lines.

110.2.2 Depths of Removal of Roots, Stumps, and Other Debris: In all areas where excavation is to be performed, or roadway embankments are to be constructed, remove roots and other debris to a depth of 12 inches below the ground surface. Remove roots and other debris from all excavated material to be used in the construction of roadway embankment or roadway

base. Plow the surface to a depth of at least 6 inches, and remove all roots thereby exposed to a depth of at least 12 inches. Completely remove and dispose of all stumps within the roadway right-of-way.

Remove all roots, etc., protruding through or appearing on the surface of the completed excavation within the roadway area and for structures, to a depth of at least 12 inches below the finished excavation surface.

Remove or cut off all stumps, roots, etc., below the surface of the completed excavation in borrow pits, material pits, and lateral ditches.

Within all areas where standard clearing and grubbing is to be performed, remove roots and other debris projecting through or appearing on the surface of the original ground to a depth of 12 inches below the surface, but do not plow or harrow these areas.

110.2.3 Trees to Remain: As an exception to the above provisions, where so directed by the Engineer, trim, protect, and leave standing desirable trees within the roadway area. Trim branches of trees extending over the area occupied by the roadway as directed, to give a clear height of 16 feet above the roadway.

110.2.4 Boulders: Remove any boulders encountered in the roadway excavation or found on the surface of the ground. When approved by the Engineer, place boulders in neat piles inside the right of way. The Contractor may stockpile boulders encountered in City-furnished borrow areas which are not suitable for use in the embankment construction within the borrow area.

### 110.3 Selective Clearing and Grubbing.

The Contractor shall remove and dispose of all vegetation, obstructions, etc., as provided above except that, where so elected, the Contractor may cut roots, etc., flush with the ground surface. Completely remove and dispose of stumps. Entirely remove undergrowth except in specific areas designated by the Engineer to remain for aesthetic purposes. Trim, protect, and leave standing desirable trees, with the exception of such trees as the Engineer may designate to be removed in order to facilitate right-of-way maintenance. Remove undesirable or damaged trees as so designated by the Engineer. Perform Selective Clearing and Grubbing only in areas so designated in the plans.

### 110.4 Protection of Property Remaining in Place.

Protect and do not displace property obstructions which are to remain in place, such as buildings, sewers, drains, water or gas pipes, conduits, poles, walls, posts, bridges, etc.

### 110.5 Removal of Buildings.

110.5.1 Parts to be Removed: Completely remove all parts of the buildings, including utilities, plumbing, foundations, floors, basements, steps, connecting concrete sidewalks or other pavement, septic tanks, and any other appurtenances, by any practical manner which is not detrimental to other property and improvements. Remove utilities to the point of connection to

the utility owner's cut-in. After removing the sewer connections to the point of cut-in, construct a concrete plug at the cut-in point, as directed by the Engineer, except where the utility owners may elect to perform their own plugging. Contact the appropriate utility companies prior to removal of any part of the building to ensure disconnection of services.

110.5.2 Removal by Others: Where buildings within the area to be cleared and grubbed are so specified to be removed by others, remove and dispose of any foundations, curtain walls, concrete floors, basements or other foundation parts which might be left in place after such removal of buildings by others.

#### 110.6 Removal of Existing Structures.

110.6.1 Structures to be Removed: Remove and dispose of the materials from existing structures. Remove the following: (1) those structures, or portions of structures, shown in the plans to be removed; (2) those structures, or portions of structures, found within the limits of the area to be cleared and grubbed, and directed by the Engineer to be removed; (3) those structures, or portion of structures, which are necessary to be removed in order to construct new structures; and (4) other appurtenances or obstructions which may be designated in the Contract Documents as to be included in an item of payment for the work under this Article.

Notify the Florida Department of Environmental Protection (DEP) using DEP Form 62-257.900(1) Notice of Asbestos Renovation or Demolition at least 10 working days prior to the demolition or renovation of any structures, even if asbestos is not found on the project. Provide a copy of this Notice to the Engineer.

#### 110.6.2 Method of Removal:

110-6.2.1 General: Remove the structures in such a way so as to leave no obstructions to any proposed new structures or to any waterways. Pull, cut off, or break off pilings to the requirements of the permit or other Contract Documents, or if not specified, not less than 2 feet below the finish ground line. In the event that the plans indicate channel excavation to be done by others, consider the finish ground line as the limits of such excavation. For materials which are to remain the property of the City or are to be salvaged for use in temporary structures, avoid damage to such materials, and entirely remove all bolts, nails, etc. from timbers to be so salvaged. Mark structural steel members for identification as directed.

110.6.2.2 Removal of Steel Members With Hazardous Coatings: Provide to the Engineer for approval a copy of the Contractor's Lead in Construction Compliance Program from the firm actually removing and disposing of these steel members before any members are disturbed.

Vacuum power tool clean any coated steel member to bare metal as defined by SSPC-SP11 a minimum of 4 inches either side of any area to be heated (torch cutting, sawing, grinding, etc.) in accordance with 29 CFR 1926.354. Abrasive blasting is prohibited.

Provide air-supplied respirators in accordance with 29 CFR 1926.62 and 29 CFR 1910.134.

110.6.3 Partial Removal of Bridges: On concrete bridges to be partially removed and widened, remove concrete by manually or mechanically operated pavement breakers, by concrete saws, by chipping hammers, or by hydro-demolition methods. Do not use explosives. Where concrete is to be removed to neat lines, use concrete saws or hydro-demolition methods capable of providing a reasonably uniform cleavage face. If the equipment used will not provide a uniform cut without surface spalling, first score the outlines of the work with small trenches or grooves. For all demolition methods, submit for review and approval of the Engineer, a demolition plan that describes the method of removal, equipment to be used, types of rebar splices or couplers, and method of straightening or cutting rebars. In addition, for hydro-demolition, describe the method for control of water or slurry runoff and measures for safe containment of concrete fragments that are thrown out by the hydro-demolition machine.

110.6.4 Authority of U.S. Coast Guard: For structures in navigable waters, when constructing the project under authority of a U.S. Coast Guard permit, the U.S. Coast Guard may inspect and approve the work to remove any existing structures involved therein, prior to acceptance by the City.

110.6.5 Asbestos Containing Materials (ACM) Not Identified Prior to the Work: When encountering or exposing any condition indicating the presence of asbestos, cease operations immediately in the vicinity and notify the Engineer.

Make every effort to minimize the disturbance of the ACM. Immediately provide for the health and safety of all workers at the job site and make provisions necessary for the health and safety of the public that may be exposed to any potentially hazardous conditions. Provisions shall meet all applicable laws, rules or regulations covering hazardous conditions and will be in a manner commensurate with the gravity of the conditions.

The Engineer will notify the Engineer who will coordinate with the City for assessment and/or remediation. The Contractor shall provide access to the potential contamination area. Preliminary investigation by the City will determine the course of action necessary for site security and the steps necessary to resolve the contamination issue.

The City or its designee will delineate the contamination area(s), any staging or holding area required. The Contractor shall coordinate with the City or its designee and the Engineer to develop a work plan that will provide the City s or its designee s operations schedule with projected completion dates for the final resolution of the contamination issue.

The City or its designee will maintain jurisdiction over activities inside any outlined contaminated areas and any associated staging holding areas. The City or its designee will be responsible for the health and safety of workers within the delineated areas. Provide continuous access to these areas for the Asbestos/CAR Contractor and representatives of regulatory or enforcement agencies having jurisdiction.

The Contractor and the City or its designee will use the schedule as a basis for planning the completion of both work efforts. The Engineer may grant Contract Time extensions according to the provisions of the Contract Documents.



The Contractor will cooperate with the City or its designee to expedite integration of the remediation operations into the construction project. The Contractor is not expected to engage in routine construction activities involving asbestos-containing materials. Adjustments to quantities or to contract unit prices will be made according to work additions or reductions on the part of the Contractor in accordance with the Contract Documents.

The Engineer will direct the Contractor when operations may resume in the affected area.

#### 110.7 Removal of Existing Pavement.

Remove and dispose of existing flexible asphalt pavement, rigid Portland Cement Concrete pavement, sidewalk, slope pavement, ditch pavement, curb, and curb and gutter etc., where shown in the plans or ordered by the Engineer to be removed or where required because of the construction operations. Retaining walls, drainage structures and flexible asphalt pavement are not included in the work under this Article.

#### 110.8 Ownership of Materials.

Except as may be otherwise specified in the Contract Documents, the Contractor shall take ownership of all buildings, structures, appurtenances, and other materials removed by him and shall dispose of them in accordance with Section 110.9.

#### 110.9 Disposal of Materials.

110.9.1 General: Either stack materials designated to remain the property of the City in neat piles within the right-of-way or, if approved by the City, load onto the City's vehicles.

Dispose of timber, stumps, brush, roots, rubbish, and other objectionable material resulting from clearing and grubbing in areas and by methods meeting the applicable requirements of all Local, State and Federal regulations. Do not block waterways by the disposal of debris.

110.9.2 Burning Debris: Where burning of such materials is permitted, perform all such burning in accordance with the applicable laws, ordinances, and regulations. Perform all burning at locations where trees and shrubs adjacent to the cleared area will not be harmed.

110.9.3 Timber and Crops: The Contractor may sell any merchantable timber, fruit trees, and crops that are cleared under the operations of clearing and grubbing for his own benefit, subject to the provisions of the Contract Documents, which may require that the timber, fruit trees, or crops be burned at or near the site of their removal, as directed by the Engineer. The Contractor is liable for any claims which may arise pursuant to the provisions of this Subarticle.

110.9.4 Disposal of Treated Wood: Treated wood, including that which comes from bridge channel fender systems, must be handled and disposed of properly during removal. Treated wood should not be cut or otherwise mechanically altered in a manner that would generate dust or particles without proper respiratory and dermal protection. The treated wood must be disposed of in at least a lined solid waste facility or through recycling/reuse. Treated wood shall not be disposed by burning or placement in a construction and demolition (C D) debris landfill. All compensation for the cost of removal and disposal of treated wood will be included in the Cost of Clearing and Grubbing.

110.9.5 Hazardous Materials/Waste: Handle, transport and dispose of hazardous materials in accordance with all Local, State and Federal requirements including the following:

- a. SSPC Guide 7
- b. Federal Water Pollution Control Act, and
- c. Resource Conservation and Recovery Act (RCRA).

The Contractor shall accept responsibility for the collection, sampling, classification, packaging, labeling, accumulation time, storage, manifesting, transportation, treatment and disposal of hazardous waste, both solid and liquid. Separate all solid and liquid waste and collect all liquids used at hygiene stations and handle as hazardous materials/waste. Obtain written approval from the Engineer for all hazardous materials/waste stabilization methods before implementation.

The Contractor shall obtain an EPA/FDEP Hazardous Waste Identification Number (EPA/FDEP ID Number) before transporting and/or disposal of any hazardous materials/waste, listing the City as the generator of all hazardous materials/waste.

Submit the following for the Engineer s approval before transporting, treatment or disposal of any hazardous materials/waste:

- a. Name, address and qualifications of the transporter,
- b. Name, address and qualifications of the treatment facility, and
- c. Proposed treatment and/or disposal of all Hazardous Materials/Waste.

The Contractor shall transport all hazardous materials/waste in accordance with applicable 40 CFR 263 Standards and provide a copy of all completed Hazardous Materials/Waste manifest/bills of lading to the Engineer within 21 days of each shipment.

110.9.5.1 Steel Members with Hazardous Coating: Dispose of steel members with hazardous coating in one of the following manners:

- (a) Deliver the steel members and other hazardous waste to a licensed recycling or treatment facility capable of processing steel members with hazardous coating.
- (b) Deliver the steel members with hazardous coating to a site designated by the Engineer for use as an offshore artificial reef. Deliver any other hazardous materials/waste to a licensed hazardous materials/waste recycling treatment facility.

Dismantle and/or cut steel members to meet the required dimensions of the recycling facility, treatment facility, or offshore artificial reef agency.

All compensation for the cost of removal and disposal of hazardous materials/waste will be included in the Cost of Clearing and Grubbing.

110.9.5.2 Certification of Compliance: Furnish two copies of Certification of Compliance from the firm actually removing and disposing of the hazardous materials/waste stipulating, the hazardous materials/waste has been handled, transported and disposed of in accordance with this Specification. The Certification of Compliance shall be attested to by a person having legal authority to bind the company.

The Contractor shall maintain all records required by this Specification and ensure these records are available to the City upon request.

#### 110.10 Miscellaneous Operations.

110.10.1 Water Wells Required to be Plugged: Fill or plug all water wells within the right-of-way, including areas of borrow pits and lateral ditches, that are not to remain in service, in accordance with applicable Water Management District rules or the Department of Environmental Protection regulations.

Cut off the casing of cased wells at least 12 inches below the ground line or 12 inches below the elevation of the finished excavation surface, whichever is lower. Water wells, as referred to herein, are defined either as artesian or non-artesian, as follows:

- (a) An artesian well is an artificial hole in the ground from which water supplies may be obtained and which penetrates any water-bearing rock, the water in which is raised to the surface by natural flow or which rises to an elevation above the top of the water-bearing bed. Artesian wells are further defined to include all holes drilled as a source of water that penetrate any water-bearing beds that are a part of the artesian water system of Florida, as determined by representatives of the applicable Water Management District.
- (b) A non-artesian (water-table) well is a well in which the source of water is an unconfined aquifer. The water in a non-artesian well does not rise above the source bed.

When the plans do not indicate whether a non-flowing well is artesian or non-artesian, obtain this information from the Engineer.

110.10.2 Landscape Areas: When certain areas of the right-of-way, outside of the limits of construction, are shown in the plans or designated by the Engineer to be landscaped, either under the construction Contract or at a later time, remove undesirable trees, stumps,

undergrowth, and vegetation, as directed, and preserve and trim natural growth and trees as directed by the Engineer.

110.10.3 Leveling Terrain: Within the areas between the limits of construction and the outer limits of clearing and grubbing, fill all holes and other depressions, and cut down all mounds and ridges. Make the area of a sufficient uniform contour so that the City's subsequent mowing and cutting operations are not hindered by irregularity of terrain. Perform this work regardless of whether the irregularities were the result of construction operations or existed originally.

110.10.4 Mailboxes: When the Contract Documents require furnishing and installing mailboxes, permit each owner to remove the existing mailbox. Work with the Local Postmaster to develop a method of temporary mail service for the period between removal and installation of the new mailboxes. Install the mailboxes in accordance with the FDOT Design Standards.

#### 110.11 Method of Measurement and Payment.

110.11.1 Clearing and Grubbing: When direct payment is provided in the Contract, the quantity to be paid for will be the lump sum quantity to include clearing and grubbing, removal of existing pavement, plugging water wells, mailbox replacements, delivery of salvageable material to the City,

Price and payment will be full compensation for all clearing and grubbing required for the roadway right-of-way and for lateral ditches, channel changes, or other outfall areas, and any other clearing and grubbing indicated, or required for the construction of the entire project, including all necessary hauling, furnishing equipment, equipment operation, furnishing any areas required for disposal of debris, leveling of terrain and the landscaping work of trimming, etc., as specified herein, except for any areas designated to be paid for separately or to be specifically included in the costs of other work under the Contract. Where construction easements are specified in the plans and the limits of clearing and grubbing for such easements are dependent upon the final construction requirements, no adjustment will be made in the lump sum price and payment, either over or under, for variations from the limits of the easement defined on the plans.

110.11.2 General: In each case, except as provided below, where no item of separate payment for such work is included in the proposal, all costs of such work will be included in the various scheduled items in the Contract, or under specific items as specified herein below or elsewhere in the Contract.

END OF SECTION 110

## SECTION 113 - DISPOSAL OF DEBRIS

### W-113.01 General

The Contractor shall furnish all labor, materials, and equipment required to transport and dispose of debris removed from all pipelines and structures. Debris shall be defined as all material existing in the pipeline for which removal is required to provide a clean pipeline.

### W-113.02 Scope of Work

The Contractor will be permitted to transport and temporarily store debris at the Howard F. Curren AWT Plant at 2700 Maritime Boulevard between the hours of 6:00 a.m. to 6:00 p.m., as directed by the Engineer. Within 30 days after the completion of the work, the Contractor will be responsible for hauling the stored debris from the Treatment Plant to an approved disposal site. Final payment will not be issued until the debris is entirely removed from the temporary storage area. The Contractor shall also be responsible for providing all equipment required for dumping and collecting debris at the temporary storage area. No Treatment Plant personnel or equipment will be provided for this purpose. In addition, the Contractor will have the following responsibilities:

- a. Be solely responsible to handle, transport, test, permit, and dispose of debris in accordance with all applicable regulatory requirements.
- b. For transportation between project site and disposal site.
- c. To apply for, pay fees, and obtain all required environmental or transportation permits prior to handling debris. Permitting agencies include, but are not limited to, EPA, DER, DOT, Hillsborough County, City of Tampa, and Expressway Authority.
- d. To perform all necessary tests as required by permit and all applicable regulatory requirements.
- e. To select a disposal site and acquire approval from the disposal site owner for disposal of debris. The Contractor is responsible to pay all applicable disposal fees.

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## SECTION 425 - STORMWATER INLETS, MANHOLES AND JUNCTION BOXES

### W-425.01 General

The work specified in this section consists of the construction of inlets, manholes, junction boxes, shoulder gutter inlets, and yard drains. These structures shall be of reinforced concrete, or may be of brick masonry if circular and constructed in place, and shall include the necessary metal frames and gratings. The work under this section shall also include the adjustment of those structures shown in the plans to be adjusted or which are required to be adjusted for the satisfactory completion of the work. The new structures shall be constructed in conformity with the plans and in accordance with these specifications and the latest City of Tampa Stormwater Standard Details.

### W-425.02 Composition and Proportioning

**Concrete:** Unless otherwise shown in the plans, all concrete for these structures shall be Class II as specified in the latest FDOT Standard Specifications Section 346 – Portland Cement Concrete (EXCEPT section 346.6.1) and Section 347 – Portland Cement Concrete – NS.

**Mortar:** The mortar for brick masonry shall be of portland cement and sand, mixed in the proportions of one part cement to two parts of sand. Miami Oolitic rock screenings may be substituted for the sand upon prior approval of the Engineer. All the materials shall pass the No. 8 Sieve, and be uniformly graded from coarse to fine. At the option of the Contractor, hydrated lime, in an amount not to exceed ten percent of the amount of cement used, may be added to the mortar.

As an alternate to the above, masonry cement may be used in lieu of the above-specified mortar provided that it is delivered in packages properly identified by brand name of manufacturer, net weight of package, and whether it is Type 1 or Type 2, and further provided that it has not been in storage for a period greater than six months. Hydrated lime shall not be used with masonry cement.

The sand and cement shall be thoroughly mixed dry in proper boxes or mortar mixers and such quantity of clean fresh water added as will provide a stiff mortar of the proper consistency. The whole mass shall be thoroughly mixed until used. Any mortar that has set shall not be retempered in any way, and no mortar shall be used more than one and one-half (1-1/2) hours after mixing.

### W-425.03 Gratings

Gratings and frames fabricated from structural steel shall be Zinc (hot-dip galvanized) Coatings on Iron and Steel Products, in accordance with the requirements of ASTM A123 These requirements do not apply when A-588 steel is used.

When Alternate "G" grates are specified, the chain, bolt, nuts, and cold shuts shall be galvanized after fabrication in accordance with the requirements of ASTM A 153.

#### W-425.04 Forms

Forms shall be of wood or metal, so designed and constructed that they may be removed without injury to the concrete. They shall be built true to line and grade and braced in a substantial and unyielding manner, and shall be approved by the Engineer before being filled with concrete.

#### W-425.05 Precast Inlets, Manholes, and Junction Boxes

Careful attention shall be given to the proper construction or reconstruction of the pavement adjacent to the gutters and at street intersections to obtain satisfactory drainage to the inlets from the intersecting streets.

The Contractor may request to substitute precast inlets, manholes, and junction boxes in lieu of cast-in-place units unless otherwise shown in the plans or directed by the Engineer. At locations not so restricted, the Contractor shall carefully examine the plan details at each structure to determine if use of a precast unit is feasible. The design and fabrication of precast units shall be in accordance with the standard index drawings, which may allow use of designs other than those detailed in the standard index drawings.

Smooth welded wire fabric may be substituted for deformed re-bar or welded deformed wire reinforcement in non-circular precast drainage structures provided the following requirements are met:

1. The smooth welded wire fabric shall comply with ASTM A-185.
2. Substitution of equal areas of smooth wire fabric for the reinforcing steel and provided the width and length of the unit is four times the width of the spacing of the cross wires.
3. Wire shall be continuous around the box and spliced at a quarter point of one side with an overlap of not less than the spacing of the cross wires plus two inches.

#### W-425.06 Construction Methods

**Excavation:** Excavation shall comply with the requirements specified in Section 1.

**Placing and Curing Concrete:** The concrete shall be placed in the forms, to the depth shown in the plans and thoroughly vibrated. After the concrete has hardened sufficiently, it shall be covered with suitable material approved by the Engineer, and kept moist for a period of three days.

**Setting Manhole Castings:** After the concrete has been cured as specified above, the frame of the casting shall be set in a full mortar bed composed of one part portland cement to two parts of fine aggregate.

**Reinforcing Steel:** The construction methods for the steel reinforcement shall be as specified in Section 6.

**Laying Brick:** All brick shall be saturated with water before being laid. The brick shall be laid by the shovejoint method so as to bond them thoroughly into the mortar. Headers and stretchers shall be so arranged as to bond the mass thoroughly. Joints shall be finished properly as the work progresses and shall be not less than 1/4 inch or more than 3/4 inch in thickness. No spalls or bats shall be used except for shaping around irregular openings or when unavoidable at corners.

The inside of the brick masonry walls shall be plastered uniformly with cement mortar one-half (1/2) inch in thickness mixed in proportions of one part of cement and two parts of clean, sharp sand.

**Placing Pipe:** Inlet and outlet pipes shall be of the same size and kind as the connecting pipe shown in the plans. They shall extend through the walls for a distance beyond the outside surface sufficient for the intended connections, and the concrete shall be constructed around them neatly so as to prevent leakage along their outer surface. The inlet and outlet pipes shall be flush with the inside of the wall.

**Backfilling:** Backfilling shall conform with the requirements specified in Section 2.

**Adjusting Existing Structures:** Existing manholes, catch basins, inlets, valve boxes, monument boxes, etc., within the limits of the proposed work, that do not conform to the finished grade of the proposed pavement, or to the finished grade designated on the plans for such structures, shall be cut down or extended, and made to conform to the grade of the new pavement, or to the designated grade of the structure if outside of the proposed pavement area. The materials and construction methods for this work shall conform to the requirements specified above.

Where manholes are to be raised, the adjustment may, at the Contractor's option, be made by the use of adjustable extension rings of the type which do not require the removal of the existing manhole frame. The extension device shall provide positive locking action and shall permit adjustment in height as well as diameter. The particular type of device used shall meet the approval of the Engineer.

**Adjusting Structures:** When an item of payment for adjusting manholes, valve boxes, inlets, or monument boxes is provided in the proposal, the number of such structures designated to be paid for under separate items, and which are satisfactorily adjusted, shall be paid for at the contract units prices each for Adjusting Inlets, Adjusting Manholes, Adjusting Valve Boxes, and Adjusting Monument Boxes.

For any of such types of these structures required to be adjusted but for which no separate item of payment is shown in the proposal for the specific type, payment shall be made under the item of Adjusting Miscellaneous Structures.



## W-425.07 Drainage Structures

1. All inlets, manholes, and junction boxes shall, unless otherwise directed by the Engineer, be constructed as per design plans and applicable design standards. All manholes shall be Traffic Bearing type. It shall be the responsibility of the Contractor to assure that the designated sizes of the drainage structures meet the following criteria:
  - a. The minimum distance from the top of the opening for the highest pipe to the bottom of the top slab shall be ten inches (10"); 12 inches from top of pipe to bottom of top slab, before "stack" is used.
  - b. The minimum diameter for stack heights shall be thirty-six (36) inches.
  - c. The minimum distance between pipe openings shall be nine (9) inches.
  - d. For four-sided structures having openings in more than one corner, individual shop drawings must be submitted for prior approval.
2. If warranted by field conditions and directed by the Engineer, the Contractor shall, at such locations, construct brick drainage structures (in place of concrete drainage structures), according to the standards specified below:

Brick construction shall be as follows:

- a. Wall thickness minimum eight inches (8") up to eight feet (8') height, unless specified otherwise.
- b. Wall thickness minimum twelve inches (12") up to twelve feet (12') height, unless specified otherwise.
- c. Brick shall be laid in 1:2 (Portland cement-sand) mortar.
- d. Before laying the bricks in mortar, the bricks shall be thoroughly sprinkled with clean water (not to saturation extent).
- e. Brick for manhole and inlet structures shall be laid in stretcher courses, with every sixth course a header course.
- f. All brick structures shall be plastered smooth inside also with 1/2-inch thick, 1:2 (Portland cement-sand) mortar.
- g. No "unsound" brick shall be used. As a test, if a light hammer blow, with the brick held lightly in hand, does not produce a uniform crisp ringing sound, the brick shall be construed to have crack(s), or otherwise unsound and shall be rejected.
- h. All bricks shall be solid.

3. No additional compensation shall be paid for brick structures. Brick and concrete shall not be used simultaneously in drainage structure walls. Walls of round structures shall be constructed of concrete only.
4. For all types of manholes, the top and bottom slab shall be as per applicable D.O.T. standards, even if brick is allowed to be used in the manhole walls. The following criteria shall apply to slab thicknesses and steel reinforcements:
  - a. Top and bottom slabs shall have same thicknesses and reinforcements in any manhole structure.
  - b. The minimum slab thickness and reinforcement shall be 8 inches thick and #6 bars at 6-inch centers both ways.
  - c. 4-foot by 6-foot (4' x 6') or larger manholes, including circular manholes with inside diameter of 5-feet (5.0') or larger, shall have 10-inch thick slabs with #7 bars at 6-inch centers both ways.
  - d. Unless specified on the Plans, four-sided structures with both inside dimensions in excess of eight feet (8.0') and circular structures with inside diameter in excess of eight feet (8.0') shall not be covered by D.O.T. and the above criteria.
5. All grate inlets shall conform to the City of Tampa design standards.
6. Grates on inlets, as well as all other structures, shall be Traffic Bearing Type, unless specified otherwise, and subject to approval of the Engineer. All grate inlets shall be fitted with an approved metal frame at the top to seat the grates.
7. All Type-P manholes shall be bid at one average unit price regardless of size and shape. Similarly, all Type-J manholes will be bid at one average unit price regardless of size and shape unless indicated otherwise in the proposal.
8. The reinforcements and shapes for all drainage structures, unless directed by the Engineer otherwise, shall conform to the Plans and applicable design standards.
9. Vertical support columns (one in case of Type 5 inlet) shall be constructed by the Contractor, as a part of the D.O.T. Type 5 and 6 curb inlets, where and as directed by the Engineer.
10. The Contractor, if so directed by the Engineer in order to better meet site requirements, shall construct B-S-1, B-R-2, B-V-1, or B-R-1 type curb inlets in lieu D.O.T. Type 5 and 6 inlets and vice-versa without additional cost to the City. P-5 and P-6 inlets shall have 3-1/2-foot by 3-1/2-foot substructures unless oversize pipe is to be accommodated or otherwise directed by the Engineer. Legible, detailed plans of each inlet type shall be provided to the Contractor.

Side openings in curb and grate type inlets may be specified in the Plans or by the Construction Engineer to meet site conditions. The Contractor shall provide such openings without any additional cost.

11. When precast drainage structures are requested as substitutions for poured in place concrete structures, the Contractor shall meet the following additional requirements:
  - a. Minimum height of the base structure (manhole or inlet barrel), unless restricted by design, shall be 5 feet 0 inches before extending the structure height by another precast "barrel." The minimum height of the top (extension) precast "barrel" shall be 1 foot 6 inches. "Barrel" extensions of less than 1-foot 6-inch height shall be cast in place with continuous reinforcement.
  - b. Four-sided structures may be considered as an alternate to circular structures, but not the reverse.
  - c. For substructures for the City-type curb inlets, unless specified otherwise, directed by the Engineer, or to accommodate larger pipes, the Contractor may use a 3-foot by 4-foot (inside dimensions) structure. This structure shall have same slab and wall thicknesses and steel reinforcing as specified for "Type E" grate inlet.
  - d. When circular structures are precast in accordance with ASTM C-478, minimum wall thickness shall be six inches (6") thick or as specified in ASTM C-478 for larger diameter structures.
  - e. The location of the pipe holes and adequate basic substructures height, unless directed otherwise by the Engineer, shall be the responsibility of the Contractor.
  - f. The Contractor shall submit shop drawings only as specified below:
    - (1) One each-typical for different type of structures.
    - (2) For structures directed by the Engineer, and/or requiring change with respect to design plans, or as otherwise required by these specifications.
  - g. Provide schedule of manufacture of the structures. No compensation shall be paid to the Contractor for unusable precast drainage structures.
  - h. Provide material testing acceptance reports by a licensed private laboratory verifying:
    - (1) that the structures were constructed in accordance with details shown on the Plans and/or Shop Drawings;
    - (2) the exact design criteria adhered to; if more than one, identify which criteria

applies to which structures;

- (3) the project title, project number, file number, date cast, structure, plan sheet number and station;
  - (4) reinforcement size, spacing and amount;
  - (5) concrete placement, curing and strength, and verification of concrete cover on reinforcement; and
  - (6) that the testing laboratory stamp is placed on each structure prior to shipment.
- i. Cooperate with Department personnel regarding periodic inspection of the precast units and the precast operations.
12. All manhole and inlet structures shall be set on a minimum 6-inch thick layer of compacted number 57 size coarse aggregate unless noted otherwise in the Plans or Specifications, or unless the Engineer determines a thicker layer is required due to soil and/or water conditions. All such coarse aggregate shall be completely enveloped in non-woven filter fabric as directed by the Engineer.
- Payment for the 6-inch thick layer of stone shall be included in the price of the structure. Payment for thicker layers of stone shall be made from the select bedding material (stone) pay item, if available, or as extra work.
13. All casting covers, such as for inlets and manholes, shall bear the appropriate City of Tampa identification for storm sewers and for sanitary sewers, as shown on the Plans and directed by the Engineer.

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## SECTION 430 - PIPE CULVERTS AND STORM SEWERS

### W-430.01 General

The work specified in this section consists of furnishing drainage pipe and mitered end sections, conforming to these specifications and of the particular types, sizes, and dimensions shown in the plans. This work shall include the installation of the pipe and mitered end sections at the locations called for, in conformity with the lines and grades given, and the furnishing and construction of such joints and connections to existing pipes, catch basins, inlets, manholes, walls, etc., as may be required to complete the work as indicated in the plans.

### W-430.02 Laying Pipe

General: Each section of pipe shall be inspected for defects before being lowered into the trench. All pipe shall be carefully laid, true to the lines and grades given, with hubs up and tongue end fully entered into the hub. When pipe with quadrant reinforcement, or circular pipe with elliptical reinforcement, is used, the pipe shall be installed in a position such that the manufacturer's marks designating "top" and "bottom" of the pipe shall not be more than five degrees from the vertical plane through the longitudinal axis of the pipe. Any pipe that is not in true alignment or which shows any settlement after laying shall be taken up and relaid without additional compensation.

Trench Excavation: The excavation of the trench for pipe culverts and storm sewers shall be as specified in Section 1.

Foundation: Where the foundation material is of inadequate supporting value, a suitable foundation shall be provided, as directed by the Engineer, by the removal of unsuitable material and replacing with suitable material as specified in Section 2. Where in the Engineer's opinion, the removal and replacement of unsuitable material is not practicable, he may direct alternates in the design of the pipeline, as required to provide adequate support. Should such alteration in the design result in an increase in the costs of the installation, an appropriate adjustment will not be considered as an adequate basis for extra compensation.

Pipe shall not be laid on blocks or timbers, or on other unyielding material, except where the use of such devices is called for in the plans.

Backfilling: The backfilling around the pipe shall be as specified in Section 2.

Plugging Pipe: When so shown in the plans, the ends of the pipe culverts shall be sealed with a masonry plug a minimum of eight (8) inches in thickness unless otherwise shown in the plans.

End Treatment: The end treatment required at each cross drain, side drain, or storm sewer pipe end is shown in the plans. Alternate types are permitted only when shown. Details

for each type of end treatment are contained in the standard index drawings.

As an exception to the above, when concrete mitered end sections are permitted, reinforced concrete U-endwalls may be used but shop drawings must be submitted to the Engineer for approval prior to use.

**Metal pipe Protection:** To protect corrugated steel or aluminum pipe embedded in a concrete structure, such as an inlet, manhole, junction box, endwall, or concrete jacket, a bituminous coating shall be applied to the surface area of the pipe within and 12 inches beyond the concrete or mortar seal prior to sealing.

The surface preparation, application methods (dry film thickness and conditions during application), and equipment used shall be in accordance with the coating manufacturer's published specifications.

All coating products used must be approved by the Bureau of Materials and Research, Florida Department of Transportation, Gainesville, Florida.

The cost of furnishing and applying the bituminous material shall be included in the contract unit price for new pipe.

#### W-430.03 Removing and Relaying Existing Pipe

**Removal:** If the plans indicate that existing pipe is to remain the property of the City, all existing pipe or pipe arch so indicated in the plans to be removed or that does not conform to the lines and grades of the proposed work and that is not to be relaid, shall be taken up and stacked neatly along the right of way, as directed by the Engineer. Due care shall be exercised to prevent damage to salvageable pipe during removal and stacking operations.

**Relaying:** Where so shown in the plans, existing culvert pipe shall be taken up and cleaned and shall be relaid in the same manner as specified for new culvert pipe. Where necessary, existing metal pipe or pipe arch shall be straightened before it is relaid.

#### W-430.04 Placing Pipe Under Railroad

**General:** Pipe culverts to be constructed under railroad tracks shall be constructed in accordance with the requirements of the railroad company.

Unless the specific provisions specifically stipulate that the work of shoring under the tracks, and sheeting and bracing of the trench, is to be done by the railroad company, all such work required by the railroad company or deemed necessary by the Engineer in order to assure safe and uninterrupted movement of the railroad equipment, shall be done by the Contractor at his expense.

**Requirements of the Railroad Company:** The method of installation shall be as required by the railroad company as specified in the specific provisions.

When the general method of installation which the railroad company will require is indicated in the plans, such method and any other specific details of the installation which might be indicated in the plans, shall not be changed without written approval of the Engineer, after the approval (or the direction) for such change has been obtained from the railroad.

Notification to Railroad Company; The Contractor shall notify the railroad company of the date on which he expects to begin the work of placing pipe under the railroad tracks at least ten days prior to such date.

Placing Pipe by Jacking: When the placing of the pipe through the railroad embankment is done by the jacking method, the details of the jacking method to be used must be approved by the Engineer and the railroad company before the work is started.

Use of Tunnel Liner: When the railroad company requires that a tunnel liner be used for placing the pipe in lieu of the jacking method, separate payment for the tunnel liner material will be made only in cases where the plans or specifications do not specifically provide that a tunnel liner will be required; in which cases the City will reimburse the Contractor for the actual cost of the liner, delivered at the site. Such cost shall be based on a liner having the minimum gauge acceptable to the railroad.

#### W-430.05 Specific Requirements for Concrete Pipe

##### Sealing Joints:

(1) Round Concrete Pipe Other than Side Drain: For all round concrete pipe other than side drain pipe, the pipe joints shall be sealed by the use of round rubber gaskets. When rubber gaskets are used, the pipe joints shall meet the requirements specified in the Workmanship and Materials Section W-942. The gasket and the surface of the pipe joint, including the gasket recess, shall be clean and free from grit, dirt, and other foreign matter at the time the joints are made. In order to facilitate closure of the joint, application of an approved vegetable soap lubricant immediately prior to closing of the joint will be permitted.

(2) Side Drain Pipe: For all concrete pipe which does not have rubber-gasket joints, the joints shall be thoroughly wetted before the inside mortar is placed; and before succeeding sections of the pipe are laid, the lower half of the joint portion of the pipe in place shall be filled on the inside with cement mortar and the upper half of the tongue portion of the next joint wiped with cement mortar, both in sufficient thickness to bring the inner surface of the abutting pipe flush and even, when the pipe is laid. After the pipe is laid, the inside of the joint shall be wiped and finished smooth and a mortar bead not less than 3/4 inch thick shall be formed completely around the outside of the joint.

Laying Requirements for Concrete Pipe with Rubber Gasket Joints: For concrete pipe laid with rubber gasket joints, any deviation from true alignment or grade which would result in a displacement from the normal position of the gasket of as much as 1/4 inch, or which would produce a gap exceeding 1/2 inch between sections of pipe for more than 1/3 of the

circumference of the inside of the pipe, will not be acceptable and where such occurs the pipe shall be relaid without additional compensation. Where minor imperfections in the manufacture of the pipe cause a gap greater than 1/2 inch between pipe sections, the joint will be acceptable provided the gap does not extend more than 1/3 the circumference of the inside of the pipe. No mortar, joint compound, or other filler which would tend to restrict the flexibility of the gasket joint shall be applied to the gap.

Field Joints for Elliptical Concrete Pipe: Field joints for elliptical concrete pipe will be detailed in the plans or may be made with a preformed plastic gasket material. Pipe to be laid with joints made from preformed plastic material shall be subject to the following requirements:

(1) General: Installation shall be in accordance with the manufacturer's instructions and these specifications. The Contractor shall be responsible for obtaining a permanent watertight joint.

(2) Material: The preformed gasket material shall conform to the requirements of Section W-942.

(3) Joint Design: The pipe manufacturer shall furnish the Engineer with details in regard to configuration of the joint and the amount of gasket material required to effect a satisfactory seal. Joint surfaces which are to be in contact with the gasket material shall not be brushed or wiped with a cement slurry. Minor voids may be filled with cement slurry provided that all excess cement slurry is removed from the joint surface at the point of manufacture.

(4) Primer: Prior to application of the gasket material, a primer of the type recommended by the manufacturer of the gasket material shall be applied to all joint surfaces which are to be in contact with the gasket material. The surface to be primed shall be thoroughly cleaned and dry when the primer is applied.

(5) Application of Gasket: Prior to placing a section of pipe in the trench, gasket material shall be applied to form a continuous gasket around the entire circumference of the leading edge of the tongue and the groove joint in accordance with the detail entitled "Detail for Application of Gasket Material (Before Joint Pull-Up)." The paper wrapper on the exterior surface of the gasket material shall be left in place until immediately prior to joining of sections. The gasket material shall be checked to assure that it is bonded to the joint surface, immediately prior to placing a joint in the trench. Plastic gasket material shall be applied only to surfaces which are dry. A hand heating device shall be kept at the job site to dry joint surfaces immediately before application of the plastic gasket material. When the atmospheric temperature is below 60 degrees F., plastic joint seal gaskets shall either be stored in an area warm to above 70 degrees F., or artificially warmed to this temperature in a manner satisfactory to the Engineer.

(6) Installation of Pipe: Handling of a section of pipe after the gasket material has been affixed shall be carefully controlled to avoid displacement of gaskets or contamination of gasket material with dirt or other foreign material. Any gasket displaced or contaminated in handling of the pipe shall be removed and repositioned or replaced as directed. The pipe shall be installed in a dry trench. The bottom of the trench shall be carefully shaped so as to minimize the



need for realignment of sections of pipe after they are placed in the trench. Care shall be taken to properly align each section of pipe prior to the gaskets coming into contact. Realignment of a joint after the gaskets come into contact tends to reduce the effectiveness of the seal and shall be held to a minimum. When the pipes are joined, the entire joint shall be filled with gasket material and there shall be evidence of squeeze-out of gasket material for the entire internal and external circumference of the joint. Excess material on the interior of the pipe shall be trimmed to provide a smooth interior surface. After the pipe is in its final position, the joint shall be carefully examined to determine that the gasket material is satisfactorily adhering to all surfaces of the joint and that the entire joint is filled with gasket material. If a joint is defective, the leading section of pipe shall be removed and the joint resealed.

#### Requirements for Concrete Radius Pipe:

Design: Concrete radius pipe shall be constructed in segments not longer than four feet (along the pipe centerline), except where another length is called for in the plans or the specific provisions. Each segment shall be joined by round rubber gaskets. The pipe manufacturer shall submit details of his proposed joint and the segment length and shape for approval by the Engineer prior to manufacture.

Pre-Assembly: Prior to acceptance of the pipe, the manufacturer shall pre-assemble the entire radius section in his yard to assure a proper fit for all parts. This assembly may be made without gaskets at the option of the manufacturer. Upon satisfactory assembly, the joints shall be consecutively numbered on both the interior and exterior surfaces of each joint, and match marks showing proper position of joints shall be made. Installation on the project shall be in the order of pre-assembly.

#### W-430.06 Field Joints for Aluminum Pipe

General: Field joints for aluminum pipe shall be made with bands fabricated of the same alloy as the culvert sheeting and shall meet the requirements of AASHTO M 196.

Aluminum Cross Drains, Storm Sewers, and Gutter Drains: The provisions specified above for corrugated steel pipe for these installations shall apply also to aluminum pipe (for circular and helical corrugations) except that the material used in the bands and band connections for the alternate combination of joint materials shall be fabricated of the same alloy as the culvert sheeting.

#### W-430.07 Joints in Cast Iron Pipe

The provisions of Section 430 for mortaring and wetting inside the joints, as specified for concrete side drain pipe without rubber gaskets, shall apply to the inside joints of all cast iron pipe.

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SECTION W-800 SERIES - HIGH DENSITY  
POLYETHYLENE PIPE (HDPE)

W-800.01 General

The purpose of this specification is to cover the requirements for the manufacturing, materials, testing, couplings, fittings and delivery of High Density Polyethylene Pipe (HDPE) to the City of Tampa.

W-800.02 Standards

The HDPE pipe shall be manufactured from a PE 4710 resin. The resin material shall meet the specifications of ASTM D 3350 with a minimum cell classification of 445574CC. Pipe shall have a manufacturing standard of ASTM F 714. The pipe shall have ductile iron size (DIPS) outside diameter unless noted otherwise. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.

W-800.03 Fittings

A. BUTT FUSION FITTINGS: Molded butt fusion fittings shall be in accordance with ASTM D 3261 and shall be manufactured by injection molding, a combination of extrusion and machining, or fabricated from HDPE pipe conforming to this specification. All fittings shall be pressure rated to provide a working pressure rating no less than that of the pipe. The fitting shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.

B. ELECTROFUSION FITTINGS: Electrofusion Fittings shall be PE 4710 HDPE, minimum cell classification of 445574C meeting ASTM D 3350 and be the same base resin as the pipe. Electrofusion Fittings shall have a manufacturing standard of ASTM F 1055.

C. FLANGED AND MECHANICAL JOINT ADAPTERS: Flanged and Mechanical Joint Adapters shall be PE 4710 HDPE, Cell Classification of 445574C meeting ASTM D 3350 and be the same base resin as the pipe. All adapters shall be pressure rated to provide a working pressure rating no less than that of the pipe.

D. MECHANICAL RESTRAINT: Mechanical restraint for HDPE may be provided by mechanical means separate from the mechanical joint gasket sealing gland. The restrainer shall provide wide, supportive contact around the full circumference of the pipe and be equal to the listed widths. Means of restraint shall be machined serrations on the inside surface of the restrainer equal to or greater than the listed serrations per inch and width. Loading of the restrainer shall be by a ductile iron follower that provides even circumferential loading over the entire restrainer. Design shall be such that restraint shall be increased with increases in line pressure. Serrated restrainer shall be ductile iron ASTM A 536 with a ductile iron follower; bolts

and nuts shall be corrosive resistant, high strength alloy steel. The restrainer shall have a pressure rating of, or equal to that of the pipe on which it is used or 150 PSI whichever is lesser. Restrainers shall be EBAA Iron Megalug or approved equal.

Nominal Size	Restraint Width	Serrations per inch
4", 6"	1-1/2"	8
8" 10 & 12"	1-3/4"	8

Pipe stiffeners shall be used in conjunction with restrainers. The pipe stiffeners shall be designed to support the interior wall of the HDPE. The stiffeners shall support the pipe's end and control the "necking down" reaction to the pressure applied during normal installation. The pipe stiffeners shall be formed of 304 or 316 stainless steel to the HDPE manufacturers published average inside diameter of the specific size and DR of the HDPE. Stiffeners shall be by JCM Industries or approved equal.

#### W-800.04 Joining

A. BUTT FUSION: Sections of polyethylene pipe should be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400-450 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 PSI. The butt fusion joining will produce a joint weld strength equal to or greater than the tensile strength of the pipe itself.

B. SIDEWALL FUSION: Sidewall fusions for connections to outlet piping shall be performed in accordance with HDPE pipe and fitting manufacturer's specifications. The heating irons used for sidewall fusion shall have an inside diameter equal to the outside diameter of the HDPE pipe being fused. The size of the heating iron shall be ¼ inch larger than the size of the outlet branch being fused.

C. MECHANICAL: Bolted joining may be used where the butt fusion method cannot be used. Flange joining will be accomplished by using a HDPE flange adapter with a 316 stainless steel back-up ring. Mechanical joint joining will be accomplished using either a molded mechanical joint adapter or the combination of a Megalug Restrainer and Pipe Stiffener as manufactured by EBAA Iron, Inc. or approved equal. Either mechanical joint joining method will have a ductile iron mechanical joint gland.

D. OTHER: Socket fusion, hot gas fusion, threading, solvents, and epoxies may not be used to join HDPE pipe.

#### W-800.05 Pipe Packaging, Handling & Storage:

The manufacturer shall package the pipe in a manner designed to deliver the pipe to the project neatly, intact and without physical damage. The transportation carriers shall use appropriate methods and intermittent checks to insure the pipe is properly supported, stacked

and restrained during transportation such that the pipe is not nicked, gouged, or physically damaged.

Pipe shall be stored on clean, level ground to prevent undue scratching or gouging. If the pipe must be stacked for storage, such stacking shall be done in accordance with the pipe manufacturer's recommendations. The pipe shall be handled in such a manner that it is not pulled over sharp objects or cut by chokers or lifting equipment.

Sections of pipe having been discovered with cuts or gouges in excess of 10% of the pipe wall thickness shall be cut out and removed. The undamaged portions of the pipe shall be rejoined using the heat fusion joining method.

Fused segments of the pipe shall be handled so as to avoid damage to the pipe. Chains or cable type chokers must be avoided when lifting fused sections of pipe. Nylon slings are preferred. Spreader bars are recommended when lifting long fused sections.

\* \* \*

## SECTION 942 - GASKETS

### W-942.01 Round Rubber Gaskets for Pipe Joints

Except where O-ring type gaskets are specified for special cases and for special type pipe, round rubber gaskets for use in concrete pipe joints shall meet the requirements of Article 6.9 of ASTM C 361, with the additional requirements that the gasket used shall be of such cross-sectional area and perimeter as to properly fit the space provided in the pipe joint in which it is to be used.

Prior to use, the gasket shall be stored, in as cool a place as practicable.

### W-942.02 Cold Adhesive Preformed Plastic Gaskets (For Sealing Elliptical Concrete Pipe Joints)

Cold adhesive preformed plastic gaskets shall be of a material, shape, and size so as to effect a permanent watertight seal in joints of elliptical concrete pipe. A minimum of two pieces of gasket material shall be used in each joint.

The gasket material shall be protected by a two-piece removable wrapper. To facilitate application, the two-piece wrapper shall be so designed that one-half may be removed longitudinally without disturbing the other half.

The size of the gasket shall be in accordance with the manufacturer's recommendation for the particular joint in which it is to be used. However, the minimum size for each of the gaskets used in a joint shall be in accordance with the following:

Pipe Size (Inches)	Nominal Gasket Size (Inches)	Minimum Cross Section (Square Inches)
Up to 19 x 30	1 1/2	1.75
19 x 30 to 53 x 83	1 3/4	2.50
Over 53 x 83	2	3.25

The above minimum size requirements are based on a joint designed with a maximum taper of 10 degrees and an in-place annular space of approximately 1/4 inch.

The gasket sealing the joints shall be produced from blends of refined hydrocarbon resins and plasticizing compounds reinforced with inert mineral filler. The material shall contain no solvents and shall not produce irritating fumes or obnoxious odors. The gasket shall not depend on

oxidizing, evaporation, or chemical action for its adhesive or cohesive strength.

The chemical composition of the gasket material shall meet the following requirements:

	Min.	Max.
Bitumen (petroleum plastic content) ( by weight)	50	70
Ash-Inert Mineral Matter ( by weight)	30	50
Volatile Matter 325 degrees F ( by weight)	2.0 Max.	

The gasket joint sealing compound when immersed for 30 days at ambient room temperature separately in 5 solution of caustic potash, a mixture of 5 hydrochloric acid, a 5 solution of sulfuric acid, and a saturated hydrogen sulfide solution shall show no visible deterioration.

The physical properties of the gasket joint sealing compound as shipped shall meet the following requirements:

	Min.	Max.
Specific Gravity 77 degrees F	1.20	1.35
Ductility 77 degrees (cm)	5.0	
Softening Point 77 degrees F	320 deg. F. Min.	
Penetration 77 degrees F (150 gms) 5 sec.	50	120

The manufacturer of the gasket material shall furnish the Engineer certified test results covering each shipment of material to each project.

\* \* \*

**SOIL STABILIZATION SYSTEM  
(CSI FORMAT) SECTION 31 32 00**

**PART 1 GENERAL**

**1.1 SUMMARY**

- A. Work Included: This Section includes providing all material, labor, tools and equipment for installation of Cellular Confinement System as shown in the Contract Documents and as specified in this Section.
- B. The Cellular Confinement System shall be used for load support.

**1.2 REFERENCES**

- A. American Association of State Highway and Transportation Officials (AASHTO)
  - 1. AASHTO M 218 - Steel Sheet, Zinc-Coated (Galvanized) for Corrugated Steel Pipe.
  - 2. AASHTO M 288 - Geotextile Specification for Highway Applications
- B. American Society of Testing and Materials (ASTM)
  - 1. ASTM D 1505 - Density of Plastics by the Density-Gradient Technique.
  - 2. ASTM D 1603 - Standard Test for Carbon Black in Olefin Plastics
  - 3. ASTM D 1693 - Environmental Stress-Cracking of Ethylene Plastics.
  - 4. ASTM D 5199 - Measuring Nominal Thickness of Geotextiles and Geomembranes.
  - 5. ASTM E 41 - Terminology Relating to Conditioning.

**1.3 SUBMITTALS**

- A. Submit Manufacturer's shop drawings in accordance with Section SP-72, including Manufacturer's product data, samples and section layout.
- B. Manufacturer's Certificate of Analysis: Manufacturer shall supply certificate of analysis containing the following test results for the cellular confinement material used for project: Base Resin Lot Number(s), Resin Density per ASTM-1505, Production Lot Number(s), Material Thickness, Short Term Seam Peel Strength, and percentage of Carbon Black.
- C. Submit qualifications certifying the installer is experienced in the installation of the specified products.

**1.4 QUALITY ASSURANCE AND CONTROL**

- A. The cellular confinement system material shall be provided from a single Manufacturer for the entire project.
- B. The Manufacturer's Quality management system shall be certified and in accordance with ISO 9001:2008 and CE certification. Any substitute materials submitted shall provide a certification that their cellular confinement manufacturing process is part of an ISO program and a certification will be required specifically stating that their testing facility is certified and in accordance with ISO. An ISO certification for the substitute material will not be acceptable unless it is proven it pertains specifically to the Geoweb manufacturing operations.
- C. The Manufacturer shall provide certification of compliance to all applicable testing procedures and related specifications upon the customer's written request. Request for certification shall be

submitted no later than the date of order placement. The Manufacturer shall have a minimum of 20 years experience producing cellular confinement systems.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in Manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and Manufacturer.
- B. The materials shall be stored in accordance with Manufacturer's instructions. The materials shall be protected from damage and out of direct sunlight.
- C. The materials shall be delivered, unloaded and installed in a manner to prevent damage.

#### 1.6 WARRANTY

- A. The Manufacturer shall warrant each Geoweb section that it ships to be free from defects in materials and workmanship at the time of manufacture. The Manufacturer's exclusive liability under this warranty or otherwise will be to furnish without charge to the original f.o.b. point a replacement for any section which proves to be defective under normal use and service during the 10-year period which begins on the date of shipment. The Manufacturer reserves the right to inspect any allegedly defective section in order to verify the defect and ascertain its cause.

### PART 2 PRODUCTS

#### 2.1 ACCEPTABLE MANUFACTURER

- 1. Presto Geosystem
- 2. Or Equal

#### 2.2 GEOWEB CELLULAR CONFINEMENT SYSTEM

- A. Manufacturing Certification
  - 1. The manufacturer shall have earned a certificate of registration, which demonstrates that its quality-management system for its Geoweb cellular confinement system is currently registered to the ISO 9001:2008 and CE quality standards.
- B. Base Materials
  - 1. Polyethylene Stabilized with Carbon Black
    - a) Density shall be 58.4 to 60.2 lbs/ft<sup>3</sup> (0.935 to 0.965 g/cm<sup>3</sup>) in accordance with ASTM D 1505.
    - b) Environmental Stress Crack Resistance (ESCR) shall be 5000 hours in accordance with ASTM D 1693.
    - c) Ultra-Violet light stabilization with carbon black.
    - d) Carbon Black content shall be 1.5 to 2 percent by weight, through addition of a carrier with certified carbon black content.
    - e) Carbon black shall be homogeneously distributed throughout material.
    - f) The manufacturer must have an in-place quality control to prevent irregularities in strip material.
- C. Cell Properties
  - 1. Individual cells shall be uniform in shape and size when expanded.
  - 2. Individual cell dimensions (nominal) shall be plus or minus 10%.



3. Cell Dimensions (or approved by Engineer)
    - a) Length shall be 11.3 inches (287 mm).
    - b) Width shall be 12.6 inches (320 mm).
    - c) Nominal area shall be 71.3 in<sup>2</sup> (460 cm<sup>2</sup>) plus or minus 1%.
  4. Nominal cell depth shall be 3 inches (76 mm)
- D. Strip Properties and Assembly
1. Perforated Textured Strip/Cell
    - a) Strip sheet thickness shall be 50 mils (1.27 mm), minus 5 percent, plus 10 percent in accordance with ASTM D 5199. Determine thickness flat, before surface disruption.
    - b) Polyethylene strips shall be textured surface with a multitude of rhomboidal (diamond shape) indentations.
    - c) Textured sheet thickness shall be 60 mils, plus or minus 6 mils (1.52 mm plus or minus 0.15 mm).
    - d) Indentation surface density shall be 140 to 200 per in<sup>2</sup> (22 to 31 per cm<sup>2</sup>).
    - e) Perforated with horizontal rows of 0.4 inch (10 mm) diameter holes.
    - f) Perforations within each row shall be 0.75 inches (19 mm) on-center.
    - g) Horizontal rows shall be staggered and separated 0.50 inches relative to hole centers.
    - h) Edge of strip to nearest edge of perforation shall be min of 0.3 inches.
    - i) Centerline of spot weld to nearest edge of perforation shall be a minimum of 0.7 inches (18 mm).
    - j) A slot with a dimension of 3/8 inch x 1-3/8 inch (10 mm x 35 mm) is standard in the center of the non-perforated areas and at the center of each weld.
- E. Assembly of Cell Sections
1. Fabricate using strips of sheet polyethylene each with a length of 142 inches (3.61 m) and a width equal to cell depth.
  2. Connect strips using full depth ultrasonic spot-welds aligned perpendicular to longitudinal axis of strip.
  3. Ultrasonic weld melt-pool width shall be 1.0 inch (25 mm) maximum.
- F. Cell Seam Strength Tests
1. Minimum seam strengths are required by design and shall be reported in test results. Materials submitted with average or typical values will not be accepted. Written certification of minimum strengths must be supplied to the Engineer at the time of submittals.
  2. Short-Term Seam Peel-Strength Test
    - a) Cell seam strength shall be uniform over full depth of cell.
    - b) Minimum seam peel strength shall be 480 lbf (2,130 N) for 6 inch (150 mm) depth.
  3. Long-Term Seam Peel-Strength Test
    - a) Conditions: Minimum of 7 days in a temperature-controlled environment that undergoes change on a 1 hour cycle from room temperature to 130 degrees F (54 degrees C).

- b) Room temperature shall be in accordance with ASTM E41.
- c) Test samples shall consist of two, 4 inch (100 mm) wide strips welded together.
- d) Test sample consisting of 2 carbon black stabilized strips shall support a 160 pound (72.5 kg) load for test period.

## 2.3 INTEGRAL COMPONENTS

### A. Clip

- 1. The clip is a molded, high-strength polyethylene device available in standard (0.5 inch) and metric (10-12 mm) versions.
- 2. Clips can be installed as an end cap on standard (0.5 inch) and metric (10-12 mm) steel reinforcing rods to form anchors.
- 3. Clips can be used with tendons as load transfer restraint clips.

### B. Key

- 1. Keys shall be constructed of polyethylene and provide a high strength connection.
- 2. Keys shall be used to connect Geoweb panels together at each interleaf and end to end connection.

## 2.4 STAKE ANCHORAGE

### A. Anchors

- 1. Anchors shall consist of standard (0.5 inch) or metric (10-12 mm) steel reinforcing rod with a Clip attached as an end cap.
- 2. Anchors shall be assembled by inserting the clip onto the reinforcing rod so that the end is flush with the top of the clip. Prior to attaching the clip, the reinforcing rod shall be free from all burrs and beveled.

## 2.5 TENDON ANCHORAGE

### A. Tendon Type

- 1. Woven Polyester - TP-67
  - a) Material shall be bright, high-tenacity, industrial-continuous-filament, polyester yarn woven into a braided strap.
  - b) Elongation shall be 9 to 15 percent at break.
  - c) Minimum break strength shall be 1506 lbf (6.70 KN) for TP-67.

## 2.6 CELL INFILL MATERIALS

### A. Cell infill material shall be an engineered fill consisting of topsoil and aggregate mixture for vegetated surfaces.

- 1. Material shall be acceptable and meet specifications as required under Section 2 (W2)
- 2. The mixture will promote vegetation growth and provide structural support.
- 3. The aggregate portion shall have a particle range from 0.375 to 1.0 inches (9.5 to 25 mm) with a D50 of 0.5 inches (13 mm).

4. The percentage void space of the aggregate portion when compacted shall be at least 30%.
  5. The pulverized topsoil portion shall equal 25% of the total volume. The topsoil shall be blended with the aggregate to produce a homogeneous mixture.
  6. Once placed, the engineered fill shall be compacted to a 95% Standard Proctor.
- B. Infill material shall be free of any foreign material.
  - C. Clays, silts and organics are not acceptable infill material.
  - D. Infill material shall be free-flowing and not frozen when placed in the Geoweb sections.

## 2.7 ADDITIONAL COMPONENTS

- A. Subbase Materials
  1. The subbase materials shall be as specified in the Contract Documents.
- B. Vegetation
  1. Vegetation shall be as specified in the Contract Documents.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify site conditions are as indicated on the drawings. Notify the Engineer if site conditions are not acceptable. Do not begin preparation or installation until unacceptable conditions have been corrected.
- B. Verify layout of structure is as indicated on the drawings. Notify the Engineer if layout of structure is not acceptable. Do not begin preparation or installation until unacceptable conditions have been corrected.

### 3.2 INSTALLATION OF LOAD SUPPORT SYSTEMS

- A. Prepare subgrade and install the Geoweb load support system in accordance with Manufacturer's instructions and Contract Documents.

**END OF SECTION GW-SPECIAL**

**END OF SECTION**

## Schedule of Values for Lump Sum Contract Items

**Contract Item 1:** Lump Sum wastewater improvements include the following demolition and wastewater improvements and shall be bid as single lump sum line item as part of bidder proposal. After award submit a schedule of values for the lump sum item including line-item breakdown with unit costs for all work associated with wastewater improvements identified below:

1. Provide new 8-inch sanitary sewer and one new manhole (Manhole B) in the north lane of Virginia Avenue north of the new stormwater curb inlets to route existing house service flow to the junction manhole (Manhole C) upstream of the station wet well. The new sewer will pass under the new storm sewer cross-pipes. Connect the manhole that serves the house services (Manhole A) to the new manhole (Manhole B) sewer located in the road. Demolish the existing 6-inch clay sewer that currently serves the house services from Manhole A to Manhole C.
2. Provide new 4-inch force main in the north ROW green space from the rehabilitated station to the receiving manhole in Ridge Avenue (Manhole F), include connection to manhole and all roadway restoration at this location. Abandon the existing 6-inch force main in place after filling with flowable fill.
3. Provide new black vinyl-coated chain link site fencing with double gate at the station site. Locate the gate at the road.
4. Install new 2-inch potable water main in the south right-of-way. Connect existing services to new watermain and relocate meter boxes as required.
5. Re-grade the wet well site and access drive to raise the top slab elevation to 5.0 feet and the grade adjacent to the slab to 4.5 feet from the current 3.25 feet.
6. Replace the existing asphalt access drive from the road to the pump station slab with a new concrete driveway.
7. Provide new 8-inch sewer from Manhole D in the south ROW to the existing junction manhole (Manhole E) upstream of the wet well to provide clearance for the new storm pipe that crosses the sewer from the ditch bottom inlet to the discharge point.
8. Demolish the existing wet well internals, including pump bases, discharge pipe, submersible pumps, guide rails and brackets, float holders and the like. Provide new items.
9. Demolish the pump station top slab, the valve vault and pump discharge piping and valves and the brick wet well starting 4 feet above the wet well floor. Provide a new 6-foot ID precast concrete wet well to extend the brick wet well up to the new top slab. Provide new top slab for the wet well with aluminum access hatch for wet well and extend slab for the pump discharge piping. Provide a top slab elevation of 5.0 feet (as compared to existing El. 3.25 feet).
10. Provide new above-grade discharge piping with rubber flapper check and plug valve for each pump, a bypass tee with plug valve and air release valve.
11. Provide new 4-inch force main from the station to the existing sewer in Ridge Avenue continuously up-slope to the connection point.
12. Reline the brick wet well and new precast concrete wet well with structural lining.
13. Provide remote pump station control panel and new radio antenna in the north ROW located such that the bottom of the control panel is above 100-year flood elevation (approximately 260 feet east of the pump station).
14. Provide an aluminum platform at elevation 8.0 feet adjacent to the wet well, with two steps up to the platform from the wet well top slab elevation of 5.0 feet. Provide local control panels. Locate the bottom of the panel at minimum elevation 12.0 feet (one foot above 100-year flood elevation of 11.0 feet).

15. Provide conduit and conductors for the pump power and controls from the remote control panels to the station site and connect to a junction box located at elevation 11.0 feet on the elevated platform adjacent to the top slab, as described above.
16. The power to the existing station is an underground service from a power pole located at the east end of Virginia Avenue. Terminate this service. Provide a new service drop from the pole adjacent to the new station main control panel.
17. Erosion control barriers shall be provided as shown on the contract documents and conform to all City, State, and District regulations. Erosion control line item shall be equally divided between stormwater and wastewater lump sum line items.
18. CIPP lining of sanitary piping as shown on plans.
19. Rehabilitation of existing wastewater manholes as described in the plans and specifications.
20. Brick road restoration and curbing costs shall be split in half 50:50 within Contract Item #1.

**Contract Item 2:** Lump Sum stormwater improvements include the following demolition and stormwater improvements and shall be bid as single lump sum line item as part of proposal. After award, provide a schedule of values including line item breakdown with unit costs for all work associated with stormwater improvements identified below:

1. Provide two Type 2 curb inlets on the north side of the road eastward from the station. These curb inlets are piped (north to south) to two new Type 2 curb inlets on the south side of the road. Connect the curb inlets with ERCP pipe to a Type E ditch bottom inlet with concrete collar. From the ditch bottom inlet provide an outfall pipe to a Mitered End Section (MES) for the outfall ERCP. Provide muck removal for bedding the storm pipe and fill under the pipe and over the pipe. The sodded area between the grate inlet west to the MES shall have GeoCell stabilization with sod installed over as shown on drawings.
2. Continue the existing curb in the north right of way westward to the station access road, then south to the ditch bottom inlet. Utilize 6-inch high concrete curb, but transition to a FDOT type drop curb section at the drive entrance to the station to provide access for City vehicles.
3. Provide Type-D curbing with top elevation of 3.75 feet (6-inches above grate inlet) at the location shown in the Contract Documents on the west and south sides of the inlet grate concrete apron.
4. Re-build the brick street associated with construction of cross-pipes of storm sewers.
5. Re-grade and rebuild the brick street from the ditch bottom inlet eastward to eliminate stormwater/tide accumulation. All work associated with the installation of the new sanitary gravity sewer within the roadway limits, including excavation, trenching, roadway restoration required for the installation shall be included in the wastewater work, and omitted from stormwater lump sum pricing.
6. Provide bollards in front of the retaining wall to prevent vehicle access west of the retaining wall.
7. Provide rip-rap downstream of MES, and GeoCell stabilization minimum 10-ft on each side of MES.
8. Erosion control barriers shall be provided as shown on the contract documents and conform to all City, State, and District regulations. Erosion control line item shall be equally divided between stormwater and wastewater lump sum line items.
9. Brick road restoration and curbing costs shall be split in half 50:50 within Contract Item #2.

\* \* \*

**APPENDIX – A**  
**Geotechnical Report**

# TIERRA

December 9, 2020

Hydro Solutions Consulting, LLC  
202 Lake Miriam Drive, Suite E1  
Lakeland, Florida 33759

Attn: Mr. Mike Pekkala, P.E.

**RE: Report of Geotechnical Engineering Services  
Virginia Avenue Stormwater and Wastewater Improvements  
City of Tampa, Florida  
Tierra Project No. 6511-20-224**

Mr. Pekkala:

Tierra, Inc. has completed the geotechnical engineering services for the above referenced project. The results of our field exploration program and subsequent geotechnical evaluations are presented in this report.

Should there be any questions regarding this report, please do not hesitate to contact our office at (813) 989-1354. Tierra would be pleased to continue providing geotechnical and materials testing services throughout the implementation of the project. We look forward to working with you on this and future projects.

Respectfully Submitted,  
**TIERRA, INC.**



Joseph R. Antinori, P.E.  
Geotechnical Engineer  
Florida License No. 73176



Kevin H. Scott, P.E.  
Senior Geotechnical Engineer  
Florida License No. 65514

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## PROJECT DESCRIPTION

### Project Information

The project consists of stormwater and wastewater improvements along Virginia Avenue from west of Ridge Avenue to the Hillsborough River. The City of Tampa has elected to rehabilitate the existing wastewater pump station and improve the stormwater conveyance system. Tierra's involvement is to provide geotechnical recommendations for the installation of approximately 60 feet of 24"X38" Elliptical Reinforced Concrete Pipe (ERCP), a 12½-foot long by 1½-foot wide headwall located at the end of the ERCP adjacent to the Hillsborough River and minor regrading of Virginia Avenue. This report provides geotechnical information for use in the design and construction of the proposed improvements.

### Scope of Services

The objective of our study was to obtain information concerning subsurface conditions at the site in order to base engineering estimates and recommendations. The following services were completed:

1. Reviewed published soils, topographic and potentiometric information. This published information was obtained from the "Tampa, Florida" Quadrangle Map and Potentiometric Map published by the United States Geological Survey (USGS) and the Soil Survey of Hillsborough County, Florida, published by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS).
2. Executed a program of subsurface exploration consisting of borings, subsurface sampling, and field-testing. Tierra performed three (3) Standard Penetration Test (SPT) borings.
3. Visually classified the samples in the laboratory using the Unified Soil Classification System (USCS) and American Association of State Highway and Transportation Officials (AASHTO) classification system.
4. Estimated design parameters for use in headwall design.
5. Prepared this engineering report, which summarizes the course of study pursued, the field and laboratory data generated, subsurface conditions encountered and our geotechnical recommendations and construction considerations.

## REVIEW OF PUBLISHED DATA

### USGS Quadrangle Map

The project site is adjacent to the Hillsborough River in Tampa, Florida. Based on a review of the "Tampa, Florida" United States Geological Survey (USGS) Quadrangle Map, the natural ground elevation at the project site appears to be on the order of approximately +0 to +5 feet, National Geodetic Vertical Datum of 1929 (NGVD).

## Potentiometric Surface Maps

Based on a review of the “Potentiometric Surface of the Upper Floridan Aquifer, West-Central Florida” maps published by the USGS, the potentiometric surface elevation of the Upper Floridan Aquifer at the project site appears to range from approximately +10 to +20 feet, NGVD 29.

## Hillsborough County Soil Survey

Based on a review of the Hillsborough County Soil Survey, it appears that there is one (1) primary soil-mapping unit noted within the vicinity of the project site. The general soil properties are presented in the following table, as described in the Soil Survey.

USDA Map Symbol and Soil Name	Depth (in)	Soil Classification		Permeability (in/hr)	pH	Seasonal High Water Table	
		USCS	AASHTO			Depth (feet)	Months
(59) Winder	0-4	SP-SM, SM	A-3, A-2-4	6.0 - 20.0	5.6 - 8.4	0.3 - 1.5	Jul-Oct
	4-10	SM, SP-SM	A-2-4, A-3	6.0 - 20.0	5.6 - 8.4		
	10-14	SC, SM	A-2-4, A-6, A-4	0.2 - 0.6	5.6 - 8.4		
	14-30	SC, CL	A-7-6, A-6	0.1 - 0.2	5.6 - 8.4		
	30-58	SC, CL, SC-SM	A-4, A-6	0.1 - 0.2	5.6 - 8.4		
	58-80	SC, SM	A-2-4, A-6, A-4	2.0 - 6.0	5.6 - 8.4		

It should be noted that information contained in the USDA NRCS Soil Survey may not be reflective of current subsurface conditions, particularly if recent development in the project vicinity has modified existing soils or surface/subsurface drainage.

## FIELD EXPLORATION AND SUBSURFACE CONDITIONS

Prior to commencing field activities, Tierra created a boring location plan with the design files provided by Hydro Solutions Consulting (HSC). Tierra performed three (3) SPT borings to depths ranging from 15 to 25 feet below the existing ground surface.

The borings were located in the field by a representative of Tierra using Garmin Etrex® hand-held Global Positioning System (GPS) equipment with a reported accuracy of ±10 feet and should therefore be considered approximate. The approximate boring locations are presented on the **Report of Core Borings** sheet in the **Appendix**.

The SPT borings were performed with the use of a drill rig using Bentonite Mud drilling procedures. The soil sampling was performed in general accordance with American Society for Testing and Materials (ASTM) Test Designation D-1586. SPT resistance N-values were taken continuously to a depth of 10 feet and at intervals of 5 feet thereafter to the boring termination depth at boring locations SPT-1 and SPT-2. At boring location SPT-3, the initial 4 feet were manually augered to verify utility clearance. SPT resistance N-values were then taken continuously to a depth of 10 feet and at intervals of 5 feet thereafter to the boring termination depth. The soil samples were classified in the field and transported to our laboratory for review.

The results of the SPT borings performed are presented on the **Report of Core Borings** sheet in the **Appendix**. The soil strata encountered in the borings performed for the project are summarized in the following table:

Stratum	Soil Description	USCS Symbol	AASHTO Symbol
1	Gray to Brown Sand to Sand with Silt	SP/SP-SM	A-3
2	Gray to Brown Silty Sand	SM	A-2-4
3	Green-Gray Clayey Silty Sand	SM-SC	A-4
5	Dark Brown to Black Organic Sand with Silt to Muck	SP-SM/PT	A-8
6	Weathered Limestone	--- <sup>1</sup>	--- <sup>1</sup>
--- <sup>1</sup> USCS does not have a soil classification for Limestone			

The subsurface soil stratification is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The soil profiles included in the **Appendix** should be reviewed for specific information at individual boring locations. These profiles include soil descriptions, stratifications, and penetration resistances when applicable. The stratifications shown on the boring profiles represent the conditions only at the actual boring location. Variations did occur and should be expected between boring locations. The stratifications represent the approximate boundary between subsurface materials and the actual transition may be gradual.

### Groundwater Information

The groundwater table was measured at the existing ground surface to a depth of approximately 2 feet below existing grade at the time the borings were performed. It should be noted that due to the proximity of the project site to Tampa Bay, the GWT/SHGWT will be influenced by tidal fluctuations. During site visits, Tierra representatives observed water levels 2 to 3 feet above grade at location SPT-1. Groundwater levels tend to fluctuate with the tide, periods of prolonged drought and extended rainfall and may be affected by man-made influences. The encountered groundwater levels measured during completion of the SPT borings are presented adjacent to the soil profiles in the **Appendix**.

## EVALUATION AND RECOMMENDATIONS

### General

All earthwork and construction activities should be completed in accordance with the City of Tampa and/or FDOT Standard Plans and Specifications. In general, the existing subsurface soils encountered within the borings are suitable for the proposed installation of the proposed 24X38 ERCP, headwall construction and regrading of the roadway after proper site and subgrade preparation including removal of organic soils.

## Organic Soils

Organic soils (Stratum 4) were encountered from the ground surface to approximately 4 feet below the existing ground surface. The organic soils shall be entirely removed and replaced in accordance with Section 125 of the FDOT Standard Specifications for Road and Bridge Construction. The horizontal removal limits of the organic soils should extend a minimum of 2 feet beyond the perimeter of the headwall. Removal of organic soils and utilization of materials for regrading of Virginia Avenue should be completed in accordance with FDOT Standard Plans Indices 120-002 and 120-001, respectively.

## On Site Soil Suitability

The suitability of the soil for reuse in construction should be evaluated against the project engineering fill requirements. Variations in the subsurface stratification should be expected between borings. All fill should be placed in accordance with the recommendations provided in this report, and the current City of Tampa and/or FDOT Standard Plans and Specifications. The subsurface soil conditions encountered are presented on the **Report of Core Borings** sheet in the **Appendix**.

The material from Stratum 1 appears satisfactory for use in roadway construction when utilized in accordance with FDOT Standard Plans and Specifications. In general, Stratum 1 may be moved and used for grading purposes, site leveling, and fill in other areas, provided the fill is free of organic soil, clay, debris or any other material deemed unsuitable for construction and evaluated against engineering fill requirements.

## Headwall Recommendations

It is our understanding that the drainage headwall will be supported on a shallow foundation and will be designed by others. Organic soils (Stratum 4) were encountered within the borings at depths ranging from the ground surface to 4 feet below the existing ground surface. These soils should be removed and replaced in accordance with FDOT Standard Plans and Specifications.

Based on the anticipated construction and that the shallow organic soils are removed, field results indicate the headwall foundation may be designed for a nominal bearing pressure of 3,000 psf and a modulus of subgrade reaction of 50 pcf. The foundation should bear on properly placed and compacted cohesionless (sand) fill or properly compacted sandy Stratum 1 soils encountered at the site. The existing near surface sandy soils should be improved by compaction after clearing operations to improve foundation support and reduce total and differential settlement.

## **Construction Considerations**

### **General**

The overall site preparation and mechanical densification work should be in accordance with the City of Tampa and/or FDOT Standard Plans and Specifications.

### **Groundwater and Dewatering Concerns**

The groundwater levels presented in this report are the levels that were measured at the time of our field activities. Fluctuation should be anticipated. We recommend that the Contractor determine the actual groundwater levels at the time of the construction to determine groundwater impacts on his construction procedure. Care should be given to open excavations and site grading to minimize ponding of surface water.

As previously mentioned, the potentiometric surface elevation of the Upper Floridan Aquifer at the project site appears to be approximately +10 to +20 feet, NGVD 29. The contractor's dewatering equipment and methods should be adequate to control a potentiometric elevation up to +20 feet, NGVD 29 at no additional cost to the City of Tampa.

Weathered limestone was encountered within the borings at relatively shallow depths. Limestone is porous and will be difficult to dewater. The Contractor shall anticipate variations in the depth, consistency and porosity of this material.

### **Protection of Existing Structures**

Construction operations are proposed in close proximity of existing residential structures. Monitoring and Protection of existing structures should be in accordance with the City of Tampa and/or FDOT Specifications. It is recommended that vibratory equipment not be used within 75 feet of residential structures and that a pre and post condition survey of adjacent structures be completed.

### **Excavations**

Drilling and excavations into and/or through the relatively shallow limestone material will be difficult and will require non-conventional construction techniques and specialized excavation and/or drilling equipment. In addition, limestone is porous and will be difficult to dewater. The Contractor shall anticipate variations in the depth and hardness of this material.

Excavations and temporary side slopes should comply with the Occupational Safety and Health Administration's (OSHA) trench safety standards, 29 C.F.R., s. 1926.650, Subpart P, all subsequent revisions or updates of OSHA's referenced standard adopted by the Department of Labor and Employment Security and Florida's Trench Safety Act, Section 553.62, Florida Statutes. We are providing this information solely as a service to our client. Tierra does not assume responsibility for construction site safety or the contractor's or other party's compliance with local, state, and federal safety or other regulations.

## **REPORT LIMITATIONS**

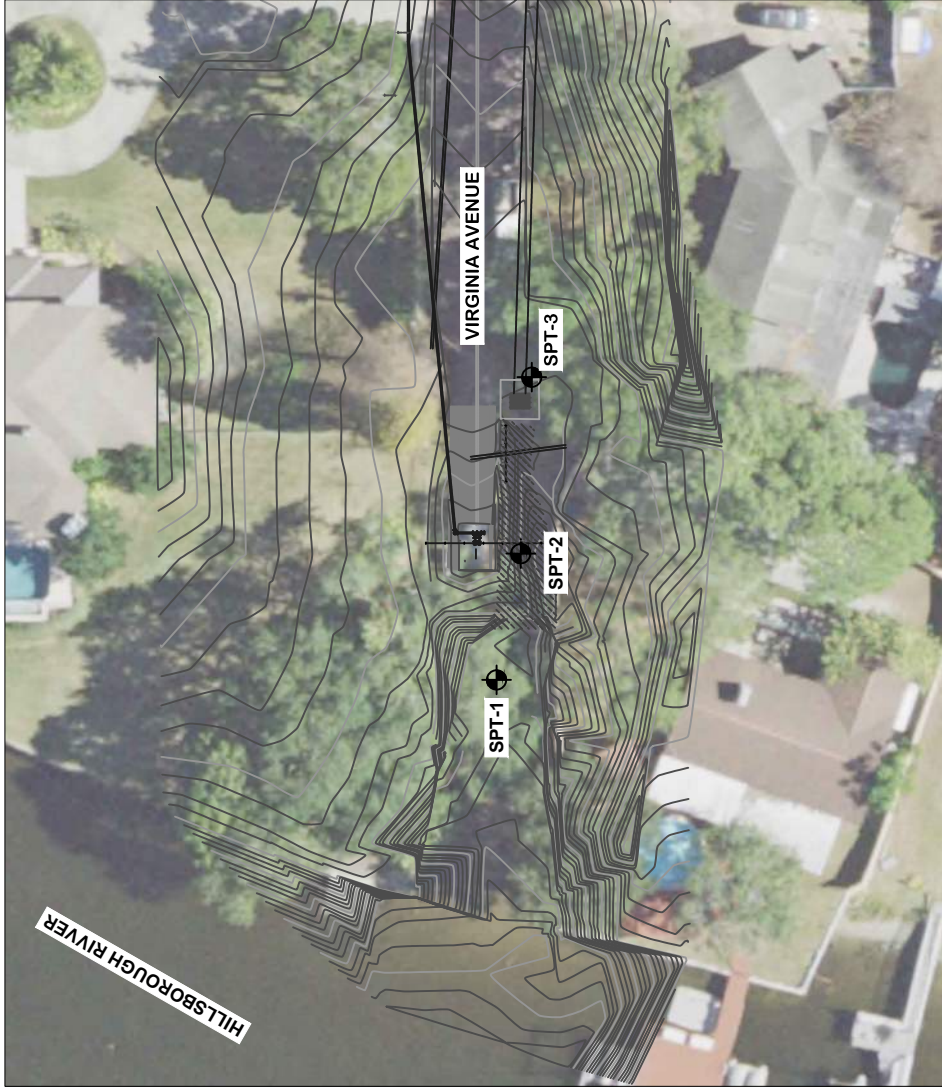
The analyses, conclusions and recommendations contained in this report are opinions based on the site conditions and project layout described herein and further assume that the conditions observed in the exploratory borings are representative of the subsurface conditions throughout the site, i.e., the subsurface conditions elsewhere on the site are the same as those disclosed by the borings.

This report was prepared for the exclusive use of the Hydro Solutions Consulting, LLC and their client for evaluating the design of the project as it relates to the geotechnical aspects discussed herein. It should be made available to prospective contractors for information on factual data only and not as a warranty of subsurface conditions included in this report. Unanticipated soil conditions may require that additional expense be made to attain a properly constructed project.

# **APPENDIX**

## Report of Core Borings

# BORING LOCATION PLAN



# LEGEND

- 1 GRAY TO BROWN SAND TO SAND WITH SILT (SP/SP-SM) [A-3]
- 2 GRAY TO BROWN SILTY SAND (SM) [A-2-4]
- 3 GREEN-GRAY CLAYEY SILTY SAND (SM-SC) [A-4]
- 4 DARK BROWN TO BLACK ORGANIC SAND WITH SILT TO MUCK (SP-SM/PT) [A-8]
- 5 CALCAREOUS CLAY TO WEATHERED LIMESTONE

APPROXIMATE LOCATION OF SPT BORING  
GROUNDWATER LEVEL ENCOUNTERED DURING INVESTIGATION

N SPT N-VALUE IN BLOWS/FOOT FOR 12 INCHES OF PENETRATION (UNLESS OTHERWISE NOTED)

SP UNIFIED SOIL CLASSIFICATION SYSTEM

A-3 AASHTO SOIL CLASSIFICATION SYSTEM

50/4 NUMBER OF BLOWS FOR 4 INCHES OF PENETRATION

HA HAND AUGERED TO VERIFY UTILITY CLEARANCES

NOTES:

- THE BORINGS WERE LOCATED IN THE FIELD BY A REPRESENTATIVE OF TERRA USING GARMIN ETRX<sup>®</sup> HAND-HELD GLOBAL POSITIONING SYSTEM (GPS) EQUIPMENT WITH A REPORTED ACCURACY OF ±10 FEET AND SHOULD THEREFORE BE CONSIDERED APPROXIMATE.
- BASED ON A REVIEW OF THE "POTENTIOMETRIC SURFACE OF THE UPPER FLORIDAN AQUIFER, WEST-CENTRAL FLORIDA" MAPS PUBLISHED BY THE USGS, THE POTENTIOMETRIC SURFACE ELEVATION OF THE UPPER FLORIDAN AQUIFER AT THE PROJECT SITE APPEARS TO RANGE FROM APPROXIMATELY +10 TO +20 FEET, NGVD 29. CONSTRUCTION DEWATERING EQUIPMENT AND METHODS SHOULD BE ADEQUATE TO CONTROL A POTENTIOMETRIC ELEVATION UP TO +20 FEET, NGVD 29 AT NO ADDITIONAL COST TO THE CITY OF TAMPA.
- DRILLING AND EXCAVATIONS INTO AND/OR THROUGH THE RELATIVELY SHALLOW LIMESTONE MATERIAL WILL BE DIFFICULT AND WILL REQUIRE NON-CONVENTIONAL CONSTRUCTION TECHNIQUES AND SPECIALIZED EXCAVATION AND/OR DRILLING EQUIPMENT. IN ADDITION, LIMESTONE IS POROUS AND WILL BE DIFFICULT TO DEWATER. VARIATIONS IN THE DEPTH AND HARDNESS OF THIS MATERIAL SHOULD BE ANTICIPATED.

- 200 PERCENT PASSING #200 SIEVE
- NMC NATURAL MOISTURE CONTENT (%)
- LL LIQUID LIMIT (%)
- PI PLASTICITY INDEX (%)
- OC ORGANIC CONTENT (%)

A - WITH TRACE ORGANICS

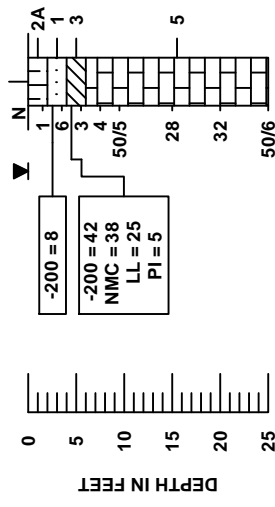
# SOIL PROFILES

ENVIRONMENTAL CLASSIFICATION:  
SUBSTRUCTURE CONCRETE: EXTREMELY AGGRESSIVE  
(WATER CHLORIDES = 3,000 PPM AND RESISTIVITY = 300 OHM-CM)  
SUBSTRUCTURE STEEL: EXTREMELY AGGRESSIVE  
(WATER CHLORIDES = 3,000 PPM AND RESISTIVITY = 300 OHM-CM)

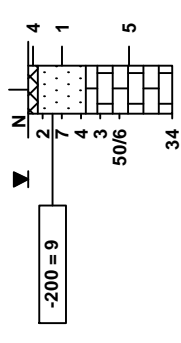
SOIL TEST RESULTS  
RESISTIVITY: 1,600 TO 2,400 OHM-CM  
CHLORIDES: 135 TO 165 PPM  
SULFATES: 144 TO 225  
pH: 8.4 TO 8.6

WATER TEST RESULTS  
RESISTIVITY: 300 OHM-CM  
CHLORIDES: 3,000 PPM  
SULFATES: 230 PPM  
pH: 7.3

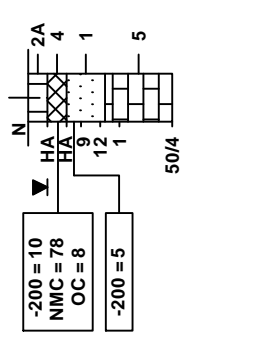
BOR # SPT-1  
EASTING 502550  
NORTHING 1325656  
DATE 11/17/2020  
HAMMER AUTOMATIC  
RIG D-25



BOR # SPT-2  
EASTING 502583  
NORTHING 1325650  
DATE 11/17/2020  
HAMMER AUTOMATIC  
RIG D-25



BOR # SPT-3  
EASTING 502629  
NORTHING 1325647  
DATE 11/17/2020  
HAMMER AUTOMATIC  
RIG D-25



AUTOMATIC HAMMER	
GRANULAR MATERIALS-RELATIVE DENSITY	SPT (BLOWS/FT.)
VERY LOOSE	LESS THAN 3
LOOSE	3 TO 8
MEDIUM	8 TO 24
DENSE	24 TO 40
VERY DENSE	GREATER THAN 40
SILTS AND CLAYS CONSISTENCY (BLOWS/FT.)	
VERY SOFT	LESS THAN 1
SOFT	1 TO 3
FIRM	3 TO 6
STIFF	6 TO 12
VERY STIFF	12 TO 24
HARD	GREATER THAN 24

DRAWN BY: SW  
CHECKED BY: JMN

APPROVED BY: JRA  
DATE: NOV 2020

ENGINEER OF RECORD:  
JOSEPH R. ANTINORI, P.E.  
FLORIDA LICENSE NO.: 73176



SCALE: NOTED

PROJECT NUMBER: 6511-20-224

GEOTECHNICAL ENGINEERING SERVICES  
VIRGINIA AVENUE STORMWATER IMPROVEMENTS  
HILLSBOROUGH COUNTY, FLORIDA

SHEET 1



## **APPENDIX – B**

### **Tampa Water Technical Manual**

**Reference Tampa Water Department Web Link Below**

<https://www.tampa.gov/document/water-technical-manual-17416>