The Enclosed Document Is Provided For Your Convenience.

Please Email ALL Questions:

MailTo:ContractAdministration@TampaGov.net

Please Let Us Know If You Plan To Bid

City of Tampa
Contract Administration Department
306 E. Jackson St. #280A4N
Tampa, FL 33602
(813)274-8456

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 13-C-00019

HOWAD F. CURREN AWTP SCREEN AND GRIT BUILDING NO. 1 BAR SCREEN REPLACEMENT

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

SEPTEMBER 2013

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

****

BID NOTICE MEMO

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

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CONTRACT NO.: 13-C-00019; Howard F. Curren AWTP Screen and Grit No. 1 Bar Screen Replacement
BID DATE: October 8, 2013 **ESTIMATE:** $1,800,000 **SCOPE:** The project comprises furnishing all labor, materials and equipment to remove, dispose of, and replace 3 bar screens, and 3 sluice gates, removal of access platforms, removal/disposal of plant air piping, concrete channel and concrete floor restoration and coating, electrical work comprising removal of existing motors, controls, conduits, conductors, support structures, modification of Motor Control Center, furnish and install transfer switch, conduits, terminal boxes, control equipment. **PRE-BID CONFERENCE:** Tuesday, September 24, 2013, 9:00 a.m., AWTP Maintenance Building Training Room, 2700 Maritime Drive, Tampa, FL 33619. Attendance is not mandatory, but recommended. Firms must email names and companies represented for all attendees a minimum of 24 hours in advance to Richard.Birchmire@tampagov.net Miriam.vliet@tampagov.net and Elaine.Tait@tampagov.net to obtain security clearance.

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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. Pre-Bid Conference is held at the same location unless otherwise indicated. Plans and Specifications and Addenda for this work may be examined at, and downloaded from, www.demandstar.com. Backup files are available at http://www.tampagov.net/dept_contract_administration/programs_and_services/construction_project_bidding/index.asp. Subcontracting opportunities may exist for City certified Small Local Business Enterprises (SLBEs). A copy of the current SLBE directory may be obtained at www.Tampagov.net. Phone (813) 274-8456 for assistance. **Email Technical Questions to: contractadministration@tampagov.net .**

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NOTICE TO BIDDERS
CITY OF TAMPA, FLORIDA
Contract 13-C-00019; Howard F. Curren AWTP Screen and Grit Building No. 1 Bar Screen Replacement

Sealed Proposals will be received by the City of Tampa no later than 1:30 P.M., October 8, 2013, in the 4th 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, dispose of, and replace 3 bar screens, and 3 sluice gates, removal of access platforms, removal/disposal of plant air piping, concrete channel and concrete floor restoration and coating, electrical work comprising removal of existing motors, controls, conduits, conductors, support structures, modification of Motor Control Center, furnish and install transfer switch, conduits, terminal boxes, control equipment 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/dept_contract_administration/programs_and_services/construction_project_bidding/index.asp. 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 Performance and Payment Bonds within twenty (20) days after receipt of Notice of Award of Contract.

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.

Communication with City Staff

Pursuant to City of Tampa Ordinance 2010-92, during the solicitation period, including any protest and/or appeal, NO CONTACT initiated by bidders or responders with City officers or employees, other than the individuals specified below is permitted:
Director of Contract Administration, David Vaughn
Contracts Management Supervisor, Jim Greiner
Contract Officer, Jody Gray
The City's Legal Department staff
The City's Contract Administration Department staff.
Technical Questions and Requests For Information should be directed to the Department via
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 Statues.

In accordance with the City of Tampa's Equal Business Opportunity Ordinance, a Goal may have been established for subcontracting with Small Local Business Enterprises, SLBEs, certified by the City. Links to further information and a list of SLBEs are on the Department's Construction Project Bidding Web page. A link to the current complete directory of SLBEs is on the Minority Business Development Office Website.

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

I-1.01 GENERAL:

The proposed work is the Howard F. Curren AWTP Screen and Grit Building No. 1 Bar Screen Replacement 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.

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. 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, with notice given to all prospective bidders at the respective fax numbers or e-mail addresses furnished, for such purposes. 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 SIGNATURE OF BIDDERS: Section I-2.07 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. The Proposal shall also bear the seal of the corporation attested by its secretary.

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 Country where its principal place of business is. Failure to submit what is required is grounds to reject the bid of that bidder.

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 300 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 $500.00 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.

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

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 Pages beginning with INS-1. Before commencing work, the Contractor shall provide the evidence of the insurance required on a Certificate of Insurance accompanied by evidence of authority to bind the insurance company or companies such as agents license, power of attorney, or letter of authority.

I-1.10 EQUAL BUSINESS OPPORTUNITY PROGRAM / SLBE / REQUIREMENTS

In accordance with the City of Tampa's Equal Business Opportunity Ordinance, a goal of 7.2% has been established for subcontracting with Small Local Business Enterprises, (SLBEs), certified by the City. The goal is based upon the availability of the firms listed on the Goal Worksheet and as posted in the "SLBEs" link under this Contract's notice on the Department's Construction Project Bidding web page.

BIDDERS MUST SOLICIT ALL SLBEs ON THAT LIST and provide documentation of emails, faxes, phone calls, letters, or other communication with the firms as a first step to demonstrate Good Faith Efforts to achieve the goal. The list is formatted to facilitate e-mail solicitations to the listed firms by copying and pasting e-mail addresses.

Bidders may explore other opportunities for subcontracting with SLBEs by consulting the current directory of all certified SLBEs posted on the Minority Business Development Office web page.

GOOD FAITH EFFORT COMPLIANCE PLAN REQUIRED - When a Goal has been established, the Bidder must submit, with its bid, completed to the fullest extent possible, a Good Faith Effort Compliance Plan using the form GFECP contained herein. Additional documentation is required whenever an SLBE subcontractor's low quote is not utilized. Supplemental information or documentation concerning the Bidder's Compliance Plan may be required prior to award as requested by the City.

DIVERSITY MANAGEMENT INITIATIVE, DMI, DATA REPORTING FORMS REQUIRED - Bidders must submit, with its bid, "DMI-Solicited" forms listing all subcontractors solicited and "DMI-Utilized" forms listing all subcontractors to be utilized. Supplemental forms, documentation, or information may be submitted at bid time or as requested by the City.

After an award, "DMI-Payments" forms are to be submitted with payment requests to report payments to subcontractors.

Bidders may visit the Minority Business Development Office's web page at TampaGov.net for other information about the SLBE program, FAQ's, and the latest SLBE directory of certified firms.

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 Key rating Guide Property-Liability.

I-1.12 PUBLIC CONSTRUCTION BOND:

The Bidder who is awarded the Contract will be required to furnish a Public Construction Bond upon the forms provided herein, each equal to 100 percent of the Contract price, such Bonds to be issued and executed by (a) surety company(ies) acceptable to the City of Tampa and licensed to underwrite contracts in the State of Florida.

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

I-1.13 AGREEMENT
Section 2 – Powers of the City's Representatives
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 Paragraph 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 Contract 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.

I-1.14 Section 5 – subcontracts and Assignments, Article 5.01, Page A-7, Last Paragraph:
Change "…twenty-five (25) percent… "to fifty-one (51) percent…"

Section 10-Payments, Article .05 Partial Payments, 1st Paragraph, 1st Sentence:
Change "…fair value of the work done, and may apply for…" to "…fair value of the work done, and shall apply for…"

I-1.15 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 the contractor to perform work pursuant to the contract.

I-1.16 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. The documents may be downloaded from the City's web site, at
http://www.tampagov.net/dept_contract_administration/programs_and_services/construction_project_bidding/index.asp

I-1.17 PAYMENT DISPUTE RESOLUTION

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

INSTRUCTIONS TO BIDDERS
SECTION 1 - SPECIAL INSTRUCTIONS

I-1.18 SCRUTINIZED COMPANIES.

For Contracts $1,000,000 and greater, if the City determines the Contractor submitted a false certification under Section 287.135(5) of the Florida Statutes, or if the Contractor has been placed on the Scrutinized Companies with Activities in the Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, the City shall either terminate the Contract after it has given the Contractor notice and an opportunity to demonstrate the City's determination of false certification was in error pursuant to Section 287.135(5)(a) of the Florida Statutes, or maintain the Contract if the conditions of Section 287.135(4) of the Florida Statutes are met.

I-1.19 FLORIDA'S PUBLIC RECORDS LAW

4.33.3 The City of Tampa is a public agency subject to Chapter 119, Florida Statutes. In accordance with Florida Statutes, 119.0701, if applicable, Contractor shall comply with Florida's Public Records Law. Specifically, the Contractor shall:

1. Keep and maintain public records that ordinarily and necessarily would be required by the City in order to perform the service;

2. Provide the public with access to such public records 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 public records that are exempt or that are confidential and exempt from public record requirements are not disclosed except as authorized by law;

4. Meet all requirements for retaining public records and transfer to the City, at no cost, all public records in possession of the contractor upon termination of the contract and destroy any duplicate public records that are exempt or confidential and exempt. All records stored electronically must be provided to the City in a format that is compatible with the information technology systems of the agency.

4.33.4 The failure of Contractor to comply with the provisions set forth in this Article shall constitute a Default and Breach of this award and the City shall enforce the Default in accordance with the provisions set forth in the DEFAULT/RE-AWARD section of this document.

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 time 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

During the life of the award/contract the Awardee/Contractor shall provide, pay for, and maintain insurance with companies authorized to do business in Florida, with an A.M. Best rating of B+ (or better) Class VII (or higher), or otherwise be acceptable to the City if not rated by A.M. Best. All insurance shall be from responsible companies duly authorized to do business in the State of Florida.

All commercial general liability insurance policies (and Excess or Umbrella Liability Insurance policies, if applicable) shall provide that the City is an additional insured as to the operations of the Awardee/Contractor under the award/contract including the additional insured endorsement, the subrogation wavier endorsement, and the Severability of Interest Provision. In lieu of the additional named insured requirement, if the Awardee/Contractor's company has a declared existing policy which precludes it from including additional insureds, the City may permit the Contractor to purchase an Owners and Contractors Protective Liability policy. Such policy shall be written in the name of the City at the same limit as is required for General Liability coverage. The policy shall be evidenced on an insurance binder which must be effective from the date of issue until such time as a policy is in existence and shall be submitted to the City in the manner described below as applicable to certificates of insurance.

The insurance coverages and limits required must be evidenced by a properly executed Acord 25 Certificate of Insurance form or its equivalent. Each Certificate must be personally manually signed by the Authorized Representative of the insurance company shown in the Certificate with proof that he/she is an authorized representative thereof. Thirty days' written notice must be given to the City of any cancellation, intent not to renew, or reduction in the policy coverages, except in the application of the aggregate liability limits provisions. Should any aggregate limit of liability coverage be reduced, it shall be immediately increased back to the limit required by the contract. The insurance coverages required herein are to be primary to any insurance carried by the City or any self-insurance program thereof.

The following coverages are required:

A. Commercial General Liability Insurance shall be provided on the most current Insurance Services Office (ISO) form or its equivalent. This coverage must be provided to cover liability arising from premises and operations, independent contractors, products and completed operations, personal and advertising injury, contractual liability, and XCU exposures (if applicable). Completed operations liability coverage shall be maintained for a minimum of one-year following completion of work. The amount of Commercial General Liability insurance shall not be less than the amount specified.

(a) $1,000,000 per occurrence and a $2,000,000 general aggregate for projects valued at $2,000,000 or less. General aggregate limit for projects over that price shall equal or exceed the price of the project. An Excess or Umbrella Liability insurance policy can be provided to meet the required limit. Risk Management may be contacted for additional information regarding projects of this nature.

B. Automobile Liability Insurance shall be maintained in accordance with the laws of the State of Florida, as to the ownership, maintenance, and use of all owned, non-owned, leased, or hired vehicles. The amount of Automobile Liability Insurance shall not be less than the amount specified.

(a) $500,000 combined single limit each occurrence bodily injury & property damage- for projects valued at $100,000 and under

(b) $1,000,000 combined single limit each occurrence bodily injury & property damage – for projects valued over $100,000

C. Worker's Compensation and Employer's Liability Insurance shall be provided for all employees engaged in the work under the contract, in accordance with the Florida Statutory Requirements. The amount of the Employer's Liability Insurance shall not be less than:

(a) $500,000 bodily injury by accident and each accident, bodily injury by disease policy limit, and bodily injury by disease each employee – for projects valued at $100,00 and under
(b) $1,000,000 bodily injury by accident and each accident, bodily injury by disease policy limit, and bodily injury by disease each –for projects valued over $100,000

D. Excess Liability Insurance or Umbrella Liability Insurance may compensate for a deficiency in general liability, automobile, or worker's compensation insurance coverage limits. If the Excess or Umbrella policy is being provided as proof of coverage, it must name the City of Tampa as an additional insured **(IF APPLICABLE).**

E. Builder's Risk Insurance, specialized policy designed to cover the property loss exposures that are associated with construction of buildings. The amount of coverage should not be less than the amount of the project. **(IF APPLICABLE).**

F. Installation Floater- a builder's risk type policy that covers specific type of property during its installation, is coverage required for highly valued equipment or materials such as compressors, generators, or other machinery that are not covered by the builder's risk policy **(IF APPLICABLE).**

G. Longshoreman's & Harbor Worker's Compensation Act/Jones Act coverage shall be maintained for work being conducted upon navigable water of the United States. The limit required shall be the same limit as the worker's compensation/employer's liability insurance limit **(IF APPLICABLE).**

H. Professional Liability shall be maintained against claims of negligence, errors, mistakes, or omissions in the performance of the services to be performed and furnished by the Awardee/Contractor or any of its subcontractors when it acts as a DESIGN PROFESSIONAL. The amount of coverage shall be no less than amount specified **(IF APPLICABLE).**

(a) $1,000,000 per incident and general aggregate. Note all claims made policies must provide the date of retroactive coverage.

The City may waive any or all of the above referenced insurance requirements based on the specific nature of goods or services to be provided under the award/contract.

ADDITIONAL INSURED - The City must be included as an additional insured by on the general and (Excess or Umbrella liability policies) if applicable. Alternatively, the Contractor may purchase a separate owners protective liability policy in the name of the City in the specified amount as indicated in the insurance requirements.

CLAIMS MADE POLICIES - If any liability insurance is issued on a claims made form, Contractor agrees to maintain uninterrupted coverage for a minimum of one year following completion and acceptance of the work either through purchase of an extended reporting provision, or through purchase of successive renewals with a retroactive date not later than the beginning of performance of work for the City. The retroactive date must be provided for all claims made policies.

CANCELLATION/NON-RENEWAL - Thirty (30) days written notice must be given to the City of any cancellation, intent to non-renew or material reduction in coverages (except aggregate liability limits). However, ten (10) days notice may be given for non-payment of premium. Notice shall be sent to the City of Tampa Department of Public Works, 306 E. Jackson Street, Tampa, FL 33602.

NUMBER OF POLICIES - General and other liability insurance may be arranged under single policies for the full amounts required or by a combination of underlying policies with the balance provided by an excess or umbrella liability insurance policy.

WAIVER OF SUBROGATION - Contractor waives all rights against City, its agents, officers, directors and employees for recovery of damages to the extent such damage is covered under the automobile or excess liability policies.

SUBCONTRACTORS - It is the Contractor's responsibility to require all subcontractors to maintain adequate insurance coverage.

PRIMARY POLICIES - The Contractor's insurance is primary to the City's insurance or any self insurance program thereof.

RATING - All insurers shall be authorized to do business in Florida, and shall have an A.M. Best rating of B+ (or better), Class VII (or higher), or otherwise be acceptable to the City if not rated by A.M. Best.

DEDUCTIBLES - The Contractor is responsible for all deductibles. In the event of loss which would have been covered but for the presence of a deductible, the City may withhold from payment to Contractor an amount equal to the deductible to cover such loss should full recovery not be obtained under the insurance policy.

INSURANCE ADJUSTMENTS - These insurance requirements may be increased, reduced, or waived at the City's sole option with an appropriate adjustment to the Contract price.

Document updated on 12/22/2009 by RLD (Risk Management)

City of Tampa MBD Office

Underutilized WMBEs

9/5/13

ELECTRICAL SERVICES

Brown & Brown Electric, Inc. **Federal**
59-2283934

6555 N.W. 9th Ave. S-205
Ft. Lauderdale, FL 33310-5003

Phone (954) 938-8986
Fax (954) 938-9272

Minority African American
Contact Winston Brown

E-mail winston@brownandbrownelectric.com

Acktel Electric Company, Inc. **Federal**
59-3579225

P.O. Box 52292
Jacksonville, FL 32201-2292

Phone (904) 356-1274
Fax (904) 356-1374

Minority African American
Contact Sedley Huey

E-mail acktelel@bellsouth.net

All-In-One Electric, Inc. **Federal**
04-3689273

1201 W Waters Ave.
Tampa, FL 33604

Phone (813) 849-6331
Fax (813) 514-0473

Minority African American
Contact Rodney Jones

E-mail allinoneelectric@msn.com

Romero & Gray Electric, Inc. **Federal**
57-1164017

6001 Johns Rd.
Tampa, FL 33634

Phone (813) 881-1876
Fax (813) 249-4840

Minority African American
Contact Alfredo Romero

E-mail mgray@rg-electric.com

Prime Electric, LLC **Federal**
20-1137443

1229 W. Main St
Leesburg, FL 34748

Phone (352) 728-5966
Fax (352) 728-5921

Minority African American
Contact Wylie Hamilton

E-mail wylie@primeelectricllc.net

City of Tampa MBD Office

Underutilized WMBEs

9/5/13

MECHANICAL CONTRACTING SERVICES

One Degree Air Condition & Refrigeration, LLC **Federal**
26-2553764

PO Box 22684
Tampa, FL 33622

Phone (813) 244-0658
Fax (813) 884-4999

Minority African American
Contact Michael Mills

E-mail snakeeyes4204@aol.com

A & R Air Conditioning & Refrigeration, Inc. **Federal**
27-2506848

P.O. Box 291048
Tampa, FL 33687-1048

Phone (813) 924-3696
Fax

Minority African American
Contact Rodney Thomas

E-mail a_rairconditioning@yahoo.com

Just Koolin Air Conditioning and Heating, Inc. **Federal**
45-5494658

501 S. Falkenburg Road, Ste A5
Tampa, FL 33619

Phone (813) 444-2594
Fax (813) 354-2594

Minority African American
Contact Michael Solomon

E-mail Justkoolinac@gmail.com

City of Tampa MBD Office

SLBE Goal Setting Firms Report

as of 9/5/2013

ELECTRICAL SERVICES

Apollo Construction & Engineering Services, Inc. **Federal Number** 59-2811166

P.O. Box 5848
Sun City Center, FL 33571-5848

Phone (813) 645-4926
Fax (813) 645-3351
Minority Small Business
Contact Thomas Kamprath
E-mail tkamprath@apollo-construction.com

Gaylord / Miller Electric Corp **Federal Number** 59-1631953

602 North Oregon Avenue
Tampa, FL 33606

Phone (813) 254-4681
Fax (813) 254-9473
Minority Small Business
Contact James A. Tepper
E-mail james.gmelectric@verizon.net

All-In-One Electric, Inc. **Federal Number** 04-3689273

1201 W Waters Ave.
Tampa, FL 33604

Phone (813) 849-6331
Fax (813) 514-0473
Minority Small Business
Contact Rodney Jones
E-mail allinoneelectric@msn.com

Romero & Gray Electric, Inc. **Federal Number** 57-1164017

6001 Johns Rd.
Tampa, FL 33634

Phone (813) 881-1876
Fax (813) 249-4840
Minority Small Business
Contact Alfredo Romero
E-mail mgray@rg-electric.com

JDP Electric, Inc. **Federal Number** 59-3511620

6600 N. Florida Avenue
Tampa, FL 33604

Phone (813) 234-4004
Fax (813) 236-0394
Minority Small Business
Contact Jeffrey Priede
E-mail jdpinc@tampabay.rr.com

Cousins Electrical Contracting, Inc. **Federal Number** 20-1736062

P. O. Box 320534
Tampa, FL 33679

Phone (813) 907-5323
Fax (813) 994-1047
Minority Small Business
Contact Marilee Cousins
E-mail couselec@aol.com

Mandy Electric, Inc. **Federal Number** 59-2914874

9353 E. Fowler Ave.
Thonotosassa, FL 33592

Phone (813) 264-9234
Fax (813) 333-9701
Minority Small Business
Contact Armando Hernandez
E-mail lhernandez@mandyselectric.com

City of Tampa MBD Office

SLBE Goal Setting Firms Report

as of 9/5/2013

ELECTRICAL SERVICES

Ralph A. Philbrook, III LLC — **Federal Number** 61-1460231

3316 Bainbridge Dr.
Holiday, FL 34691

Phone (727) 847-3766
Fax (727) 845-3567
E-mail philbrook3llc@aol.com

Minority Small Business
Contact Ralph Philbrook III

Crevello Electric, Inc. — **Federal Number** 59-3559003

3305 N. Stanley Rd.
Plant City, FL 33565

Phone (813) 986-6106
Fax (813) 986-9633
E-mail crevelloelectric@gmail.com

Minority Small Business
Contact Bill Crevello

Electrical Handyman Services — **Federal Number** 27-2406369

7046-B West Hillsborough Ave
Tampa, FL 33634

Phone (813) 901-8185
Fax (813) 884-5060
E-mail ehs915@aol.com

Minority Small Business
Contact Jose Cruz

SJM Electric Corporation — **Federal Number** 20-4183090

333 North Falkenburg Rd, Suite B201
Tampa, FL 33619

Phone (813) 684-7459
Fax (813) 654-0420
E-mail tami@sjmelectric.com

Minority Small Business
Contact Scott Mroczkowski

YES Electric, LLC — **Federal Number** 27-1341928

2412 E. 7th Avenue
Tampa, FL 33605

Phone (813) 447-2531
Fax
E-mail yeselectric@tampabay.rr.com

Minority Small Business
Contact George Pages

JBC Builders & Electric, Inc. — **Federal Number** 08-0054484

5001 N. Nebraska Avenue, Suite A
Tampa, FL 33603

Phone (813) 232-5000
Fax (813) 232-3555
E-mail jbc@tampabay.rr.com

Minority Small Business
Contact Gerald Martinez

Suarez Electric Systems, Inc. — **Federal Number** 35-2377948

817 Bannockburn Ave
Tampa, FL 33617

Phone (813) 988-4678
Fax (813) 344-5604
E-mail jimsuarez@aol.com

Minority Small Business
Contact James Suarez

City of Tampa MBD Office

SLBE Goal Setting Firms Report

as of 9/5/2013

ELECTRICAL SERVICES

Best Price Electric Service, LLC — **Federal Number** 27-1211988

P.O. Box 6516
Seffner, FL 33583

Phone
Fax (813) 409-3154
E-mail BestPriceElectricServ@hotmail.com

Minority Small Business
Contact Frank Fleites

Manatee Electric, Inc. — **Federal Number** 59-3454485

845 Thompson Road
Lithia, FL Fl

Phone (813) 645-7000
Fax (813) 654-7568
E-mail john@reliableelectricusa.com

Minority Small Business
Contact John Babuka

Slentz Electric, Inc. — **Federal Number** 59-1996013

1202 Gary Ave
Ellenton, FL 34222

Phone (941) 722-9227
Fax (941) 722-3318
E-mail georgeperry2@gmail.com

Minority Small Business
Contact George Perry

Aguila Electrical Services, Inc. — **Federal Number** 20-0818128

8928 N. Newport Avenue
Tampa, FL 33604

Phone (813) 368-9323
Fax (813) 884-4092
E-mail sales@aguilaelectrical.com

Minority Small Business
Contact Jael Aguila

A American Electrical Contractor, Inc. — **Federal Number** 59-2603773

9170 126th Avenue N
Largo, FL 33773

Phone (727) 588-0126
Fax (727) 588-9170
E-mail mark.aaec@yahoo.com

Minority Small Business
Contact Mark Comerford

Rhythms Electric Corporation — **Federal Number** 27-3150153

433 37th Ave NE
St. Petersburg, FL 33704

Phone (727) 460-8779
Fax
E-mail rhythmselectric@me.com

Minority Small Business
Contact Mathew Krchmar

TAMCO Electric, Inc. — **Federal Number** 59-1396630

P.O. Box 579
Tampa, FL 33614

Phone (813) 986-3472
Fax (813) 986-5979
E-mail atrujill@tampabay.rr.com

Minority Small Business
Contact Steven Moates

City of Tampa MBD Office

SLBE Goal Setting Firms Report

as of 9/5/2013

MECHANICAL CONTRACTING SERVICES

Apollo Construction & Engineering Services, Inc. **Federal Number** 59-2811166

P.O. Box 5848
Sun City Center, FL 33571-5848

Phone (813) 645-4926
Fax (813) 645-3351
E-mail tkamprath@apollo-construction.com

Minority Small Business
Contact Thomas Kamprath

George G. Solar & Company, Inc. **Federal Number** 59-1314899

P.O. Box 7438
Tampa, FL 33673

Phone (813) 875-9148
Fax (813) 879-2315
E-mail georgesolarcompany@verizon.net

Minority Small Business
Contact George Solar

McLain Plumbing & Mechanical **Federal Number** 59-3261752

2403 East 4th Ave
Tampa, FL 33634

Phone (813) 876-9046
Fax (813) 873-9895
E-mail sandramclain01@yahoo.com

Minority Small Business
Contact Sandra McLain

First Plumbing & Air Conditioning of FL, Inc. **Federal Number** 59-3389067

13932 Methodist Church Rd.
Dover, FL 33527

Phone (813) 770-0361
Fax (813) 764-9638
E-mail firstplumbing@msn.com

Minority Small Business
Contact Timothy Trujillo

Pro-Tech Diversified Services, Inc. **Federal Number** 59-3627128

8267 Causeway Blvd. Suite F
Tampa, FL 33619-6520

Phone (813) 621-5888
Fax (813) 621-5885
E-mail info@protechbalance.com

Minority Small Business
Contact Gary Cummings

One Degree Air Condition & Refrigeration, LLC **Federal Number** 26-2553764

PO Box 22684
Tampa, FL 33622

Phone (813) 244-0658
Fax (813) 884-4999
E-mail snakeeyes4204@aol.com

Minority Small Business
Contact Michael Mills

Dynamic Heating & Cooling, Inc. **Federal Number** 20-5499872

19239 N. Dale Mabry Hwy # 3211
Lutz, FL 33548

Phone (813) 928-3646
Fax (813) 949-7489
E-mail darwin@dynamichvac.us

Minority Small Business
Contact Darwin Encarmicion

City of Tampa MBD Office

SLBE Goal Setting Firms Report

as of 9/5/2013

MECHANICAL CONTRACTING SERVICES

Main Commercial Cooking & Refrigeration Services **Federal Number** 59-2327199

16705 Scheer Blvd.
Hudson, FL 34667

Phone (727) 868-8586
Fax (727) 868-8650

Minority Small Business
Contact Martin Castello

E-mail dee.costello@maincomm.com

Baez Enterprises Corp **Federal Number** 33-1095056

7818 N. Armenia Ave., Suite 4
Tampa, FL 33604

Phone (813) 932-8140
Fax (813) 932-8142

Minority Small Business
Contact Ervis Baez

E-mail ebaez@acrexperts.net

A & R Air Conditioning & Refrigeration, Inc. **Federal Number** 27-2506848

P.O. Box 291048
Tampa, FL 33687-1048

Phone (813) 924-3696
Fax

Minority Small Business
Contact Rodney Thomas

E-mail a_rairconditioning@yahoo.com

Just Koolin Air Conditioning and Heating, Inc. **Federal Number** 45-5494658

501 S. Falkenburg Road, Ste A5
Tampa, FL 33619

Phone (813) 444-2594
Fax (813) 354-2594

Minority Small Business
Contact Michael Solomon

E-mail Justkoolinac@gmail.com

PJ Ireland & Associates, Inc. **Federal Number** 59-3261978

1252 East Lake Dr
Tarpon Springs, FL 34688

Phone (727) 937-7272
Fax (727) 939-3443

Minority Small Business
Contact Kathleen Ireland

E-mail peter.pjimechanical@gmail.com

SLBE Contract Goal

Goal
7.2%

Instructions Regarding Use of the SLBE Goal Setting List

Bidders must solicit a subcontracting bid from ALL of the firms listed on the SLBEs list provided on the City's web site, and provide documentation of emails, faxes, phone calls, letters, or other communication with the firms a first step in demonstrating Good-Faith Efforts to achieve the goal set for 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 SLBE participation Goal is based upon the availability of the certified firms indicated on the attached list. The Goal and Requirements of the City's Equal Business Opportunity Program are stated in the Bid/Contract Document, Specifications.

Procurement Guidelines To Implement Minority & Small Business Participation

Underutilized WMBE Primes by Industry Category

FORMAL PROCUREMENT

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

SUB WORK

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

SOLICITATION FOR SUBCONTRACTOR QUOTES

From:
OUR COMPANY NAME:
TELEPHONE NUMBER:
ADDRESS:
FAX NUMBER:
E-MAIL ADDRESS:

To Subcontractor:

Our firm is in the process of preparing a bid for a **City of Tampa Contract**. Please accept this notice as our request for quotes for the scope of work identified below. Please respond to this request by filling in the information below and returning via e-mail or fax to the address or number provided. Please contact us if you need any assistance in obtaining bonding, lines of credit, insurance, assistance in obtaining necessary equipment, supplies, materials, participation in a City-sponsored mentor-protégé program, or if you have any questions.

Plans and Specs for this project are posted at:
http://www.tampagov.net/dept_contract_administration/programs_and_services/construction_project_bidding/

CONTRACT NO.:
CONTRACT NAME:
CITY'S BID OPENING DATE:
DEADLINE FOR YOUR SUBCONTRACTOR BID OR RESPONSE:
SPECIFIC SCOPE OF WORK:

Please complete and submit with your subcontract bid or response:
YOUR FIRM'S NAME:
MAILING ADDRESS:
CITY:
STATE:
ZIP:
FAX NUMBER:
E-MAIL ADDRESS:
__Yes, my company is interested in quoting this project for the following items of work:

__No, my company will not quote this project for the following reason(s):

(Sample Suggested Sub Solicitation 3-9-9 Tampa MBDO)

Contract 13-C-00019; Howard F. Curren AWTP Screen and Grit Building No. 1 Bar Screen Replacement

PROPOSAL

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

Name of Bidder _____

_____
Business Phone Number and Email Address

_____
Business Name and Mailing Address

_____
Phone Number and Name of Contact Regarding Permits

_____
Contractor/Qualifiers Name and Federal Identification Number

Date of Proposal _____

(If Bidder is a firm, fill in the following blanks):

Names and Residential Addresses of Partners

_____

_____

(If Bidder is a corporation, fill in the following blanks):

Organized under the laws of the State of _____

Names and Address of President

_____

_____

Name and Address of Vice President

_____

_____

Name and Address of Secretary

_____

_____

Names and Address of Treasurer

_____

_____

The above-named Bidder affirms and declares:

(1) That the Bidder is of lawful age and that no other person, firm or corporation has any interest in this Proposal or in the Contract proposed to be entered into.

(2) That this Proposal is made without any understanding, agreement or connection with any other person, firm, or corporation making Proposal for the same purposes, and is in all respects fair and without collusion or fraud.

(3) That the 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.

(4) 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.

(5) That the 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.

(6) That the Bidder

_____ Has; Treasury Number _____

_____ Has not
(Check applicable box)

previously performed work under the President's Executive Order Nos. 11246 and 11375.

(7) That the undersigned, as Bidder, also declares that he has carefully examined and fully understands all the component parts of the Contract Documents and agrees that he will execute the Contract and finish the required Performance Bond and will completely perform the work in strict accordance with the terms of the Contract and the Contract Documents therein referred to for the following prices, to wit:

Item No.	Description	Unit	Approx. Quantity	Unit Price in Words		Unit Price		Total Computed Price
100	Contingency	L.S.	1	Sixty Thousand Dollars and No Cents	$	60,000.00	$	60,000.00
200	Furnish all labor, materials and equipment to remove and dispose (3) automated bar screens, (3) sluice gates, and conveyor system as specified on the construction plans. Installation of (3) new center flow type screens, (3) sluice gates, (3) compactor/washers and conveyor sluice. Other associated work includes extending a 4" effluent water pipe, removal of access platforms, removal/disposal of plant air piping, removal and disposal of debris from the channel; installation of new stainless steel platform, bubbler systems, water piping, valves, flow meter, painting, electrical and controls.	L.S.	1		$		$	
4800.1	Concrete Floor Restoration (as specified in plans)	S.F.	1,600		$		$	
4800.2	Concrete Channel Restoration Coating (80 mils Sikagard 75 and 25 Mils Sikagard 62 or approved equal)	S.F.	1300		$		$	
4800.3	Concrete Channel Restoration , up to 1" thick	S.F.	1,000		$		$	
4800.4	Concrete Restoration, greater than 1" to 3" thick	S.F.	200		$		$	
4800.5	Concrete Channel Restoration, greater than 3" to 5" with doweling rebar as specified in plans	S.F.	100		$		$	
4800.6	Transition Strip Overlay Coating	S.F.	40		$		$	
				TOTAL	$		$	

Computed Total Price In Words:

_____

_____ dollars and _____ cents.

Computed Total Price in Figures: $_____

The 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___.

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

Bidder acknowledges that included in the various items of the proposal and the Total Bid Price are costs for complying with the Florida Trench Safety Act (90096), (Laws of Fla.) effective October 1, 1990. The bidder further identifies the costs to be summarized below:

	Trench Safety Measure (Description)	Unit of Measure (LF, SY)	Unit Quantity	Unit Cost	Extended Cost
A.	_____	_____	_____	_____	_____
B.	_____	_____	_____	_____	_____
C.	_____	_____	_____	_____	_____
D.	_____	_____	_____	_____	_____

Total Cost $_____

Signed _____

Failure to complete the above may result in the bid being declared non-responsive.

Accompanying this Proposal is a certified check, cashier's check or Bid Bond (form included herein must be used) on the form at least five (5) percent of the total amount of the Proposal which check shall become the property of the

_____ of _____
(Name of Bank or Surety) (City & State)

City of Tampa, or which bond shall become forthwith due and payable to the City of Tampa, if this Proposal shall be accepted by the City of Tampa and the undersigned shall fail to execute a contract with and to furnish the required Performance Bond and Payment Bond to the City of Tampa within twenty (20) days after the date of receipt of written Notice of Award by the City of Tampa to the undersigned so to do.

Dated _____, 2013

_____
(Name of Bidder)

_____
(Address of Bidder)

_____
(Signature)

_____
(Title)

Where Bidder is a Corporation:

Attest:

_____
Secretary

AFFIX
CORPORATE
SEAL

(ACKNOWLEDGMENT OF PRINCIPAL)

STATE OF)
) SS:
COUNTY OF)

For a Corporation:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 2013 by _____ of _____, a _____ corporation, on behalf of the corporation. He/she is ___ personally known or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

For an Individual:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 2013 by _____ who is ___ personally known to me or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

For a Firm:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 2013 by _____ who signed on behalf of the said firm. He/she is ___ personally known or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

_____

Good Faith Effort Compliance Plan for Small Local Business Subcontracting

City of Tampa - Equal Business Opportunity Program

Contract _____ **Bid Date** _____

Bidder _____

Signature _____ **Date** _____

Name _____ **Title** _____

The following Compliance Plan is a true report of Good Faith Efforts made to accomplish subcontracting goals for Small Local Business Enterprises, SLBEs, on the referenced contract:

□ **The goal for SLBE participation has been met or exceeded. See the DMI form reporting subcontractors to be utilized.**
(Check Box, if appropriate; the remainder of the Compliance Plan need not be reported.)

□ **The goal for SLBE participation has not been met. The following is a recap of Good Faith Efforts made:**
(Check applicable boxes below. Enclose additional documents, and/or add remarks below as needed.)

(1) Soliciting through reasonable and available means the interest of SLBEs that have the capability to perform the work of the contract. The Bidder or Contractor must solicit this interest within sufficient time to allow the SLBEs to respond. The Bidder or Contractor must take appropriate steps to follow up initial solicitations with interested SLBEs. □ See DMI report forms for subcontractors solicited. □ See enclosed supplemental data on solicitation efforts. □ Remarks:

(2) Providing interested SLBEs with adequate information about the plans, specifications, and requirements of the contract, including addenda, in a timely manner to assist them in responding to the solicitation. □ See enclosed sample solicitation. □ Remarks:

(3) Negotiating in good faith with interested SLBEs that have submitted bids. Documentation of negotiation must include the names, addresses, and telephone numbers of 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 SLBEs to perform the work. That there may be some additional costs involved in soliciting and using SLBEs is not a sufficient reason for a contractor's failure to meet the goals, as long as such costs are reasonable. Bidders are not required to accept higher quotes in order to meet the goal. □ DMI subcontractor-utilized forms reflect successful negotiations □ This project is of a low-bid nature and negotiations are limited to clarifications of scope and specifications. □ See enclosed document. □ Remarks:

(4) Not rejecting SLBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The SLBEs standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations are not legitimate causes for rejecting or not soliciting bids to meet the goals. □ Not applicable. □ See attached explanation for rejection of a low-bidding subcontractor's bid. □ Remarks:

(5) Making a portion of the work available to SLBE subcontractors and suppliers and to select those portions of the work or material consistent with the available 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. □ Remarks:

(6) Making good faith efforts, despite the ability or desire of a Bidder or Contractor to perform the work of a contract with its own organization. A Bidder or Contractor who desires to self-perform the work of a contract must demonstrate good faith efforts unless the goal has been met. □ Sub-Contractors were not prohibited from submitting bids on work not usually sub-contracted. □ Remarks:

(7) Selecting portions of the work to be performed by 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 to facilitate SLBE participation, even when the Bidder or Contractor 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 on work not usually sub-contracted. □ See enclosed comments. □ Remarks:

(8) Making efforts to assist interested SLBEs in obtaining bonding, lines of credit, or insurance as required by the city or contractor. □ See enclosed sample solicitation □ see enclosed document. □ Remarks:

(9) Making efforts to assist interested SLBEs in obtaining necessary equipment, supplies, materials, or related assistance or services, including participation in a City-sponsored mentor-protégé program. □ See enclosed sample solicitation. □ See enclosed document. □ Remarks:

(10) Effectively using the services of the City and other organizations that provide assistance in the recruitment and placement of SLBEs. □ See enclosed document. □ The following services were used:

Other Supporting Good Faith Efforts: □ See enclosed document. □ Remarks:

Compliance Plan: Guidance For Meeting Good Faith Efforts

1. All firms on the SLBE Goal Setting List must be solicited and documentation provided for email, fax, letters, phone calls, and other 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 and/or Hillsborough County certification listings of SLBE's.

2. Solicitation of 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 typically be sent a week or more before the bid date. Sample copies of the bidder's solicitations should be provided.

3. With any quotes received, a follow-up should be made whenever needed to confirm scope of work. For any SLBE low quotes rejected, an explanation should be provided detailing negotiation efforts.

4. If a low bid SLBE is rejected or deemed unqualified the contractor must provide an explanation and supporting documentation for this decision.

5. Prime should break down portions of work into economical feasible opportunities for subcontracting. The SLBE directory can be useful in identifying additional subcontracting opportunities and firms not listed in the "SLBE Goal Setting Firms List."

6. Contractor should not preclude SLBEs from bidding on any part of work, even if the Contractor can self-perform the work.

7. Contractor should avoid relying solely on subcontracting out work where availability is not sufficient to attain pre-determined goal.

8. In its solicitations, the Bidder should offer assistance to SLBEs in obtaining bonding, insurance, etc, 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 SLBEs, if needed.

10. Contractor should use the services offered by such agencies as the Minority Business Development Office of the City of Tampa, Hillsborough County and the NAACP Empowerment Center for the recruitment and placement of SLBEs.

City of Tampa – DMI -Schedule of All Sub-(Contractors/Consultants/Suppliers) Solicited

(FORM MBD-10)

Contract No.:________________ Contract Name:____

Contractor Name:____ Address:__________________________

Federal ID:__________________ Phone:______________ Fax:________________ Email:________________

[ ] No Firms were contacted/solicited for this contract.

[ ] No Firms were contacted because:____

[ ] See attached documents with supplemental information.

This DMI Schedule Must Be Submitted with the Bid or Proposal (Do Not Modify This Form)

NIGP Code General Categories: Buildings = 909, General = 912, Heavy = 913, Trades = 914, Architects = 906, Engineers & Surveyors = 925, Supplier = 912-7

S = SLBE W=WMBE Federal ID	Company Name Address Phone & Fax	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 or Services NIGP Code (listed above)	Contact Method L=Letter F=Fax E=Email P=Phone	Quote or Resp. Rec'd Y/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:______________

This form must be completed and submitted with the bid or proposal. Modifying or failing to sign DMI forms may result in submission being found non-compliant and/or non-responsive.

Note: Detailed Instructions for completing this form are on the next page

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 when Goal has been established.

- **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.
- **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/solicited for this contract.** Checking the box indicates that a pre-determined Subcontract Goal 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 must be submitted with your invoices. 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/solicited.
- **See attached documents.** Check box, if after you have completed the DMI Form in its entirety, you are providing any additional 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 Women/Minority Business Enterprise.
- **Federal ID.** FIN. 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.
- **Type of Ownership.** Indicate the Ethnicity and Gender of the owner of the subcontracting business.
- **Trade, Services, or Materials** Indicate the trade, service, or material provided by the subcontractor. NIGP codes are listed at top section of document.
- **Contact Method L=letter, F=fax, E=Email, P=Phone.** Indicate with letter the method of soliciting for bid.
- Q**uote 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.

If any additional information is required or you have any questions, you may call the Minority Business Development Office at (813) 274-5522.

City of Tampa – DMI Schedule of Sub-(Contractors/Consultants/Suppliers) to be Utilized

(FORM MBD-20)

Contract No.:_____ Contract Name:_____

Contractor Name:_____ Address:_____

Federal ID:_____ Phone:_____ Fax:_____ Email:_____

[ ] See attached documents.

[ ] No Subcontracting (of any kind) will be performed on this contract.

This DMI Schedule Must Be Submitted with the Bid or Proposal (Do Not Modify This Form)

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

S = SLBE W=WMBE Federal ID	Company Name Address Phone & Fax	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 if available.	Percent of Scope/Contract %

Total 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:_____

This form must be completed and submitted with the bid or proposal. Modifying or failing to sign DMI forms may result in submissions being found non-compliant and/or non-responsive.

Note: Detailed Instructions for completing this form are on the next page.

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 projected to be utilized must be included on this form.

- **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.
- **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 (of any kind) will be performed on this contract.** Checking box indicates your business will not use subcontractors when no Subcontract Goal has been 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 must be submitted with your invoices. Note: Certified SLBE or WMBE firms bidding as Primes are not exempt from outreach and solicitation of subcontractors.
- **See attached documents.** Check if you have provided any additional documentation relating to the utilization of subcontractors.

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.
- **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. NIGP codes are available at http:/www.tampagov.net/mbd.
- **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.
- **Total Subcontract/Supplier Utilization.** – Provide total dollar amount of all subcontractors/suppliers projected to be used for the contract. (Dollar amounts may not apply to CCNA proposals.)
- **Total SLBE Utilization.** Provide total dollar amount for all projected SLBE subcontractors/Suppliers used for this contract. (Dollar amounts may not apply to CCNA proposals.)
- **Total WMBE Utilization.** Provide total dollar amount for all projected WMBE subcontractors/Suppliers used for this contract. (Dollar amounts may not apply to CCNA proposals.)
- **Percent SLBE Utilization.** Total amount allocated to SLBEs divided by the total bid amount. (Dollar amounts may not apply to CCNA proposals.)
- **Percent WMBE Utilization.** Total amount allocated to WMBEs divided by the total bid/proposal amount. (Dollar amounts may not apply to CCNA proposals.)

If any additional information is required or you have any questions, you may call the Minority Business Development Office at (813) 274-5522.

TAMPA BID BOND
Contract 13-C-00019; Howard F. Curren AWTP Screen and Grit Building No. 1 Bar Screen Replacement

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 13-C-00019, Howard F. Curren AWTP Screen and Grit Building No. 1 Bar Screen Replacement.

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 Performance Bond and Payment 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 _____,2013.

Principal _____

BY _____

TITLE _____

BY _____

TITLE _____

Countersigned:
(SEAL)

_____
Local Resident Producing Agent

_____
Local Resident Producing Agent's Address

_____
Name of Local 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 13-C-00019 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, this ____ day of _____, 2013, between the City of Tampa, Florida, hereinafter called the City, and hereinafter called the Contractor.

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 13-C-00019; Howard F. Curren AWTP Screen and Grit Building No. 1 Bar Screen Replacement, shall include, but not be limited to, furnishing all labor, materials and equipment to remove, dispose of, and replace 3 bar screens, and 3 sluice gates, removal of access platforms, removal/disposal of plant air piping, concrete channel and concrete floor restoration and coating, electrical work comprising removal of existing motors, controls, conduits, conductors, support structures, modification of Motor Control Center, furnish and install transfer switch, conduits, terminal boxes, control equipment 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 Contact.

(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 conditions(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 of 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 Contact 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 of 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 of 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 indemnity 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 Contact 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

_____
Bob Buckhorn, Mayor
(SEAL)

ATTEST:

_____
City Clerk

Approved as to Form:

The execution of this document was authorized by Resolution No. _____

_____
Justin R. Vaske, Assistant City Attorney

Contractor

By:_____
(SEAL)

Title:

ATTEST:

_____
Secretary

STATE OF)
) SS:
COUNTY OF)

For a Corporation:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 2013 by _____ of _____, a _____ corporation, on behalf of the corporation. He/she is ___ personally known or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

For an Individual:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 2013 by _____ who is ___ personally known to me or has ___ produced _____ as identification.

_____
Notary

My Commission Expires:

_____

For a Firm:

STATE OF _____
COUNTY OF _____

The foregoing instrument was acknowledged before me this ___ of _____, 2013 by _____ who signed on behalf of the said firm. He/she is ___ personally known or has ___ produced _____ as identification.

_____
Notary

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)

_____
(Principal Business Address)

By _____

Title _____

_____
Telephone Number of Principal

Countersignature:

_____
(Name of Local Agency)

_____
(Address of Resident Agent)

By _____

Title _____

_____
Telephone Number of Local Agency

_____
(Name of Surety)

_____
(Surety Address)

By _____
(As Attorney in Fact)*

_____
Telephone Number of Surety

Accepted by City of Tampa:

By _____
Bob Buckhorn, Mayor

Date: _____ 20____

Approved as to legal sufficiency:

By _____
Assistant City Attorney

Date: _____, 20____

*(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 thw 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.

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 cosntructed in accordance with the requirements of the Contract Documents.

SECTION 6

TEMPORARY STRUCTURES

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 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.

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.

SECTION 13
CLEANING

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.

* * * * * * *

SPECIFIC PROVISIONS

SP-1.G Scope

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

The Contractor shall furnish all labor, materials and equipment for the accomplishment of all work as described in the Specifications, as shown on the Plans and as directed by the Engineer in accordance with the obvious or expressed intent of the Contract.

SP-2.TP Permits

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 permit fees will be paid by the City.

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 Inspectional Services Division of the Department of Housing and Development Coordination all required inspections and tests for all phases of work to obtain final approval thereof.

The Contractor is encouraged to contact the City's Permitting Department and Building Inspections Bureau prior to commencement of work to ascertain their respective requirements.

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-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-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 two (2) hours. 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 on Page G-14 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-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-51 City Testing

The cost of retesting materials and/or workmanship, which has been initially tested by the City and found to be unacceptable, is to be borne by the Contractor.

SP-60 Contingent Items

Contract Items in the Proposal marked with an asterisk (*) are contingent. These items may or may not be used.

Contingent Contract Items that have an established unit price by the City or a unit bid price established by the Contractor will be the unit price the City will pay the Contractor should it become necessary to use more or less of the stated quantities.

SP-68 Water, Light and Power

Delete Article G-7.01 Water and G-7.02 Light and Power on Page G-14 from GENERAL CONDITIONS. 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-71 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 latest issue of the 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 as complying with the requirements of a Southern Building Code Congress International (SBCCI) recognized testing laboratory for the particular applications wherever available.

Where listing is not available for the device as a whole, refer to the provision entitled "Electrical Equipment Certification" for submittal requirements.

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 post 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 (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 with 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. A sample of the valve numbering system to be used will be furnished by the Engineer. 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 as furnished and 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 up to four (4) hardcopies and one (1) bookmarked, unsecured electronic post document format (PDF) file for all Submittals, RFI, and Shop Drawings. 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 general spreadsheet that is intended to begin tracking assets and their respective preventative maintenance at an early stage in the project. An ATF shall be prepared and submitted by Contractor (in electronic format) during two phases of the project. The first phase ATF shall be submitted after procurement of each piece of equipment and will include general information and specifications on the equipment

such as, but not limited to, model, voltage, amperage, horsepower, material, and preventative maintenance tasks. The second ATF submission shall accompany the final submission of the Operation and Maintenance Manuals. Information included during this submission will include specific information on the equipment such as, but not limited to, serial numbers, equipment number, location, runtime hours, etc.

The City of Tampa Wastewater personnel will provide a blank electronic copy of the ATF in Microsoft Office 2007. Any submission must be in the same format.

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-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-83 Identification (Will usually need the above)

The Contractor shall provide a Photo I.D. card for each employee. Each Photo I.D. card shall be encapsulated in plastic and be provided with a clip for fastening to each employee's apparel. Each Photo I.D. card shall be approximately 2 inches by 3 inches in size and shall include the following:

1. Employee photograph mounted on the left half of the card.

2. Name of employee and name of Contractor located on the right half of the card.

Each employee shall display the Photo I.D, card on outer apparel at all times when on the plant site.

Any person found on the site without the required Photo I.D. card will be directed to leave the site immediately.

The cost of Photo I.D. cards 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 and slide gates 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.

3. Piping shall be identified with a designation and directional flow arrow. The designation will be furnished by the Engineer. The designation will comprise a maximum of 20 letters. The designations and flow arrows shall be painted on after completion of color coding using suitable stencils and colors. Designations and flow arrows shall be arranged to be clearly in view from the normal operating or access space all as directed and approved by the Engineer. Designations and flow arrows shall be located along straight runs at intervals of not more than 50 feet, near valves, branches and junction points, and where pipes pass through walls or ceilings. Underground piping wrapped with polyethylene shall be provided with colored material selected by the Engineer.

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-87.TP Use of Site for Storage and Field Office

Space, on the site, for storage and field office for the Contractor shall be as directed by the Engineer. Any structures or facilities needed for storage or field office shall be constructed by the Contractor at his own expense and no separate payment will be made therefor. All security requirements for such facilities shall be provided and maintained by the Contractor.

Upon completion of the work, and as directed, the Contractor shall clean up the areas, remove any temporary facilities and finish grade as necessary, all as approved.

SP-97 Protection of Existing Building

The Contractor shall protect the existing buildings as indicated on the Plans.

The Contractor shall hire a certified testing company to monitor vibration levels at buildings while construction takes place in the vicinity.

All costs associated with protection of the facilities and vibration monitoring services shall be included in the price of the work to which they are incidental.

SP-129.TP 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 color PDF copy of "As-Built" plans. Plan sheets shall have all deviations from original design annotated in red pencil to clearly show as-built conditions. Relocation of existing facilities and utilities must be clearly noted.

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 the City will provide AutoCAD drawings.

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.

Suggest, 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 (i.e.: AWTP Lockout/Tagout Procedures, AWTP Hot Work Permits, etc) 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. Air-Borne Gases: The AWTP is located in an industrial area and as such there are several different substances, either on or off site, that can escape and become dangerous fumes such as: chlorine, methanol, anhydrous ammonia, etc. The AWTP currently has nine (9) Shelter In Place (SIP) locations that are designated as safe havens in the event of release of hazardous gases. These SIP's are stocked with necessary instructions and supplies to protect City and any Contractor's personnel.

The first day on site, City personnel will show all the Contractor's personnel present where the several closest SIP's are located, explain the alarm signals and provide the current alarm testing schedule. It shall be the Contractor's responsibility to show any future employee and/or sub-contractor that comes on site the location of the SIP's and explain the alarm signals.

In the event of an alarm, the Contractor's personnel shall immediately and hastily proceed to the nearest SIP along with the City personnel and remain there until further notice, taking guidance from and following the instruction of the senior City employee present.

G. Lockout / Tagout Policy: The AWTP Lockout / Tagout program is designed to set standards to help safeguard all employees from hazardous electrical or mechanical energy while they are performing service or maintenance on machines and equipment at the AWTP or any pump station. This program will also identify the practices and procedures to shut down and Lockout or Tagout machines and equipment. The Contractor shall be given a copy of the AWTP "LOCKOUT / TAGOUT POLICY AND PROCEDURES" instruction and shall make all of his employees and sub-contractors aware of this program.

No padlock (lockout) shall be removed except by the individual that installed it or if not available, by a City of Tampa AWTP team leader.

No tag (tagout) shall be removed except by the individual that installed it or if not available, by a City of Tampa AWTP team leader, except in an Emergency and the tag states "Do Not Use Unless in an Emergency". In that event, the Contractor shall notify the City of Tampa AWTP team leader, who will prepare the necessary follow up report.

H. 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].

I. 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.

J. 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.

K. 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.

L. 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-133 Tampa Port Authority Access

The Tampa Port Authority has restricted access in accordance with Florida Statute 311.12. Procedures for Tampa Port Authority access are included in these Specific Provisions. All costs to comply with these procedures shall be included in the total Price for this project, and no separate payment shall be made therefore.

* * *

Part 1 GENERAL

1.1 SCOPE – Supply all labor, materials, equipment and incidentals required to install and place into operation the fine screening system as shown on the Drawings and as specified herein.

1.2 REFERENCE STANDARDS – The properties of all materials, design, fabrication and performance of the equipment to be furnished under this section shall be in accordance with the latest issue of applicable standard specifications. The governing authorities of these standards are listed below.

A. AICS, American Institute of Steel Construction
B. AISI American Iron and Steel Institute
C. ANSI, American National Standards Institute
D. ASCE, American Society of Civil Engineers
E. ASME, American Society of Mechanical Engineers
F. ASTM, American Society of Testing and Materials
G. AWS, American Welding Society
H. IBC, International Building Code
I. IEC, International Electric Code
J. IEEE, Institute of Electrical and Electronics Engineers
K. NEC, National Electrical Code
L. NEMA, National Electrical Manufacturers Association
M. Underwriters Laboratory (UL and cUL)

1.3 SUBMITTALS - Submittals shall be provided to the engineer that includes all the following information:

A. Certified shop drawings showing all important details of construction, dimensions and anchor bolt locations.
B. Descriptive product literature.
C. Schematic electrical wiring diagram and electrical controls information.
D. Complete motor and drive data.
E. The total weight of the equipment.
F. A complete bill of materials of all equipment.
G. A certificate from an industry recognized, independent testing facility verifying compliance with Screening Capture Ratio requirement.
H. All as built drawings for record and design calculations must be stamped by a certified PE in the State of Florida.

1.4 QUALIFICATIONS

A. All the equipment specified under this Section shall be supplied by a single manufacturer involved in the manufacture of fine screening equipment. Qualified manufacturers shall have a minimum of ten (10) years' experience with wastewater screening systems, including center flow band screens and washing compactors, for consideration.

B. If equipment is not manufactured by supplier, including welding and machining, the name and contact information of manufacturing facility must be supplied. If more than one manufacturer is used all companies and facilities must be provided.

C. If patents protecting equipment are not owned by supplier then affidavit must be supplied stating owner of design and expiration of licensing agreement.

D. Any manufacturer proposing equipment described herein, prior to the submittal, must conduct independent testing of actual wastewater flow onsite. The testing shall simulate the proposed screen's operation within the

channel and shall be capable of measuring screens solids capture, blinding and grid velocity based on the specified opening size and grid type. A minimum of 10 separate tests must be performed with a minimum of 2,000 gallons of plant wastewater tested at multiple points in the water column to ensure accuracy. Testing shall be conducted by a manufacturer employed factory technician, not a third party representative. An electronic copy of the results shall be provided to the Engineer.

1.5 DESIGN REQUIREMENTS

A. System Description

1. The fine screen will have a continuous stainless steel belt that automatically rotates within the internal guide system of the static frame.

2. The fine screen herein specified will be of the center flow type. The flow enters the inside of the continuous belt and exits through both sides and the bottom of the belt.

3. The screen shall have undergone performance testing by an industry recognized, independent testing facility. The results of this testing shall verify a Screening Capture Ratio of at least 84% for solids equal to or larger than the screen grid opening listed in System Performance below.

4. The screen will be installed into the channel as shown on the contract drawings to accommodate the flow pattern through the screen belt. Screen must be centered under electric hoist.

5. The solids will collect as a mat on the inside of the continuous belt. The belt will intermittently rotate and elevate the solids to the discharge point. Larger objects will be picked up by a series of hooks and trays placed at regular intervals.

6. The solids will be removed at the top of the screen by a minimum of two spray bar headers positioned on the outside of the belt. The screenings will drop into an internal hopper.

7. The continuous belt will be directly driven by drive sprockets that shall support and rotate the grid assembly.

8. The screens must be designed to withstand, startup and run under a static differential head of 6 feet as listed in 1.5 B of this specification. The manufacturer will be required to provide calculations, stamped by a certified PE in FL, with the submittal that establish that each screen frame, frame anchorage and grid design is adequately designed to prevent undue stress and deflection and that the drive system will support the rotation of the grid at this condition. All stresses will be under material's yield stress at all conditions with appropriate safety factors designed by certified engineering calculations.

9. The screen will be totally enclosed and have access covers that will be lightweight and easily removable for maintenance. The lowest point of all maintenance, inspection, access and lubrication points shall be no higher than 70 inches above grade level. If any points are higher than this level manufacturer shall include permanent steps, grating and railing attached to screen frame to limit operator reach to this height.

10. The Washing Compactor will be positioned next to the screening channels and will be fed by a sluice system.

11. The Washing Compactor will be adequately sized to handle all the screenings and wash water that will be generated by the screen at peak flow. The system will be required to wash the screenings to reduce the organic content and compact the remaining solids into a dry plug.

12. The Washing Compactor will generally comprise of a screw auger rotating within the washing and drainage trough, a wash water system, a compaction zone and an outlet chute arrangement.

13. All stainless steel (including frame, grid, drive components and hardware) mentioned below as stainless steel shall be T316 or T316L stainless steel. All hardware shall be T316 or T316L stainless steel.

B. System Performance – The fine screening system will be designed to meet the following design parameters:

1.	Number of screens	3
2.	Peak flow to plant	140 MGD
3.	Peak flow per screen	55 MGD
4.	Screen grid opening	6 mm
5.	Head loss at peak flow	12 inches @ 50% blinding
6.	Channel width	90 inches
7.	Channel depth	126 inches
8.	Maximum operational head loss	6 feet
9.	Screen discharge height above top channel	75 inches
10.	Number of Washing Compactors	3
11.	Diameter of screw	12 inches
12.	Diameter of shaft	3.5 inches
13.	Compactor discharge height above grade	120 inches
14.	System wash water requirements	182 GPM @ 60 PSI

Part 2 PRODUCTS

2.1 MANUFACTURER

A. The equipment shall be the Hydro-Flo Screen and Washing Compactor as provided by Hydro-Dyne Engineering, Inc., Oldsmar, FL. All manufacturers proposing equipment described herein, will provide a detailed submittal package, which will consist, at a minimum, of all information and details prescribed in section 1.3 of this specification. .

B. If submitted equipment requires arrangement differing from that specified, prepare and submit for review complete structural, mechanical, and electrical drawings and equipment lists showing all necessary changes and embodying all special features of equipment proposed. Any changes are at no additional compensation and the Manufacturer will be responsible for all engineering costs of redesign by the Engineer, if necessary.

2.2 THE CENTER FLOW FINE SCREEN

A. Perforated Plate - The Continuous Screening Belt

1. The screenings belt will consist of panels manufactured from 3/8" thick UHMWPE with perforations of the specified opening.

2. The perforated panels will be supported by 12 gauge stainless steel vertical mounted lifting hooks horizontally spaced a maximum of 3 inches apart preventing deflection. The lifting hooks shall support the screening grid and bear tension loads across the entire length and width of the screen belt.

3. The hooks on elements shall form horizontal lifting trays or shelves for removing large solids and rags every 8 inches around the entire screen grid.

4. The lifting trays will span the grid every 24 inches around the screen belt. Intermittent lifting trays will incorporate a heavy duty shelf. The lifting shelf shall be capable of lifting a minimum of a 7 inch diameter solid.

5. The perforated panels will be connected by heavy duty stainless steel axles every 8 inches to form a continuous belt that will rotate within the frame's guide system. The axle design will allow the plates to pivot and create a seal between the perforated panels to prevent the passage of solids. Axles shall be a minimum 7/8"diameter.

6. The axles will include machined Delrin spacers that will maintain the 3 inch space between the vertical support elements. Delrin spacers will also form a seal between each perforated panel with clearance not to exceed 0.5mm.

7. The axles will be extended to fix a UHMWPE guide link to the side of each perforated plate. These guides will interlock to create a continuous guide link system that will slide within the frame.

8. The heavy duty guide links will be minimum 2 inches thick to protect against undue wear from grit and will be specially machined to form a closure seal between the rotating belt and the static frame.

9. The seal shall be continuous from grade level through the water flow forming an uninterrupted closure between the traveling screen grid and the stationary frame. The seal shall be heavy gauge stainless steel, fixed to the screen frame and be adjustable so it will remain in contact with the rotating screen belt at all times. There shall be no gap in the grid to frame seal larger than 0.5mm.

10. Guide systems that use rollers, stainless or hardened steel chains will not be acceptable.

11. Grid panel sealing systems that use neoprene seals or stainless steel hinges will not be acceptable.

12. Grid to frame sealing systems that use adjustable UHMWPE strips attached to the frame will not be acceptable.

B. The Frame

1. The continuous belt will rotate within a heavy duty stainless steel static support frame that shall be a rectangular box construction.

2. The guide link system will travel around a stainless steel guide wear track that is integral to the support frame. Top and bottom wear tracks shall be bolt in and field replaceable.

3. There shall be a removable inspection panel located directly beneath the drive allowing easy access to the grid drive sprockets, drive shaft and screenings collection hopper.

4. The design will ensure that the support frame meshes with the closure seal on each guide link to prevent passage of screening material and grit particles.

5. The frame shall accommodate stainless steel protective covers designed to prevent leakage and contain spray wash. All access covers for maintenance will be lightweight and easily removable. Screens with covers requiring neoprene, rubber or plastic seals are not acceptable.

6. The screen manufacturer will supply the stainless steel angled filler plates to connect from the upstream corners of the support frame to the channel walls.

7. The filler plates and screen back-plate will terminate 6" above the high water level. The remaining space from the top of the plates to 6" from the operating floor will incorporate a stainless steel bar rack with 3" spacing to prevent large solids from passing downstream in the event of an overflow.

8. The back-plate of the screen shall be furnished with a bypass gate that will allow manual removal for complete flow by-pass.

C. The Offloading of Screenings

1. A minimum of two stainless steel spray wash headers will be located in the head space of the screen to offload the screenings from the continuous belt.

2. The spray bars will incorporate brass nozzles at 2 inch spacing that can easily be replaced or removed for cleaning.

3. The spray bars will be positioned behind the rotating belt and will backwash the solids into an internal hopper manufactured from stainless steel. The wash water will be used to continuously flush the screenings from the internal hopper into the extended sluice.

4. The spray bars will have a quick release mechanism allowing them to be quickly removed and changed out for maintenance. Spray bars that bolt in place or that require tools for removal will not be acceptable.

5. The addition of a rotating or static brush system to aid offloading will not be acceptable.

D. The Drive Mechanism

1. Each screen will have a single 1 hp minimum, continuous duty electric geared motor suitable for use on a 460/3/60 supply, and in a Class I, Division 1, Group D environment. The motor will be TEFC NEMA rated. The motor will be located outside of the screen covers and above the top of the channel.
2. Motors shall be as specified in section W-47.

3. The gear reducer shall be directly coupled to a heavy duty shaft machined from solid stainless steel round bar.

4. The drive shaft shall be supported on both ends by grease filled roller bearings. Separate grease-filled self-contained cartridge seals shall be mounted on drive shaft between bearings and frame to eliminate spray wash from entering bearings or gear reducer.

5. The continuous belt will be supported and rotated around heavy duty stainless steel sprockets located on the drive shaft in the head space of the screen.

6. These sprockets will have lugs that transmit torque directly from the gear reducer to notches on the underside of the UHMWPE guide links. Driving forces shall be transmitted to areas located behind the screen's grid to prevent solids from contacting drive surfaces.

7. Chain driven systems or screens with wheels submerged in the waste water are not acceptable.

E. Parabolic Proportional Weir

1. The screen manufacturer shall supply a parabolic proportional weir that will be installed by the contractor downstream of the screen.

2. The weir will be designed to maintain a downstream water depth that will increase screen performance during periods of high flow.

3. The weir will be manufactured of T316 stainless steel and shall be anchored to the sides of the channel with no horizontal support across the channel to prevent the accumulation of solids.

4. There will be an opening between the bottom of the weir and the channel floor to allow for grit bypass.

5. Weir shall allow for 2" incremental height adjustment and shall have the capability to be safely removed during live flow conditions.

2.3 THE WASHING COMPACTOR

A. The Screenings Transfer Sluice

1. The screenings sluice will collect screenings and wash water from the discharge hopper of the screen and transfer them by gravity directly into the Washing Compactors washing trough. Mechanically driven conveyors are not acceptable.

2. The sluice will be manufactured from stainless steel. It shall comprise of U-shaped lengths of trough that will be (flange connected/welded) to the desired overall length.

3. A change in direction will be achieved using long swept bends that will prevent blockages from occurring.

4. The Manufacturer will design and supply the support leg structure manufactured from stainless steel. The legs will be suitable for fixing to a concrete floor.

5. Covers will be a lightweight, no more than 6 feet long and easily removed by a single operator.

6. The manufacturer shall supply solenoid valves that will be fitted into the sluice at each bend. The contractor will connect to a local plant water supply. The water supply will provide supplementary transport water.

B. The Washing Compactor

1. The main body will be the washing trough that will receive screenings and wash water directly from the end of the screenings transfer sluice.

2. The connection between the sluice discharge and Washing Compactor will be a flexible coupling and the compactor base will incorporate locking wheels to allow compactors to be easily removed.

3. The washing trough will house the screw auger and provide a dedicated section to reduce organic content. It will comprise of angled side walls manufactured from 10 gauge stainless steel that will direct the screenings on to the screw auger, and a drainage section in which the screw auger will ride.

4. The drainage section will be manufactured from stainless steel that has been machined with 5mm slots. The slots will be perpendicular to the direction of the screw so that the shearing action will prevent material collecting in the slots. The screw will not require stiff nylon brushes to keep the section clean.

5. The underside of the washing trough will be a catch pan that will collect the contaminated water that passes through the drainage section. The catch pan will feed a 6 inch diameter outlet connection. The Main Contractor will connect the pipe to take the water back to the main flow.

6. The catch pan will include a separate wash water supply to periodically purge the area of accumulated solids. The manufacturer will supply a valve connected to a single spray nozzle that will direct water across the length of the pan toward the outlet. The frequency of cleansing cycles will be controlled through the main control panel based on accumulated run time.

7. The screw auger will sit in the washing trough. Washing compactors with shaft less screws are not acceptable as shaft is required to support flight and provide necessary torque and compaction.

8. The auger will be a full pitch screw supported at the compaction end by minimum 7.5" wide UHMWPE Flight Support Bearing that creates a supporting collar around the screw flight. Each bearing ring will be designed to rotate through 180 degrees to provide a second wear surface below the screw. Each wear surface shall be fitted with a set screw that can be removed for inspection. The operator will be able to inspect and rotate the bearing by removing the outside cover without disassembling the equipment.

9. The end of the screw shall be reinforced with a triangular shaped stainless steel gusset welded behind the final screw flight to provide protection in this high wear/high torque area and to assist in compression of the screenings.

10. The screw will rotate creating sufficient agitation to break down the organic material and separate it from the non-organic screenings.

11. The wash water system will flush the separated organic material through the drainage basket in solution or as small particles.

12. A portion of the washing water will enter the washing trough with the screenings. This will be supplemented by spray nozzles that will direct water on to the screenings prior to compaction. The nozzles will be recessed into the side wall of the washing trough to protect from ragging and blockage.

13. The screw will transfer the washed screenings into the compaction zone. This will be a section of stainless steel pipe followed by the UHMWPE flight support bearing. The total length of this section will at a minimum equal two full pitches of the screw flight.

14. The compacted screenings will be pushed through the compaction zone and pass through an orifice plate into the outlet chute. The outlet chute will be tapered at 1 degree along the full length and will elevate the dewatered screenings to discharge by gravity into the dumpster.

C. The Drive Mechanism

1. Each Washing Compactor will have a single 5 hp, continuous duty electric geared motor suitable for use on a 460/3/60 supply, and in a Class I, Division 1, Group D environment. The motor will be TEFC NEMA rated.

2. Motors shall be as specified in section W-47.

3. There shall be the ability to change the height of the screw within the washing trough by using adjustment bolts on the gearbox plate. This will prevent excess wear of the screw flights and trough.

2.4 THE CONTROL PANEL

A. General Information - The manufacturer will supply three (4) UL listed 508A stainless steel main control panels (3 screen and 1 shared Compactor) and five (6) local stations (3 screen and 2 compactor, 1 sluice flush) that shall automatically control the equipment offered in this section.

B. The Screen Main Control Panels – NEMA 4X – Each Screen control panel shall consist of the following components:

1 - Enclosure, NEMA 4X, T304 Stainless Steel
1 - Main Circuit Breaker Disconnect / door handle
1 - Variable Frequency Drive, Yaskawa V1000 series [Screens, 1HP]
1 – Precision Digital INC Dual Analog Input Process Meter
1 - Control power transformer, 480-120VAC
1 - Hour Meter
1 - Lot, Timers for automatic operation, as required
2 - Pushbuttons, NEMA 4X [E-Stop, Reset]
7 - Pilot lights, NEMA 4X, Transformer type [(1) Power, (1) Run, (1) Water Valve Open, (1) Screen Fault, (1) Spray Wash Fail, (1) High Level Alarm, (1) Compactor Auto Mode Fail]

1 - Heater w/ thermostat
1 - Lot, Control relays, socket type
1 - Lot, Terminal blocks
1 - Lot, Remote contacts [(1) Power, (1) Run, (1) Screen Fault, (1) Spray Wash Fail, (1) Upstream High Water Warning, (1) Downstream Low Water Warning, Upstream High Level Alarm]

C. The Shared Compactor Main Control Panel – NEMA 4X – Each Compactor control panel shall consist of the following components:

1 - Enclosure, NEMA 4X, 304 Stainless Steel
1 - Main Disconnect / door handle
2 - Motor starter, Non-Reversing, w/ overload [Compactor, 5HP]
2 - Current monitors [Compactors]
1 - Control power transformer, 480-120VAC
2 - Hour Meter
2 - Pushbuttons, NEMA 4X [E-Stop, Reset]
11 - Pilot lights, NEMA 4X, Transformer type
[(1) Power, (2) Comp. Run, (2) Comp. Fault, (2) Wash Valve Open, (2) Wash Valve Fault, (1) Sluice Wash Valve Open, (1) Sluice Wash Valve Fault]
1 - Heater w/ thermostat
1 - Lot, Control relays, socket type
1 - Lot, Terminal blocks
1 - Lot, Remote contacts [(1) Control Power, (2) Run, (2) Fault, (2) Low Load, (2) High Load, (2) Screen Interlock]

D. The Screen and Compactor Local Control Stations – NEMA 7 - Each local control station (total of four (5)) shall consist of the following components:

1 - Enclosure, 3-Hole, NEMA 7
1 - Stop-Start Jog Switch, NEMA 7
1 - Pushbutton, NEMA 7 [E-Stop]
1 - Selector switch, NEMA 7 [H/O/A]

E. The Sluice Flush Local Control Station – NEMA 7 - Each local control station (total of one (1)) shall consist of the following components:

1 - Enclosure, 1-Hole, NEMA 7
1 - Selector switch, NEMA 7 [H/O/A]

2.5 SURFACE PREPARATION AND PAINTING

A. All stainless steel materials, including hardware, shall be acid passivated for quality control, removal of heat affected discoloration, surface treatment for corrosive environments and to provide a uniform finish to stainless surfaces.

B. All ferrous surfaces (except stainless steel) shall be coated with a pre-primer, primer, and an exterior top coating, or fusion bonded polyester coating suitable for humid/wet environments for superior corrosion protection.

C. Motor and gearbox shall be manufacturer's standard coating for humid/wet environments for superior corrosion protection.

2.6 SPARE PARTS – The manufacturer will supply the following spare parts, per screen and compactor supplied, with the equipment:

A. Ten (10) hook links and elements spacers
B. Two (2) grid axles
C. Two (2) guide links
D. Two (2) screen panels
E. One (1) center support link
F. One (1) drainage basket for compactor
G. One (1) set UHMWPE flight support bearings
H. Two (2) spray bars with nozzles

2.7 ACCESSORIES – The manufacturer will supply the following accessories, with the equipment:

A. Necessary anchor bolts for mounting
B. Three (3) 2" wash water strainers

Part 3 EXECUTION

3.1 WARRANTY – The Manufacturer of the equipment supplied under this specification shall provide a warranty for a period of twelve months commencing on acceptance and/or beneficial occupancy by the Owner but no later than 90 days from the date of shipment by the Manufacturer. The Manufacturer shall guarantee that the equipment furnished is suitable for the purpose intended and free from defects in design, materials and workmanship. In the event that the equipment fails to perform as specified the Manufacturer shall, at his option, promptly repair, modify or replace the defective equipment.

A. Throughout the warranty period the manufacturer must provide onsite support for the equipment. In the event of an emergency, manufacturer must be capable of having a factory employed service technician on site within 24 hours of notification of an equipment failure.

B. The manufacturer will provide a factory employed service technician to periodically visit the installation after owner's acceptance to inspect the equipment for proper operation, maintenance and provide follow up training to plant personnel. This service will be provided at a minimum of four (4) trips per year over the course of the warranty period.

3.2 FACTORY TESTING

A. The screening system and all components shall be factory assembled and tested for a minimum of 24 hours prior to shipment. The equipment shall be shipped fully assembled and shall be capable of being set in place and field erected by the Contractor with minimal field assembly.

B. During the factory test period the screening system shall be adjusted as required assuring proper operation on completion of the field installation. The Manufacturer shall supply a certification of the completion of the factory testing of the assembled screening system and appurtenances and shall certify as to the equipment being in satisfactory operating condition at time of shipment. The Engineer and/or Owner may, at their own option and expense, witness the factory test.

3.3 DELIVERY AND STORAGE

A. The screening system shall be appropriately crated and delivered to protect against damage during shipment.

B. An authorized representative of the Contractor shall inspect the screens on delivery to the jobsite and shall report any damage or missing components to the Manufacturer and the Engineer within 72 hours of receipt of the shipment.

3.4 INSTALLATION - The installation of the equipment shall be as indicated on the drawings and in strict accordance with the Manufacturer's instructions and recommendations.

A. A Manufacturer employed service technician will be on site for supervising the installation of the equipment by the contractor. The responsibilities of the factory technician will be as follows.

1. Approving lifting points and spreader bar usage.

2. Checking bolt torques and fit-ups.

3. Signing off on all quality control documentation certifying that the following have been checked and completed properly.

    a. Mounting of screen
    b. Plumbing and electrical hookups
    c. Screen to sluice and sluice to compactor connections
    d. Placement of filler plates

B. The Contractor shall include in his bid, the cost of the above referenced service representative for a minimum of two (2) trips at six (6) eight hour days onsite to complete the installation supervision and assistance.

3.5 FIELD TESTS, ADJUSTMENTS AND COMMISSIONING

A. After completion of the installation, the equipment shall be inspected and certified by a factory employed service technician of the Manufacturer as being in compliance with the Manufacturer's recommendations and requirements. At such time as the Manufacturer has deemed the installation to be acceptable, the Manufacturer's authorized service representative shall make any required adjustments and shall start the equipment to assure proper operation.

B. The Manufacturer's authorized representative shall provide instruction to the plant personnel as to the operation and maintenance of the equipment including commissioning, shut down, on-line operations, lubrication and preventative maintenance.

C. The Contractor shall include in his bid, the cost of the above referenced service representative for a minimum of one (1) trip at three (3) eight hour days onsite to complete the equipment startup certifications described in this section.

D. The Contractor shall include in his bid, the cost of the above referenced service technician for a minimum of one (1) trip at one (1) eight hour day onsite to complete the training of plant personnel.

End of Section

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 []Sub []Supplier Federal ID	Company Name Address Phone & Fax	Total Sub Contract Or PO Amount	Amount Paid To Date Amount Pending Previously Reported	Amount To Be Paid For This Period 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:_____

Note: Detailed Instructions for completing this form are on the next page

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 of 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.

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, 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 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

Structural and miscellaneous steel, iron castings, cast-iron pipe, and steel pipe used for hangers and supports shall meet the requirements of the applicable Workmanship and Materials sections.

Pipe hangers and supports shall be 316 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."

* * *

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.

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. Plug shall not touch or drag against any part of the valve until reaching final seated 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.

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 sub-section 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 36 - PAINTING

W-36.01 General

This section covers the surfaces to be painted, the preparation of surfaces, the number of shop, priming, and field coats, and the kind of paint for the surfaces, unless otherwise specified.

The Specifications do not specify the surface treatment for every individual part of the work, but the Contract requires a complete painting job.

Before beginning shop or field painting, the Contractor shall submit to the Engineer for approval a schedule showing the mil thickness of each coating to be applied in the shop or in the field. This schedule shall be recommended by the manufacturer of the paint approved for the project. However, the total mil thickness of all coatings shall be equal to the mil thickness attained through application of The Porter Paint Company paint and coatings as called for in the "Painting Schedule."

Paints, coatings, or ingredients of paints to be mixed on the job shall be prepared, packed, labeled, and guaranteed by an approved manufacturer. All material shall be delivered to the site in original, unbroken containers.

Analyses of samples of any paint, oils, or pigments, as furnished or as applied, may be made from time to time as the Engineer may direct, and if such samples do not comply with these Specifications, the paint may be rejected and the cost of the analyses of such materials shall be at the Contractor's expense.

W-36.02 Preparation of Surfaces and Shop Painting

Prior to painting, all surfaces shall be prepared and cleaned and shall be dry before any paint is applied. All welds, beads, blisters, or protuberances, other than identification markings, shall be ground smooth and imperfections removed. All ferrous metal shall be shop primed and shall have all rust, scale, oil, grease and dirt removed by sandblasting or pickling. Cleaned ferrous metal shall be primed the same day to prevent rust. All nonferrous metals, whether shop primed or field primed, shall be solvent cleaned prior to application of the pretreatment or primer. Galvanized surfaces shall be chemically treated with a pretreatment wash coat designed for this purpose in accordance with the manufacturer's direction for use.

All wrought metals, metal castings, mechanical equipment, and electrical equipment, and all piping specified to be painted shall receive one shop coat of primer before exposure to the weather. This shop coat shall be the first coat, as specified in the painting schedule herein.

Shop-coated surfaces shall be cleaned thoroughly and retouched before the application of successive paint coats in the field.

Equipment, such as electrical control cabinets, motors, unit heaters, and similar items which

are shipped with a final baked enamel finish and having received prior approval shall not be field painted, unless the finish is damaged in installation.

W-36.03 Field Painting

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.

All painting at the site of the work is hereby designated as field painting.

The Engineer will control completely all field painting. Surfaces to be given protective coatings shall be thoroughly cleaned, scratches and abrasions on equipment which has been shop-coated shall be refinished, and all surfaces to be field painted shall be approved before starting work. Painting shall be a continuous and orderly operation to facilitate adequate inspection, but materials subject to weathering or corrosion shall be prime-coated as quickly as practicable. Surfaces of exposed members inaccessible after erection shall be cleaned and painted before erection. All paint application methods shall be to the satisfaction of paint manufacturer and as approved.

No painting shall be done when the temperature is below 50 degrees F, or in dust-laden air, or when the relative humidity is greater than 60 percent, or until moisture on the surface has completely disappeared.

Any painting found defective shall be sandblasted off and repainted as directed. Before final acceptance of the work, however, all damaged surfaces of paint shall be cleaned and repainted or touched up as directed.

Piping shall be field painted using the colors selected.

All surface preparation and application of coating materials shall be done in accordance with the manufacturer's recommendations and specifications.

W-36.04 Painting Schedule

The following schedule and formulas of materials shall control all painting. The number of coats shall not be less than the number shown on the schedule. Colors shall be as approved.

PAINTING SCHEDULE

Class of Work	Shop Coat	Field Coats 1st	2nd	3rd	4th
Painting inside Wet Well					
All metal surfaces except aluminum and/or stainless steel		E	F	F	
Concrete Surfaces		See Subsection W-36.06 Cont'd..			

Class of Work	Shop Coat	Field Coats 1st	2nd	3rd	4th
Other Painting					
Gray or Ductile Cast-Iron Pipe and Fittings					
Buried (See Note 1)					
Exposed	A	B	B		
Cast-Iron Soil Pipe (See Note 2)					
Steel Pipe and Fittings (Interior)					
Galvanized		C	A	D	D
Stainless (See Note 3)					
Other	A	D	D		
Steel Pipe and Fittings (Exterior)					
Galvanized		C	A	B	B
Stainless (See Note 3)					
Other	A	B	B		
Copper Pipe (See Note 4)					
Aluminum					
In contact with concrete (See Note 5)					
Other Interior		C	D	D	
Other Exterior		C	B	B	
Metal Castings (See Note 6)					

Concrete		
Interior	H	I
Exterior Above Grade		J J
Exterior Below Grade		Porter Tarmastic 100

NOTES:

1. Buried cast-iron pipelines shall meet the requirements of the subsection headed "Coatings" of the Workmanship and Materials section headed "Cast-Iron Pipe and Fittings."

2. Cast-iron soil pipe shall have a bituminous lining and coating meeting the requirements of ANSI A21.6.

3. Stainless steel piping and fittings shall not be painted. Such work shall be wiped clean, to the satisfaction of the Engineer.

4. Copper pipelines buried in the ground shall not be painted.

5. Where aluminum surfaces come in contact with incompatible metals, lime, mortar, concrete or other masonry materials, these areas shall be given one field coat of Porter No. 99 Metalprep and one coat of Porter No. 171 Black Asphalt Mastic at 10 Mils DFT.

6. Castings shall receive the coating specified in the Workmanship and Materials section headed "Metal Castings."

7 Paint shall be applied by brush, roller, or sprayer in accordance with the manufacturer's recommendation.

8. It is the Contractor's responsibility to inspect the work of others prior to application of any paint or finishing material.

9. It is the Contractor's responsibility to have all surfaces properly prepared and made acceptable for paint finishing operations.

10. At no time, except if permitted by the Engineer, shall there be any other manufacturer's paint delivered or used at the premises other than the paint of the manufacturer selected for this work.

11. The manufacturer's directions and instructions shall be fully followed for the treatment of the surfaces and the application of paint.

12. Tints of succeeding coats shall be varied slightly to permit identification of coats.

13. Coverage shall be complete. When color or dirt 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 to the City.

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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 such as Tne mec or Mobil may be substituted. All coats of paint for any particular surface shall be from the same manufacturer.

	Products and Formulas	Dry Film Thickness Mils per Coat
A.	Porter's 284 U-Prime	2.0
B.	Porter's I.A. 24 Gloss	2.0
C.	Porter's V.C. 1799 Vinyl Wash Prime	0.3 to 0.5
D.	Porter's H.D. 21 Series Heavy Duty Enamel	2.0
E.	International Protective Coatings, Inter Tuf	4.0
F.	International Protective Coatings, Inter Tuf	10.0
G.	Porter's M.C.R. 4300	2.0
H.	Porter's M.C.R. 4361 Hi-Build	5.0
I.	Porter's M.C.R. 43 Gloss Epoxy	2.0
J.	Porter's 520 Series Acrylic	2.0

W-37.05 Glazed Paint Coating for Masonry Units

Glazed paint coating for masonry units shall be Porter Tile 8 Epoxy System as manufactured by the Porter Paint Co., Louisville, Kentucky, or equal, meeting the following quality standards:

The material must be listed by the Underwriters' Laboratories, Inc. in accordance with their standards for incombustible coatings and shall not exceed a flame spread rating of 0-5 and shall meet the U. L. Inc. ratings or better as established for Tile 8.

The foundation coat, decorative color coat, spotting and two-stage sealing operation of Porter Tile 8 glazed coating shall be furnished in accordance with the manufacturer's instructions as per samples approved by the Engineer.

W-36.06 Wet Well

6.1 Surface Preparation - Sandblast to remove existing surface contaminations.

6.2 Prime Coat - Sika Guard #62 applied at a minimum of 4 mils dry film thickness. (Thin 5% by volume)

6.3 Additional Coats - The additional coats must be applied when previous coat is tacky but not to exceed four hours after application of previous coat.

6.4 Intermediate Coat - Sika Guard #62 applied at a minimum of 8 mils dry film thickness per coat.

6.5 Finish Coat - Sika Guard #62 applied at a minimum of 8 mils dry film thickness per coat.

6.6 City will check dry film thickness with Tooke Gauge.

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SECTION 45 - ELECTRICAL

W-45.01 Scope of Electrical Work

The work consists of furnishing all labor, materials, equipment, transportation, and performing all operations required to support the installation and commissioning of the electrical portion of the HFC AWTP Screen And Grit Bldg. No.1 Bar Screen Replacement. The work includes, but is not limited to, the following:

1. Submit working drawings, parts schedules and cut-sheets to the Engineer.

2. Furnish and install all equipment, controls and instrumentation as shown on the Plans and described in the Specifications.

   Specifically:

   a. In the Class I, Division 1, Group D Screen Area, remove all existing electrical equipment for Sewage Screens SS3, SS4 and SS5 including all motors, local controls, conductors, conduits, and supports.

   b. In the Class I, Division 1, Group D Screen Area, remove the existing electrical equipment for Sluice Gates SG9, SG10 and SG11 including all motors, local controls, conductors, conduits, and supports.

   c. In the Class I, Division 1, Group D Screen Area, remove the existing electrical equipment for Screen Conveyor SC2 including all motors, local controls, conductors, conduits, and supports.

   d. In the Electrical Room, remove the existing Sewage Screens SS3, SS4, SS5 control enclosures including all conductors, conduits, and supports.

   e. In the Electrical Room, remove the abandoned enclosures for Old Screen Controls and Telcom including all conductors, conduits, and supports.

   f. In the Electrical Room, make all required modifications to the existing MCC-28, as shown, specified, and required.

   g. In the Class I, Division 1, Group D Screen Area, provide and install the following equipment for each of Sewage Screens SS3, SS4, SS5: Sewage Screen packaged unit, , inlet channel alarm float switch, screen local control station, sluice flush local control station, wash water motorized valve, and spray water flow meter sensor. NEC Chapter 5 applies to work in this area. Conduits, fittings, conduit bodies, device boxes, and seal offs in this area shall be PVC coated aluminum. Terminal boxes, control enclosures, etc. in this area shall be NEMA 7 cast aluminum. Control pilot devices shall be UL type 7 explosion proof and corrosion resistant. Motors and other electrical equipment shall be explosion proof. Motors and other vibrating equipment shall be connected with stainless steel flexible explosion proof coupling.The existing Screen Channel Bubbler Control System shall be retained as a level and control system interlocked with the screen control panels.

   h. In the Class I, Division 1, Group D Screen Area, provide and install the following equipment for each of Compactors Comp.#3,and Comp.#4.: Compactor packaged unit, diverter position limit switch, wash water valves, sluiceway valves, sluiceway valve local control station, sluice way float switch, and Compactor local control station. NEC Chapter 5 applies to work in this

area. Conduits, fittings, conduit bodies, device boxes, and seal offs in this area shall be PVC coated aluminum.

i. In the Electrical Room, provide and install the following equipment: Sewage Screen SS3 control enclosure, Sewage Screen SS4 control enclosure, Sewage Screen SS5 control enclosure, Compactor supply power transfer switch, Compactors controls enclosure, and all necessary conduits, conductors, & grounding as shown, specified, and required. Terminal boxes, enclosures, etc. in this area shall be NEMA 12 or as scheduled. Connections to enclosures shall be by aluminum water-tight/ dust-tight (Myers) hubs. This area is not classified– uncoated rigid aluminum conduit may be used.

j. In the Electrical Room, provide and install conduit and conductors extending from the newly installed equipment to the existing SCADA RTU as shown, specified, and required. City of Tampa Instrumentation Personnel will make any required modifications to the RTU, and make the final RTU connections.

k. In the electrical room, the existing Bubbler Panel shall be modified as shown on the Drawings, as specified, and described herein. Contractor shall furnish and install pressure transmitters and digital meters as shown and specified.

l. Verify existing Power / Instrumentation / Control connections in the field prior to commencing demolition work. The Contractor shall reroute or make other accommodations for any unforeseen wiring passing through conduits or enclosures, scheduled for demolition, that must remain in service for proper operation of other systems. Coordinate Instrumentation / Control connections with City Personnel.

m. All removed equipment shall remain the property of the City and shall be removed from the premises and disposed of properly as directed by the City.

n. Provide and install stainless steel channel erector systems to mount and support enclosures, boxes, conduits and other equipment.

o. All electrical work shall be performed in accordance with the 2011 National Electrical Code (NEC) and Chapter 5 of the City of Tampa Code.

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 startup 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 two (2) years 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: Supply nine sets of operational and maintenance manuals and one complete set of blue line Contract Drawings marked in red reflecting all as-built information.

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.

The execution of work on one drive system shall not interfere with the normal operation of the remaining pumps and drives.

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.

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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 Hertz.

Control devices shall be of industrial grade, heavy-duty design, utilizing modular construction to increase flexibility.

W-46.02 Variable Frequency Drives (VFD)

Provide all labor, materials, equipment and incidentals required; and install, place in operation and field-test the Variable frequency drive equipment.

Acceptable Manufacturers: The Variable Frequency Drive shall be Yaskawa Electric America model CIMR-VU4A0004BAA. The Wastewater Department has officially standardized on this name brand and no alternates will be considered. The Standardization Certificate of Conditions and Circumstances is included hereinafter.

Ratings: Heavy Duty; 480 Volt 3-phase input, 3.4 Amp. output

Performance Features:

- Overload Capacity: 150% for 60 sec. (Heavy Duty)
- Control Methods: V/f Control, Open Loop Current Vector Control, PM Open Loop Current Vector Control Simple closed loop speed control
- DC Injection Braking, ramp to stop
- Electronic Reversing
- Adjustable Accel/Decel: 0.01 to 6000 seconds
- Controlled speed range: 40:1 (V/f mode); 100:1 (open-loop vector mode)
- Speed Regulation: ± 0.5 to 1% with slip compensation (V/f mode); ± 0.2% (open-loop vector mode)
- Displacement Power Factor: 0.98
- Output Frequency: 0 to 400 Hz
- Frequency Resolution: 0.01 Hz with digital reference; 0.06 / 60 Hz with analog reference
- Frequency Accuracy: 0.01% with digital command; 0.5% with analog command
- Volts / Hertz Ratio: infinitely adjustable pattern
- DC Injection Braking: adjustable amplitude, duration, current limited
- Torque Boost: full range, auto
- Power Loss Ride-Thru: 0.5 sec.
- Speed search
- Auto restart
- 3 Critical frequency rejection settings
- Slip Compensation

- Energy Savings Function
- Enhanced PID with loss of feedback function

Protective Features:

- Current Limit, Stall Prevention During Accel, Decel, And Run
- Motor And Drive Overload
- Over Voltage Prevention Function
- Instantaneous Over Current
- Short Circuit
- Under Voltage
- Heatsink Overheat
- Ground Fault Protection
- Over/Under Torque
- Short Circuit Current Rating: 30kA RMS Sym.

Design Features:

- Dual microprocessor logic
- Digital keypad operator, 5 digits
- LED status display
- Remote Mount Keypad Capability
- RJ-45 Style Digital Operator Connector
- 7 multifunction digital inputs
- 3 multifunction digital outputs
- Hardwire Baseblock (EN954-1 Cat. 3)
- Programmable form C output contact for customer use: 1A at 250 VAC or 30 VDC
- 24 VDC control logic compatible with sourcing or sinking outputs (PNP or NPN)
- Carrier frequency: 15 kHz max; swing PWM
- 16 multi-speed settings plus jog speed
- 2 Remote Speed References: 0-10 VDC (20 kOhms) or isolated 4-20 mA (250 Ohms)
- Signal Follower: bias and gain
- 2 programmable open collector outputs
- Analog Monitor Output: 0-10 VDC proportional to output frequency or output current
- Approx. 400 parameters & monitors
- Digital pulse train input (33 kHz max.)
- Cooling fan controlled by drive run/stop
- RS-422/485 MODBUS 115 kbps
- UL recognized electronic overload
- MTBF 28 years
- Built-in Dynamic Braking Transistor
- NEMA 1 Enclosure
- Side-by-Side mounting
- Application Presets

- Maintenance monitors

Service Conditions:

- Ambient Service Temperature: -10° to 40°C (14° to 105°F) NEMA 1; -10° to 50°C (14° to 122°F) Open Chassis
- Ambient storage temperature: -20° to 60°C (-4° to 140°F)
- Humidity: to 95% non-condensing
- Altitude: to 3300 ft; higher by derating
- Service factor: 1.0
- Input voltage: -15% to +10%; 380 to 480 VAC
- Input frequency: +/-5%; 50/60 Hz
- Input Phase sequence insensitive

W-46.03 Dual Analog Input Process Meter / Controller

The Dual Analog Input Process Meter / Controller shall be used for providing indication of the upstream, downstream, and differential wet well levels, and providing output signals used by the Wastewater Screen Controller. The basis of design: Precision Digital Corporation ProVu Series model PD6060-6R7.

1) **Physical:**
   a) Main Display: 0.60" (15 mm) red LED, 6 digits (-99999 to 999999), with leading zero blanking.
   b) Second Display: 0.46" (12 mm) red LED, 6 digits (-99999 to 999999), with leading zero blanking.
   c) Display Intensity**:** Eight user selectable levels
   d) Front Panel: NEMA 4X, IP65; with panel gasket
   e) Enclosure: 1/8 DIN, high impact plastic
   f) Operating Temperature: -40 to 65°C
2) **Performance Features:**
   a) Display Update Rate: 5/second (200 ms)
   b) Overrange: Display flashes 999999
   c) Underrange Display flashes -99999

d)	Display Assignment:	The main (Big) and second (Little) displays may be assigned to process values for Channels A (Ch-A), B (Ch-B), or C (Ch-C), toggle between (Ch-A & Ch-B, Ch-A & Ch-C, Ch-B & Ch-C, and Ch-A, Ch-B, & Ch-C), toggle between Channel & units, show channel gross value (no tare) or toggle net (tare) and gross values, show relay set points, max & min values, or Modbus input. The second display may also be set to show engineering units or be off, with no display.
e)	Calibration:	All ranges shall be calibrated at the factory.
f)	Max/Min Display:	Max/min readings reached by the process are stored until reset by the user or until power to the meter is turned off.
g)	Password:	Three programmable passwords restrict modification of programmed settings. Pass 1: Allows use of function keys and digital inputs, Pass 2: Allows use of function keys, digital inputs and editing set/reset points, Pass 3: Restricts all programming, function keys, and digital inputs.
h)	Non-Volatile Memory:	All programmed settings are stored in non-volatile memory for a minimum of ten years if power is lost.
i)	Process Inputs:	Two inputs, each separately field selectable: 0-20, 4-20 mA, ±10 V (0-5, 1-5, 0-10 V), Modbus PV (Slave)
j)	Channels:	Channel A, Channel B, Channel C (Math channel)
k)	Connections:	Removable screw terminal blocks accept 12 to 22 AWG wire, RJ45 for external relays, digital I/O, and serial communication adapters.
l)	Accuracy	±0.03% of calibrated span ±1 count, square root & programmable exponent accuracy range: 10-100% of calibrated span
m)	Temperature Drift:	0.005% of calibrated span/°C max from 0 to 65°C ambient, 0.01% of calibrated span/°C max from -40 to 0°C ambient.
n)	Signal Input Conditioning:	Linear, square root, programmable exponent, or round horizontal tank volume calculation.
o)	Decimal Point:	Up to five decimal places or none: d.ddddd, d.dddd, d.ddd, d.dd, d.d, or dddddd
p)	Calibration Range:	Input 1 & Input 2: 4-20 mA, 0.15 mA minimum span; ±10 V, 0.10 V minimum span. An Error message will appear if the input 1 and input 2 signals are too close together.
q)	Input Impedance:	Voltage ranges: greater than 500 kΩ Current ranges: 50 - 100 Ω (depending on resettable fuse impedance)
r)	Input Overload:	Current input protected by resettable fuse, 30 VDC max. Fuse resets automatically after fault is removed.

s) Relay Output: 4 SPST (Form C) rated 3 A @ 30 VDC and 125/250 VAC resistive load; 1/14 HP (≈ 50 W) @ 125/250 VAC for inductive loads. Deadband is 0-100% of span, user programmable. User may program any alarm for high or low trip point. Unused alarm LEDs and relays may be disabled (turn off).

Relay Operation: Automatic (non-latching); Latching (requires manual acknowledge); Sampling (based on time); Pump alternation control (2 to 8 relays); Off (disable unused relays and enable Interlock feature); Manual on/off control mode.

Relay Reset: User selectable via front panel buttons or digital inputs. 1.) Automatic reset only (non-latching), when the input passes the reset point. 2.) Automatic + manual reset at any time (non-latching) 3.) Manual reset only, at any time (latching) 4.) Manual reset only after alarm condition has cleared (L). Note: Front panel button or digital input may be assigned to acknowledge relays programmed for manual reset.

Time Delay: 0 to 999.9 seconds, on & off relay time delays Programmable and independent for each relay

Fail-Safe Operation: Programmable and independent for each relay. Note: Relay coil shall be energized in non-alarm condition. In case of power failure, relay will go to alarm state.

Auto Initialization: When power is applied to the meter, relays will reflect the state of the input to the meter.

t) Analog Output: Isolated 4-20mA, Output Source: Process channel A, B, or C, max or min for channel A, B, or highest or lowest max or min of A and B, set points 1-8, Modbus input, or manual control mode

Accuracy: ± 0.1% of span, ± 0.004 mA

Temperature Drift: 0.4 µA/°C max from 0 to 65°C ambient, 0.8 µA/°C max from -40 to 0°C ambient.

3) **Programming:**

a) Programming Methods: Four front panel buttons, digital inputs, PC and MeterView Pro software, Modbus registers, or cloning using Copy function.

b) Programmable Constants: Constant P (Adder): -99999 to 999999, default: 0.000; Constant F (Factor): 0.00001 to 999999, default: 1.000

c) Math Functions: Addition, Difference, Absolute diff., Average, Multiplication, Divide, Max of A or B, Min of A or B, Draw, Weighted avg., Ratio, Concentration.

d) Sequence of Operations for Input Programming:
1.) Select Input for A and B; 2.) Set up the engineering units for A, B, and C; 3.) Set up decimal point for A, B, and C 4.) Scale A & B; 5.) Set up the displays for A, B, or C; 6.) Select the transfer function for A & B (e.g. Linear); 7.) Select Math function for Channel C; 8.)

Program constants for Factor (F) and Adder (P). 9.) Program cutoff values for A and B.

4) **Power Supply:**
   a) 85-265 Vac, 50/60 Hz; 20 W max .

W-46.04 Digital Universal Input Meter / Relay

The Digital Universal Input Meter / Relay used for monitoring Washer/Compactor Motor current shall be provided with two relay outputs, a 24Vdc transmitter supply, and be suitable for panel mounting. Basis of design: Precision Digital Corporation Trident model PD765-6R2-10.

1) **Physical:**
   a) Display: 0.56" (14.2 mm) red LED, 4 digits (-1999 to 9999)
   b) Display Intensity**:** Eight user selectable levels
   c) Front Panel: NEMA 4X, IP65; with panel gasket
   d) Enclosure: 1/8 DIN, high impact plastic
   e) Operating Temperature: 0 to 65°C

2) **Performance Features:**
   a) Display Update Rate: 3.7-5/sec
   b) Noise Filter: Programmable 2 to 199 (0 will disable filter)
   c) Overrange: Display flashes 9999
   d) Underrange: Display flashes -1999
   e) Calibration: All inputs are calibrated at the factory
   f) Max/Min Display: Stored until reset by user or meter is turned off.
   g) Password: Restricts modification of programmed settings.
   h) Non-Volatile Memory: Settings stored for a minimum of 10 years.
   i) Process Inputs: 0-20 mA, 4-20 mA, 1-5 V, ±10 V
   j) Accuracy: ±0.05% FS ±1 count
   k) Calibration Range: User programmable over entire range of meter
   l) Input Overload: Protected by automatically resettable fuse
   m) Sensor Break: All relays and alarm status LEDs go to alarm state.
   n) Isolated 4-20 mA Transmitter Output
   o) Output Relays: 2 Form C (SPDT); rated 3 A @ 30 VDC or 3 A @ 250 VAC resistive load; 1/14 HP(≈ 50 watts) @ 125/250 VAC for inductive loads such as contactors, solenoids, etc.

3) **Programming:**
   a) Four front panel buttons, cloning with Copy feature, PC with MeterView or LabVIEW software, and Modbus registers.
   b) Deadband: 0-100% FS, user selectable
   c) High or Low Alarm: User may program any alarm for high or low.

d) Relay Operation: 1). Automatic (non-latching) 2). Latching 3).Pump alternation control

e) Relay Reset: User selectable via front panel buttons or PC 1). Automatic reset only (non-latching) 2). Automatic plus manual reset at any time (non-latching) 3). Manual reset only, at any time (latching) 4). Manual reset only after alarm condition has cleared (latching)

f) Time Delay: 0 to 199 seconds, on and off delays; programmable

g) Fail-Safe Operation: Programmable, independent for each relay. Relay coils are energized in non-alarm condition. In case of power failure, relays will go to alarm state.

h) Auto Initialization: When power is applied to the meter, relays will reflect the state of the input to the meter.

4) **Power Supply:**

a) 85-265 Vac, 50/60 Hz; 20 W max .

W-46.05 Gage Pressure Transmitter

Six new pressure transmitters shall be installed in the existing Sewage Screens Bubbler Panel for means of high and low level warning. Mounting of pressure transmitters shall be in accordance with electrical drawings. Basis of design: Yokogawa EJA Series gauge pressure transmitter

Power Supply:

- 115V ac + 5% / -10% 50/60 Hz
- 18 - 36Vdc
- 10W maximum power (typically 6W)

W-46.06 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-46.07 Pilot Lights

Pilot lights shall be heavy-duty, oil-tight, NEMA Type 4X, corrosion resistant, push to test, 120 VAC light emitting diode (LED) type, 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-46.08 Circuit Breakers

Circuit breakers shall be of the molded case, air-break type designed for 600 volt, 60 Hertz 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, Cutler-Hammer or equal.

W-46.09 Control Enclosure and Panel

The control enclosure shall be rated NEMA 12 and be constructed of minimum 14 gauge, 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 painted gray. All hardware shall be heavy-duty, stainless steel. A print pocket shall be provided on the inside of the door. The enclosure dimensions are custom, and 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.

W-47.10 Miniature Industrial Control Relay

Miniature Industrial Control Relays shall have the following features:

1. Conform to IEC/EN 61810-1 (ISS. 2), UL 508, and CSA C22-2 No. 14 standards
2. 120 VAC, 60 Hertz, 1.2 VA avg. consumption, coil.
3. Three-pole— three (3) N.O. and three (3) N.C. silver/nickel alloy contacts rated 10A at 250VAC
4. Spring return test button for testing contacts
5. LED indication of relay status
6. Mechanical indication of relay status
7. Plug-in protection module to protect against electrical spikes
8. Surface or DIN rail mounting
9. Mechanical life of 10 million operations

The industrial control relay shall be Telemecanique, model RXM3AB2F7 with sockets and hold-down springs, or equal.

W-46.11 General Purpose Control Relays

Relays for general control switching applications shall have the following features:

10. 120 VAC, 60 Hertz, 2 VA nominal, coil.
11. Two (2) Form C (2PDT), 10 ampere, silver-cadmium oxide contacts.
12. Eight pin octal-type plug (provide matching screw terminal sockets).
13. Clear, high-impact polycarbonate dust cover.

The control relay shall be Potter & Brumfield KRPA-11AG-120 with 27E122 socket, or equal.

W-46.12 Instrumentation Signal Multicontact Relays

Relays for switching instrumentation level signals shall have the following features: 120VAC coil; 4PDT gold-flashed silver, gold-silver nickel, or gold 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 100,000 operations at rated load.

The socket shall be of the surface or rail-mount design with screw terminals to facilitate circuit connections.

The relay and socket shall be Omron model MYQ4, or equal.

W-47.13 Time Delay Relays

Time delay relays shall have the following features:

1. Digital Integrated Circuitry
2. Switch selectable ranges from .1s to 1000 m in 6 ranges
3. 4 position DIP switch selects x0.1, x1, x10, and s or m
4. LED indication of input voltage applied and output relay status
5. Repeat accuracy of +/- 0.1% or +/- 20 ms
6. Mechanical life of 10 million operations
7. 11 pin DPDT magnal socket
8. Socket shall be surface or rail mount design with screw terminals

The relay and socket shall be ABB/SSAC model TRU Series and socket, or equal.

W-46.14 Elapsed Time Meters

Elapsed time meters shall be furnished and installed where shown. Time meters shall register up to 9999.9 hours, be non-resetable, have square cases suitable for panel mounting, and have coils for 120 volt, 60 Hertz operation. The units shall be as manufactured by Eagle Signal, Crammer, or equal.

W-46.15 Surge Protection Device (SPD)

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 277/480 VAC, 3-phase 4-wire wye. The maximum single impulse current shall be 80kA per phase.

1. The SPD shall have line to neutral protection on all phases, and also neutral to ground protection.

2. The SPD shall have a 5 year warranty. Under that warranty, the SPD shall be replaced if it is destroyed by lightning or other impulses.

3. The SPD shall have an LED failure indicator on all three phases.

4. The clamp voltages for the SPD shall be the following:

    Line to neutral - 700 volts
    Line to ground - 700 volts
    Neutral to ground - 700 volts
    Line to line - 1200 volts

The SPD shall be Advanced Protection Technologies model TE/4XF, or equal.

W-46.16 Panel Mount Terminal Blocks

Control terminal blocks shall be single pole units constructed of a thermo-set phenolic base with wire clamp terminals attached. The terminals shall be rated for 25 amps, 600 volts. The terminals shall accommodate #16 to #12 AWG conductors. The block shall have a dovetail base that facilitates joining of the blocks into a rigid, self-supporting assembly.

The terminal blocks shall be as manufactured by Allen Bradley, Phoenix Contact, Square D, or equal.

W-46.17 Control Transformers

The control transformer shall be a single output type for primary and secondary voltages as shown. Primary and secondary protection fuse blocks shall be prewired and mounted on top of the transformer. The secondary side neutral leg shall be grounded. The control transformer shall have sufficient capacity to provide the energy demands for all connected control components. They shall be designed with low impedance windings for excellent voltage regulation, and shall accommodate the high inrush current associated with contactors, starters, solenoids, relays and other connected devices. The control transformers shall be designed for a 55°C temperature rise at full load.

The electrical performance shall exceed the requirements of ANSI/NEMA ST-1 (Specialty Transformers). The transformers shall be as manufactured by Square D, General Electric, Cutler-Hammer, or equal.

W-46.18 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 ranges. 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 +65ºC.
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 as manufactured by Enercorp Instrument Ltd, or equal.

W-46.19 Multi-Range Twin Timer

The Multi-Range Twin-Timer shall be of solid-state CMOS circuitry with eight (8) operation modes and shall meet the following performance parameters:

1. Operational Modes: Sequential Start, Coarse/Fine Adjustment, Instantaneous Cycle, Cycle, Cycle Inversion, Interval On, Interval ON Delay, Sequential Interval.
2. T1 time range: .1 sec. to 6 hours
3. T2 time range: .1 sec. to 6 hours
4. Operating Temperature: -10 to +50ºC.
5. Power Consumption: 2.3VA
6. Repeat Error: +/-0.2%, +/-10ms
7. Setting Error: +/-10% maximum
8. Contact Rating: 5A @ 120VAC
9. Voltage Supply— 100 to 240VAC

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SECTION 47 - ELECTRIC MOTORS

W-47.01 General:

Electric motors shall be of the high energy efficient and high power factor type mounted on the equipment being driven. Motor characteristics shall be as specified under the Workmanship and Materials sections for equipment.

W-47.02 Design:

Motors shall conform to the latest ANSI Standards for rotating electrical machinery and in matters not covered therein, the latest NEMA Standards for motors and generators shall apply.

W-47.03 Ratings:

Motors shall have suitable output torque and speed characteristics to operate the driven equipment under design load conditions without exceeding their nameplate ratings. They shall have a 1.15 service factor. Definite purpose motors shall be used on specialized equipment requiring them.

Motors supplied for use with adjustable frequency drives (AFD) and solid-state soft starters shall be rated for inverter duty and shall meet requirements of NEMA MG1, Part 31. Inverter duty motors may be supplied with a 1.0 service factor.

Ratings shall be based on NEMA Class B, 80 degrees C, temperature rise at rated conditions above an ambient of 40°C and shall have Class F moisture resistant insulation. This temperature rise shall be for continuous operation unless otherwise specified or approved.

W-47.04 Operating Types:

Motors of 1/2 HP or larger shall be of the squirrel-cage induction type, designed for 3-phase, 60-Hertz, 460-volt operation, unless shown or specified otherwise. Smaller motors shall be of the capacitor induction type designed for single-phase, 115-volt, 60-Hertz operation unless otherwise noted or approved.

All motors, except where the driven equipment presents unusual requirements, shall have torque and locked rotor characteristics as outlined in the NEMA Standards for Design B.

All gear motors and speed reducers shall be designed for correct mounting position and rated in accordance with the application practice outlined in the Standards of the American Gear Manufacturers Association, for Class II service.

W-47.05 Bearings:

All motor bearings shall be of the antifriction type except where otherwise shown or specified. All antifriction bearings shall have a minimum rating life of 100,000 hours, based on a reliability of 90 percent in accordance with ANSI B3.15. All motor bearings shall be oil or grease lubricated with convenient provisions for inspecting and servicing.

W-47.06 Mechanical Protection:

Motors shall be of the totally enclosed, corrosion resistant (mill and chemical duty) type, unless a higher classification is required by the intended service. Vertical motors shall have solid shafts with high ring bases having ample space for coupling adjustments.

All motors shall be fan cooled except for smaller sizes (approximately 2 HP and less). All totally enclosed motors shall be tapped at a low point and fitted with an Appleton ECD 1/4-inch drain fitting.

Motors in Class I, Division 1, Group D areas shall be rated explosion proof and be of corrosion resistant aluminum or cast iron construction.

W-47.07 Installation:

Motors shall be of the right or left hand assembly, as required, so that the conduit box and nameplate will be readily accessible.

W-47.08 Performance Data:

Motor make, type and rating, speed-torque curves, along with the outline dimensions and the guaranteed full load and locked rotor amperes at full voltage, shall be presented with the equipment details for review and approval.

Motors shall have the following minimum full load efficiency and uncorrected power factor ratings (efficiencies and power factor of motors at other speeds shall be as specified with driver equipment):

Motor Efficiency and Power Factor - Minimum Percent

	At 1800 RPM		At 1200 RPM	
Horsepower	Efficiency	Power Factor	Efficiency	Power Factor
1	81.5	74.3	78.5	69.7
1-1/2	82.5	76.5	84.0	62.0
2	82.5	70.3	85.5	70.1
3	86.5	79.9	86.5	73.7
5	87.0	83.8	86.5	75.8

7-1/2	88.5	82.4	88.5	78.2
10	88.5	85.0	88.5	76.4
15	90.2	85.0	89.5	81.1
20	90.2	84.6	89.5	81.9
25	91.7	84.5	91.0	82.0
30	91.7	84.2	91.0	82.5
40	92.4	84.2	92.4	83.3
50	92.4	85.0	92.4	84.9
60	93.0	86.8	93.0	85.7
75	93.6	86.6	93.0	86.0
100	94.1	88.3	93.6	86.4
125	94.1	89.3	93.6	85.8
150	94.5	88.5	94.5	87.5

The machine noise of the motors shall not exceed the following sound power levels when measured in accordance with IEEE Standard 85:

	Overall Sound Power Level, Decibels, A-Weighted	
Horsepower	At 1800 RPM	At 1200 RPM
1 - 2	70	67
3 - 5	74	71
7-1/2 - 10	77	74
15 - 20	81	78
25 - 30	85	80
40 - 50	89	84
60 - 75	90	88
100 - 150	90	93

W-47.09 Test Reports:

Unless the equipment specifications stipulate shop tests reports on the actual motors used the test data shall be on a representative motor of the same horsepower and speed. They shall show the motor full load and locked rotor amperes and full load efficiency and power factor rating, and be recorded on standard test forms as outlined in the NEMA Standards.

W-47.10 Painting:

Painting shall meet the requirements of the Workmanship and Materials section headed "Painting." All steel parts shall be chemically treated to insure clean surfaces, then given a rust-resistant undercoat. Screws, nuts, bolts and similar items shall be of nonferrous metal or have an approved rust-resistant finish.

* * *

SECTION 62 - CONTROL AND WIRING FOR PACKAGED UNITS

W-62.01 General

The electrical requirements for packaged equipment shall be supplied as complete factory assembled units that require only external connections for installation. They shall include all electrical features necessary for the proper functioning of the units.

W-62.02 Standards

All control components shall comply with the latest ANSI, IEEE, and NEMA standards wherever applicable. The assemblies shall be listed as complying with the requirements of U.L., Inc., or other recognized testing organizations, for the particular service to be encountered, where possible.

The conduit and wiring on each unit shall be in accordance with the Workmanship and Materials section headed "Conduit, Wire and Grounding," unless otherwise shown or directed.

The Contractor shall be responsible for providing conduits and wires for field wiring of all the control devices to the packaged units whether such control devices are specifically shown or not. The Contractor shall include in his bid cost for installation and connections of all electrical equipment like control panels, switches, auxiliary control devices, conduit and wires, and all other appurtenances as required.

W-62.03 Electrical Characteristics

Controls for each unit having motors of 1/2 horsepower or larger, except as noted, shall consist of combination circuit breaker and magnetic starter, along with all required control transformers, relays, timers, heaters, and other necessary incidentals to provide a complete functioning unit. Motors shall be designed for 480-volt, 3-phase, 60-Hertz operation with all controls at 115 volts or less.

Controls for each unit having motors of less than 1/2 horsepower shall be provided with 120-volt, single phase, toggle type thermal manual motor starter with neon pilot light.

All controls and equipment shall meet the requirements of the appropriate Workmanship and Materials sections contained herein.

W-62.04 Enclosures

Principal control components shall be installed in NEMA rated enclosures as follows:

AREA	ENCLOSURE
All areas listed Class I, Group C, D	NEMA 7 - Explosion-proof
Outdoor and below grade elevation indoor	NEMA 4X type 316 stainless steel-Watertight (outdoor enclosures containing controls shall be painted white.)
Above grade indoor	NEMA 12 – Industrial

W-62.05 Auxiliary Control Devices

Float switches, pressure switches, limit switches, thermo-stats, and other auxiliary control devices shall be of the heavy-duty type and rugged enough to satisfy the intended service. All contacts shall be rated at 10 amperes, 120 volts, 60 Hertz a-c, unless otherwise specified. Where adjustable, the devices shall be conveniently set and the setting secured firmly. Limit switches shall function in accordance with contact development charts.

W-62.06 Painting

Enclosures for electrical controls and connecting conduit shall be finished in accordance with Workmanship and Materials section headed “Painting.”

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SECTION 67 - STEEL PIPE AND FITTINGS

W-67.01 General

Steel pipe and fittings include all wrought and fabricated steel pipe, stainless steel pipe, and fittings therefor. Steel pipe shall be used only where specifically shown or specified.

Completely detailed working drawings shall be submitted by the Contractor for approval in conformance with the requirements of the General Provisions. Such drawings shall show piping layouts and contain schedules of all pipe, fittings, valves, expansion joints, hangers and supports, and other appurtenances. When any of the steel pipeline work is of special design, such work shall be shown in large detail and be completely described and dimensioned.

W-67.02 Pipe Standards

Dimensions of steel pipe shall conform to ANSI B36.10, unless otherwise specified, shown, or required. Pipe 12 inches and smaller shall be not less than Schedule 40. Pipe 14 to 18 inches inclusive shall be not less than Schedule 30. Pipe 20 through 36 inches shall have a wall thickness of not less than 3/8 inch. Pipe larger than 36 inches shall have a wall thickness of not less than 1/2 inch.

Steel pipe 24 inches in diameter and smaller shall meet the requirements of ASTM A 53.

Steel pipe larger than 24 inches in diameter shall meet the requirements of AWWA C200, unless otherwise specified, shown, or required. Pipe conforming to AWWA C200 fabricated from plates shall meet the requirements of ASTM A 283 Grade B with not more than two longitudinal seams and with girth seams not less than 7 feet apart. Pipe conforming to AWWA C200 mill pipe shall be made with Grade B steel and spiral welded with inside and outside (double) fusion butt welds. All pipe shall be hydrostatically shop tested in accordance with AWWA C200 to the test pressure determined by the formula in Subsection 3.5 of AWWA C200. The Contractor shall provide an affidavit of compliance for all pipe and fittings furnished under AWWA C200. Stainless steel pipelines shall not be painted.

Steel pipe, including fabricated pipe, shall be furnished in the longest lengths commercially available unless otherwise shown, specified, or required. Pipe shall have the manufacturer's name, initials, or trademark rolled into the surface and the year of manufacture shall be suitably marked on the pipe.

W-67.03 Welding

Welding of pipe joints where shown, specified, permitted, or required shall meet the requirements of ANSI B31.1, Code for Pressure Piping, unless otherwise specified. Pipe and fittings with a wall thickness of 3/16 inch and greater shall have ends beveled for welding. All welding on steel pipelines shall be performed by certified welders having current certificates conforming to requirements of the ANSI Code. Such certification shall be submitted to the Engineer before proceeding with any pipe welding.

Steel pipelines, with interior lining, shall be shop welded. No field welding on such pipelines will be permitted unless authorized in writing by the Engineer. Steel pipelines shall be shop welded and fabricated complete which includes fittings, lugs, anchors, supports, flanges, and like items, ready for field assembly before linings, as specified, are applied. Pipeline lining, where specified, shall include pipe, fittings, and specials.

W-67.04 Sleeve-Type Couplings

Except where standard solid sleeves or split sleeves are shown or specified, sleeve-type coupling for steel 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.

The ends of pipe and fittings which are to have sleeve-type couplings shall be left free of shop coat or field coat for a distance of 12 inches, until after installation, when the pipe and couplings exposed to view shall be field painted as specified or directed.

W-67.05 Harnessing

The steel pipe joint harness shall consist of two or more steel tie rods set diametrically opposite, generally on the horizontal diameter of the pipe, extending across the joint from fabricated bent steel plate lugs welded to the pipe at either side of the joint. Steel plates used in the fabrication of bent plate lugs shall conform to ASTM A 242. Lugs and welds shall be designed to develop the full strength of the tie rods.

Harness tie rods and nuts shall be of mild steel meeting the requirements of ASTM A 307 Grade B. Nuts shall be hexagonal and have a standard chamfer on the back face.

W-67.06 Expansion and Flexible Couplings

Ample provision shall be made for flexibility in all pipelines to compensate for expansion. Expansion devices shall be adequate to allow the lines to expand and contract freely without injury to any part of the piping system. The devices may be in the form of expansion joints, expansion couplings, swivel or swing joints or pipe bends, and include such anchors as may be shown, specified, or required to make the devices effective. If expansion devices are not required, all runs of pipe subject to change in length shall be fabricated shorter than their theoretical length to the extent that there may be freedom to expand without increasing the stresses imposed when cold.

Expansion joints shall be provided with adequate tie rods to limit the axial movement at the specified test pressures, except where otherwise noted or specified.

W-67.07 Handling

During loading, transportation, and unloading, extraordinary care shall be taken to prevent injury to the pipes and coating. Loading and unloading shall be done slowly with each pipe under perfect control at all times. Under no circumstances shall a pipe be dropped. Suitable skids or blocks shall be placed under each pipe in the shop and the pipe shall be securely wedged during transportation to ensure the least possible injury to pipe, lining, and coating.

Pipe shall be handled with equipment such as stout canvas slings and wide padded skids, designed to prevent damage to the coating. The use of bare cables, chains, hooks, metal bars, or narrow skids in contact with the coating will not be permitted. All pipe handling and hauling equipment shall meet the approval of the Engineer before use. The ends of coated pipe shall be protected with roofing paper to prevent damage to the coating during transit. Abrasions

and injuries shall be promptly and efficiently repaired.

Pieces shall be examined for defects and no piece shall be installed which is known to be defective. If any defective piece should be discovered after having been installed, it shall be removed and replaced with a sound one in a satisfactory manner by the Contractor at his own expense.

W-67.08 Erection

Steel pipelines shall be furnished, fabricated, erected, and otherwise installed to the lines, elevations, locations, and dimensions shown, specified, and required for a complete installation. In all existing structures and new structures as applicable, the Contractor shall verify all dimensions shown on the Plans and shall take such field dimensions that may be necessary to properly fabricate, locate, erect, connect to existing work, and otherwise install all steel pipelines, pipe supports, pipe anchors, and structural frames required for steel pipelines. Where temporary supports are used, they shall be sufficiently rigid to prevent shifting or distortion of the pipe. Expansion devices shall be properly adjusted so that pipelines will be tight during expansion and contraction.

For sleeve type couplings, diametrically opposite bolts shall be equally tightened on the connection so that the gaskets will be brought up evenly all around the pipe. Final tightening shall be done with torque wrenches set for the torque recommended by the coupling manufacturer.

W-67.09 Hangers and Supports

All steel pipelines shall be permanently erected and supporting devices shall be furnished and installed as specified on the construction plans.

W-67.10 Linings and Coatings - General

In general, all linings and coatings, except coatings applied as field painting, shall be shop applied.

Linings and coatings, where such are specified, shall be applied to all pipe and fittings.

All bolts, nuts, couplings, and the like shall be well coated after the joint has been made.

Painting shall conform to the Workmanship and Materials section headed "Painting."

* * *

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 then 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.

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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 shall be rigid aluminum conduit covered with no less than 40 mils of PVC, as manufactured by Robroy, Ocal or equal. The PVC material shall conform to the applicable ASTM standards. The conduit shall be buried a minimum of 24 inches below grade.

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 Robroy, Ocal, or equal. The physical properties of the PVC and urethane materials shall conform to the applicable ASTM standards.

Cast 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 nonferrous screws.

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 threaded to provide watertight connections.

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 or 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. All threads in steel conduit shall be given a coat of zinc dust in oil or other approved corrosion-preventive compound before making connections. Threads on aluminum conduit shall be given a coat of graphite or other approved compound. 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 galvanized 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 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.

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 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 steel 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 nonferrous 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. Flexible conduits, where required, shall be explosion-proof and of corrosion resistant stainless steel construction.

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. Lug bolting at devices or bus bars shall be made up with a flat washer, a Belleville washer, and a locknut.

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.

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. Wires shall be color coded in conformance with the requirements of applicable codes.

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 83 - ERECTING AND JOINTING INTERIOR PIPING

W-83.01 General

Erecting and jointing interior piping includes furnishing of supports and hangers and installation of all interior and exposed exterior piping. Piping materials, coating, and linings shall be located and installed where shown on the Plans or as specified. The work shall include providing working drawings required by the General Provisions, showing the type, quantity, design, calculations, arrangement, and location of all hangers and supports.

W-83.02 Materials

Structural and miscellaneous steel, metal castings, ductile-iron pipe, and steel pipe used for hangers and supports shall meet the requirements of the applicable Workmanship and Materials sections.

W-83.03 Design

Hangers and supports not detailed on the Plans 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 having springs where necessary. Hangers and supports shall be of standard design where possible, and be best suited for the service required, as approved. They shall be screw adjustable after installation. Perforated straps will not be accepted.

All supporting devices shall be designed in accordance with the best practice and shall not be unnecessarily heavy. The injury hazard shall be considered and minimized in all protruding supporting devices.

Hangers and supports shall be supported by threaded rods properly fastened in place by suitable screws, clamps, insets, bolts, or by welding.

Brackets for the support of piping from walls and columns shall be made of welded steel and 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 a manner that the safe bearing strength of the wall will not be exceeded.

Pipe rolls or chairs shall be of cast iron. 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 ductile-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 an adjustable saddle or roll, ductile-iron pipe saddle supports, or with pipe stanchion saddles with yokes and nuts. The

base flanges shall be bolted to the floor, foundation, or concrete base.

Where adjustable supporting devices are not required, pipelines 3 inches in diameter and smaller may be supported on ductile-iron, malleable iron, or steel hooks, hook plates, rings, or ring plates.

W-83.04 Anchors

Anchors shall be furnished and installed when specified, shown, or required for holding the pipelines, tanks, apparatus, 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.

Anchors for piping shall be of the ductile-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.

Anchors detailed on the Plans shall be provided as shown and specified.

W-83.05 Inserts

Inserts for concrete shall be galvanized and 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 plane and to lock the rod nut or head automatically. Inserts shall be recessed near the upper flange to receive reinforcing rods and be designed so that they may be held in position during concreting operations. Inserts shall be designed to carry safely the maximum load that can be imposed by the rod which they engage.

W-83.06 Galvanizing and Painting

When galvanizing is specified, it shall be done in accordance with the Workmanship and Materials section headed "Galvanizing."

Hangers, supports, anchors, and similar devices shall be painted in accordance with the Workmanship and Materials section headed "Painting."

W-83.07 Transportation and Delivery

Every precaution shall be taken to prevent damage to the pipe during transportation and delivery to the site. Extreme care shall be taken in loading and unloading the pipe and fittings. Such work shall 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 any pipe or special is damaged in the process of transportation, handling, or laying, 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 to prevent the pipe from rolling.

W-83.08 Flanged Joints

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 A 307 Grade B, and ANSI B16.1.

W-83.09 Screwed Joints

Threads for screwed joints shall be thoroughly cleaned after reaming. All threads shall be coated with a suitable pipe dope, mastic metallic compound as manufactured by James K. Harbinson & Co., graphite and engine oil, or equal, before jointing. Joints shall be screwed on until a tight metal-to-metal joint is produced without evidence of heat in the threaded portion. Once a joint has been screwed up, it shall not be backed off unless the threads are recleaned and new compound applied before rejointing.

For pipe fitted with screwed flanges, the flanges shall be fitted to the pipe in the shop unless otherwise permitted. The pipe flanges shall be accurately threaded to the American Briggs gauge, after which the flanges shall be screwed on by heavy machinery until the end of the pipe projects beyond the face of the flange and a tight metal-to-metal joint is produced without evidence of heat in the threaded portion. The projecting end of the pipe shall then be cut off flush with the face of the flange. A light refacing cut shall be taken across the end of the pipe and the face of the flange at right angles to the centerline of the pipe and the pipe shall then be reamed.

W-83.10 Mechanical joints

In making up mechanical joints, the spigot shall be centered in the bell. The surfaces with which the rubber gasket come in contact shall be thoroughly brushed with a wire brush just prior to assembly of the joint. Lubricant shall be brushed over the gasket just prior to installation. The gasket and gland shall be placed in position, bolts inserted, and nuts tightened fingertight. The nuts shall be tightened by means of a torque wrench in a manner that the gland shall be brought up toward the pipe evenly. The following range of bolt torques shall be applied:

Size Inches	Range of Torque (ft. lbs.)
5/8	45-60
3/4	75-90
1	85-100
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 thorough cleaning.

All bolts shall be primed by dipping with a bituminous coating, except the threads, which shall be coated immediately prior to installation of the nuts.

W-83.11 Sleeve Type Couplings

For sleeve type couplings, diametrically opposite bolts shall be equally tightened on the connection so that the gaskets will be brought up evenly all around the pipe. Final tightening shall be done with torque wrenches set for the torque recommended by the coupling manufacturer.

W-83.12 Welding

Field welding of pipe joints where shown, specified, permitted, or required shall meet the requirements of ANSI B31.1 - Power Piping, Chapter VI (Section 136.4.2 Visual Examination)(Section 137.4 Hydrostatic Tests) or (Section

137.5 Pneumatic Tests). Pipe and fittings with wall thickness of 3/17-inch and larger shall have ends beveled for welding. Parts to be welded shall be securely held in place and in proper alignment during welding. The abutting pipe ends shall be separated before welding to permit complete fusion to the inside wall of the pipe without overlapping. Welding shall be continuous around the joint and completed without interruption. Welds shall be of the single vee butt type, of sound weld metal thoroughly fused into the ends of the pipe and into the bottom of the vee. Welds shall be free from cold shuts, pinholes, oxide inclusions, or other defects. All welding of steel pipe done off site shall conform to the requirements of the Workmanship and Materials section headed "Steel Pipe and Fittings."

W-83.13 Testing

All pipelines shall be watertight and 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.

Pressure tests of pipelines shall be made by maintaining water in the pipe at a minimum of 125 psi for a period of 30 minutes. The pipelines shall show no leakage.

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SECTION 84 - VALVE AND GATE OPERATORS

W-84.01 General

All valves and sluice and slide gates shall be manually operated unless otherwise shown or specified. Operators include manual operators with levers, tee wrenches, handwheels, chain wheels and chains, cranks and floor stands; electric motor operators with manually operated handwheels; pneumatic cylinder operators and sluice and slide gate electric motor operators designed for continuous duty service to provide modulating or throttling control.

Valve and sluice and slide gate operators shall be provided complete with all appurtenances necessary for the equipment to perform its intended function. Such appurtenances include, but are not limited to, anchor bolts and other mounting hardware, limit switches, pressure switches, gauges, control switches and control valves, electrical supply connections, air supply piping, control valves and regulating controls, solenoid valves, extension stems, local and remote indicators, torque switches, operating nuts, purge water service with all associated piping valves and controls, push-button controls, indicating lights, floor boxes, direct burial valve boxes, and other such items.

All electrical equipment and appurtenances associated with valve and gate operators installed in hazardous areas shall meet the requirements for Class I, Division I, Group D hazardous areas and shall be approved by the U.L., Inc. for use in such areas.

All valves and sluice gates shall be manually operated, unless otherwise shown, specified, or directed.

All direct burial valves shall be provided with adjustable type cast-iron valve boxes and extension stems to grade. All direct burial valves and valves in manholes shall have operating nuts and extended operating shafts to grade or as shown. Two tee wrenches shall be provided for each size and type of operating nut.

Manual operators for valves 3 inches and larger shall be handwheels, unless otherwise shown or specified.

Plug valves 8 inches and smaller shall be wrench operated with operating nuts. One wrench of suitable length shall be furnished for each three of such size operating nuts. Plug valves with operating nuts that are extended shaft type and operated from floor boxes shall be provided with two tee wrenches for each size and type of operating nut. Plug valves 10 inches and larger shall be gear operated with handwheels.

Any plug or butterfly valve located 7 feet or more above the operating floor shall have chains and chain wheel or chain lever operators to permit operation from the operating floor. The Contractor shall provide suitable hooks fastened to walls or other parts of the structure on which the chains may be hung when not in use.

Butterfly valve operations shall meet the requirements of AWWA C504, except as otherwise shown or specified. Manual butterfly valve operators shall be of the worm gear or traveling nut type and all gearing shall be totally enclosed. Butterfly valves 8 inches and smaller on process air lines may be lever operated.

Worm gear type operators shall include a worm gear and matching drive worm. Bearings shall be provided for each rotating member.

Traveling nut type operators shall include a threaded steel screw and a bronze nut. A slotted lever or link lever system shall be provided to transfer the applied torque to the disc shaft. All rotating shafts, screws, and links shall have separate bearings. Thrust bearings shall be provided.

W-84.02 Manual Valve Operators

Manual valve operators shall be of the lever type, handwheel, chain lever, chain wheel with worm gear or wrench type and shall be designed so that a pull of not more than 40 pounds on the manual operator will produce an output torque equivalent to the maximum valve shaft torque required to operate the valve under maximum line pressures and velocities. Lever and wrench handles and gear operators shall be of the locking type to prevent the valve disc from creeping or fluttering when in any intermediate position between open and closed. Gear operators shall be permanently lubricated, totally enclosed, with adjustable stops for the open and closed positions to prevent overtravel in either direction and shall have a valve disc position indicator.

Manual valve operators shall be provided for direct burial butterfly valves.

W-84.03 Floor Stands

Floor stands for 12-inch and smaller valves and sluice gates and 24-inch and smaller slide gates shall be wheel operated without gears. Floor stands for 12-inch to 20-inch valves and gates shall be single crank, single speed operated. Floor stands for 24-inch and larger valves and gates shall be single crank, two speed operated.

Materials used in floor stands shall meet the requirements of the specifications for materials used in valves and sluice gates. Frames shall be of cast iron of heavy and substantial design with smooth exterior and neat appearance. Adequate provision shall be made for lubrication and all operating parts shall be protected.

Each floor stand shall be equipped with a nameplate stating the gate or valve controlled by the stand shall also be stamped with an arrow and the word "Open" to indicate the direction of rotation.

Floor stands for rising stem valves or gates shall be fitted with ball or roller bearings designed to take the thrust and equipped with a hood to protect the stem and an indicator to show the position of the valve or gate, as specified under the Workmanship and Materials section headed "Sluice Gates." Floor stands for nonrising stem valves or gates shall be provided with an indicator to show the position of the valve or gate.

Operating nuts shall be of bronze meeting the requirements of ASTM B62, finished all over, suitably splined to connect with the handwheel or gear and with threads which will engage smoothly with those of the lifting shaft.

Crank-operated floor stands shall be operated by a crank that will open the valve or gate when the crank is turned counterclockwise. The center of the crank shall be approximately 38 inches above the floor. Gears shall be bevel or worm, of hardened steel or manganese bronze, with machine cut teeth and shall be enclosed in a cast-iron body. The crank shall have a brass, sleeve-type handgrip rotating freely on the handle. The gear ratio shall be such that the stand will operate the valve or sluice gate with a maximum force of 40 pounds on the crank at the single or low speed.

Handwheel-operated stands shall have handwheels that open the valve or sluice gate when the wheel is turned counterclockwise. The center of the handwheel shall be approximately 36 inches above the floor. The handwheel shall be of sufficient diameter so that the stand will operate the valve or sluice gate with a maximum pull on the handwheel of 40 pounds.

Floor stands shall be solidly and accurately set to center over the gate or valve and shall be bolted to the floor with through-bolts wherever possible.

Approximately 3/4 inch of Embeco cement grout or equal shall be placed beneath the floor stand to assure uniform support.

W-84.04 Bench Stands

Bench stands shall meet the requirements for floor stands, except that instead of a conventional pedestal for floor mounting, a special housing adapted to bench stand use shall be provided. Manually operated floor stands located more than 7 feet above the floor shall be provided with chains and chain wheels, meeting similar requirements specified herein and in the Workmanship and Materials section headed "Valves."

W-84.05 Electric Motor Operators

Valve and sluice gate motor operators shall be the close-coupled electric motor-driven screw type. Valve motor operators shall operate the valves from full closed to full open in 120 seconds when the valve is subjected to rated pressure and flow. Sluice gate motor operators shall be capable of operating the gates at a rate of 12 inches per minute in either direction when the gate is subjected to maximum head. Motor operators shall be totally enclosed NEMA 4 or NEMA 7 where explosion-proof construction is shown or specified. Operator enclosures shall be provided with 120-volt compartment heaters. The motor operator shall comprise a motor, power gearing, a handwheel operator, an integral controller, limit and torque switches and push buttons for open-stop-close operation. Valve operators shall have an external indicator to show the position of the valve. Gate operators shall include floor stands and yokes for self-contained gates. Additional limit switches, indicating lights, position transmitters and remote position indicators, remote operating controls and other accessories and controls shall be provided as shown, specified, or required.

Each operator shall be arranged for 480-volt, 3-phase, 60-hertz electrical supply. All controls shall be 120-volt, single-phase, 60-hertz and shall be provided with an integral 480/120-volt control transformer with fused secondary.

Motors shall be of the high starting torque, ball bearing, squirrel-cage type designed for intermittent operation on 480-volt, 3-phase, 60-hertz electrical current, except as otherwise shown, specified, or required. The stator windings shall have Class B or better insulation. Joints at the end rings shall be silver soldered, unless the bars of the squirrel-cage winding are cast integrally with the end rings. The operator shall have geared limit switches to stop the movement in each direction and adjustable torque switches to stop the opening or closing movements in case of an obstruction. At the end of two complete operating cycles with no intervening time delay, the motor winding or controller elements shall not exceed a temperature rise of 75 degrees C above an ambient or 40 degrees C when measured by thermometer, or 85 degrees C when measured by resistance.

The motor shall be capable of operating the gate or valve against the maximum differential line pressure when voltage at the terminals is within 15 percent of nominal voltage.

Drive units shall be arranged to permit the motor to attain full speed before the load is energized. Overload relays shall be provided in each phase of the motor. Full calculations for each size of motor operator indicating forces, full load and locked rotor current and horsepower shall be furnished to the Engineer for approval.

A handwheel or crank shall be provided for manual operation. The operator must be responsive to manual operation at all times, except when being electrically operated. The handwheel shall not rotate during electric operation. The motor shall not rotate during handwheel operation nor shall a fused motor prevent manual operation. When in manual operating position, the operator shall automatically return to electric operation when the motor is energized and remain in the motor position until manual operation is desired. The movement from motor to manual operation shall be accomplished by a positive declutching mechanism which will disengage the motor mechanically but not electrically.

Failure of motor gearing shall not render hand operation impossible. Handwheels shall be removable and adaptor keys provided to permit operation by a portable operator. Electrical operation of the motor shall be as shown or specified.

The controller shall be a NEMA rated reversing controller, complete with mechanical interlocks and overload relays, and be an integral part of the operator. Contacts shall be provided for indicating lights as shown, specified, or required. One light on shall indicate that the gate is fully open; the other light on shall indicate that it is fully closed; and both lights on shall indicate that it is in an intermediate position. The internal wiring in the valve operator shall be arranged so that the opening and closing coils cannot be energized simultaneously at any time, regardless of external wiring connections.

Power gearing shall consist of generated gears of heat-treated steel and worm gearing. The worm shall be of hardened alloy steel with the threads ground and polished after heat treating. The worm gear shall be of chilled nickel bronze. Antifriction bearings shall be used throughout and the operator shall be grease or oil bath lubricated. Lubricants shall be suitable for ambient temperatures from 40 to 150 degrees F.

Limit switches and torque switches shall be the adjustable type with auxiliary contacts, operative in either direction of travel. Limit switches shall be "in step" with torque switches at all times whether in motor or manual operation. The operator shall have geared limit switches to stop movement in each direction and torque switches shall be provided for protection against mechanical overload and to stop movement in either direction if an obstruction is encountered. The number, function, and arrangement of limit switches shall be as shown, specified, or required.

When used for gates or valves specified for continuous duty service (but not modulating or throttling continuous duty service), motor operators and all required accessories shall be designed for such service. Such motor operators shall conform to all applicable requirements specified herein and, in addition, the operator shall be designed to move gates at a speed of 6 inches per minute in either direction. An easily replaceable stem nut shall be provided which can be installed in the top of the unit without removing the operator from the stand. The stem nut shall be of nylon suitable for continuous duty service without stem lubrication.

Motor operators shall be as manufactured by E-I-M Company; Limitorque Corp.; Rotork, Inc.; or equal.

W-84.06 Electric Gate Motor Operators - Modulating Service

Sluice gate electric motor operators shall be designed for continuous duty modulating service where shown, specified, or required. The operator shall be arranged to move the gate at a speed of 6 inches per minute in either direction.

Motors shall be specifically designed and rated for continuous duty operation and arranged for 240-volt, single-phase, 60-hertz electrical power supply. Power gearing shall be of sufficient capacity to provide adequate service life for continuous duty modulating service.

Operators shall have an easily replaceable stem nut which can be installed in the top of the unit without removing the operator from its floor stand. The stem nut shall be of nylon suitable for modulating service without stem lubrication.

The control module shall be an electronic solid state type with proportional power variation to control the speed of the d-c motor. The control module shall be integrally mounted within the operator switch compartment and shall consist of an error detection circuit powered by a closely regulated d-c power supply and a thyristor section to power the motor. The control module shall be capable of accepting a 4-20 ma d-c signal. The error detection section of the module shall compare the in-out signal to the feedback signal and if a difference greater than one percent is detected, it

shall cause the motor to move the gate to the appropriate position at a speed proportional to the amount of error. For very small signals, an integrating circuit shall automatically increase the trigger time to the thyristors to decrease the error. There shall be no bumping or hunting in the operation. A span adjustment shall be provided which shall be 100 percent of command signal span. There shall be no interaction between any adjustments on the control module such as span, dead band, gain, and zero.

A 2-position selector switch marked AUTO and MANUAL plus two push buttons marked OPEN and CLOSE shall be integrally mounted on the operator. A key locking arrangement shall be provided and arranged so that the operator cannot be shifted out of the AUTO position without insertion of a key device. The OPEN and CLOSE push buttons on the operator shall be inoperable when the unit is in the AUTO position. When in the AUTO position, the operator shall respond to a signal as shown, specified, and required. When in MANUAL position, the operator shall be operable by either push buttons or handwheel.

The operator shall be designed such that an increase in signal will open the gate and upon loss of signal the gate will remain in position.

Other accessories and controls such as remote operating push buttons, indicators, position transmitters, and like items shall be provided as shown, specified, or required.

Motor operators for continuous duty modulating service shall be the "Modutronic" model as manufactured by Limitorque Corporation, or equal.

W-84.07 Valve Limit Switches

Valves shall be provided with suitable mechanical cam gear type limit switches for remote operation, indication and other control as shown, specified, and required. Each limit switch shall be compatible with its associated operation and suitable for the service intended. Limit switches shall be furnished with valves by the valve manufacturer.

Mechanical limit switches shall be 2-pole, 3-pole, or 4-pole gang-mounted in required multiples and with necessary mechanical linkage. Switch contact ratings shall be 120-volt a-c, 20 amperes at 75 to 100 percent power factor, and 124-volt d-c, 5 amperes minimum. Mechanical limit switches shall be Series SL2, 3, of 4HC for normal use, as manufactured by National Acme, Cleveland, Ohio, or equal. Explosion-proof type shall be Series SL2, 3, or 4XC, or equal. All enclosures shall be watertight and oiltight for normal service and of cast aluminum for explosion-proof type. Operating levers shall be National Acme Series D-1260, or equal. Switches shall be complete with all racks, gears, cam, linkages, mountings, and accessories as required.

W-84.08 Pneumatic Cylinder-Operated Pump Check Plug Valves

Each pneumatic cylinder-operated pump check plug valve shall include a 4-way, solenoid-operated pilot valve, a limit switch, a manual override system on the solenoid, a manual selector switch, a double-acting pneumatic cylinder, speed control valves, piping, pressure switch, and rapid closing system with 2-way solenoid valve. Accessories and connection to the plant air system shall be as shown, specified, and required.

The operation of the automatic pump check valves shall be as follows:

1. Pump motor starts. The control pressure switch, located between the pump and check valve, closes due to pumping pressure and energizes the 4-way solenoid pilot valve.

2. Air enters the cylinder actuator and the valve begins to open at a preset speed.

3. The valve continues to open as the pump output increases.

4. Valve and pump reach 100 percent capacity simultaneously.

Close Cycle

1. When a pump stop signal is initiated for any particular control sequence shown, the 4-way solenoid pilot valve is de-energized causing the check valve to begin the closing cycle at a preset speed.

2. Pump motor continues to run.

3. As the valve moves towards the closed position, the limit switch contacts open at a preset point, de-energizing the motor starter coil. The motor starter contacts open at a preset point, de-energizing the motor starter coil. The motor starter contacts open and the pump motor stops.

4. The valve continues to close as the pump slows down, the valve closing completely just as forward flow from the pump stops.

5. The system is ready for another open cycle.

Manual Functions

1. A manual override button shall be furnished on the 4-way solenoid pilot valve to allow manual, local operation of the check valve.

2. For manual operation, a manual-automatic selector valve shall be provided. In the manual position, the actuator piping is isolated from the supply pressure and the pressure between the opposing cylinder supply lines is relieved permitting manual operation of the valve by a wrench on the manual nut.

Rapid Closing Operation

1. A 2-way quick close solenoid pilot valve shall be provided on the cylinder operator which shall be continuously energized. Upon power failure to the pump motor, this valve shall be de-energized, causing the check valve to close immediately.

Each pneumatic cylinder shall have a fiberglass barrel with plastic coated cast-iron piston, and shall be guided throughout the length of its travel by teflon wearing rings, and shall have Buna-N seal rings. The piston rod shall be of nickel plated steel with O-ring rod packing. The cylinders shall be designed and built for valve operation at the pressure of the pipeline in which the valve is located when operated by a compressed air supply of 80 psig. The cylinders shall be fitted with a speed control valve consisting of a combination needle and check valve on each pipe connection to provide timing control in each direction of movement.

A control pressure switch shall be located on each pump discharge line between the pump and the pneumatic cylinder-operated pump check plug valve. The pressure switches shall be watertight, NEMA 4 and factory filled and sealed with an operating range from 5 to 100 psig and provided with a diaphragm seal with cleanout ring and purge water connection. Each pressure switch and MSAG diaphragm seal shall be stainless steel as manufactured by Mercoid Corporation, Chicago, IL, or equal.

Control pressure switches shall be field adjustable and shall be set so that the valve begins to open when the upstream pressure is approximately equal to the downstream pressure.

Pneumatic cylinder operators for plug check valves shall be those manufactured by De Zurik Corporation, Sartell, Minnesota, or equal.

W-84.09 Pneumatic Cylinder Valve Operators

Each pneumatic cylinder-operated valve arranged for manual open-close operation shall have an operator consisting of a 4-way solenoid-operated pilot valve with manual override, limit switches, speed control needle and check valves, piping, double-acting pneumatic cylinder, and required operating controls and accessories, all as required for a complete operation.

Pneumatic cylinders shall conform to those specified for pneumatic cylinder-operated pump check plug valves.

Operation of the valves shall be as shown, specified, and required.

W-84.10 Valve Boxes

Direct burial butterfly valves shall be provided with cast-iron soil pipe valve boxes and covers as shown. Other direct burial valves shall be provided with adjustable type cast-iron valve boxes with covers.

Valve boxes shall be of proper dimensions to fit over valve bonnets and extend to such elevation, at or slightly above finished ground surface, as shown or directed. Valve boxes shall be set vertical and concentric with valve stems. Any valve box which has moved from its original position so as to prevent application of the valve wrench shall be satisfactorily reset by the Contractor at his own expense.

W-84.11 Manufacturer's Supervision

The services of qualified representatives of manufacturers of gates and pneumatic cylinder-operated pump plug check valve systems shall be provided. The representatives shall inspect the installation of the equipment, make any necessary adjustments, place the equipment in initial trouble-free operation, and instruct operating personnel in its operation and maintenance.

W-84.12 Spare Parts

A spare nylon stem nut shall be furnished for each continuous duty service gate.

W-84.13 Painting

Exterior iron and steel surfaces of all gate and valve operators and appurtenances shall meet the requirements of the Workmanship and Materials section headed "Painting." Chain wheels and levers shall be coated by galvanizing or electroplating with zinc or cadmium. 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.

* * *

SECTION 85 - FLOOR GRATING AND PLATE

W-85.01 General

Floor grating and plate includes all grating and plate, supporting angles, and appurtenances whether constructed of steel, aluminum, or fiberglass. Steel supporting angles shall conform to the Workmanship and Materials section headed "Structural and Miscellaneous Steel."

The Contractor shall check all dimensions in the field after all concrete, piping, and equipment are in place and shall determine the exact dimensions and locations of openings and cutouts.

Completely detailed drawings of all grating and plate shall be submitted by the Contractor for approval before any fabrication is started.

Grating and plate shall be fabricated in accordance with details shown (unless specified on plans), and shall be designed for a live load of not less than 100 pounds per square foot with deflection not exceeding 1/480 of the span. In general, all grating or plate shall be of the same type and the product of the same manufacturer.

W-85.02 Steel or Aluminum Grating and Plate

Where shown on the Plans, floor grating shall be of steel, in accordance with the Workmanship and Materials section headed "Structural and Miscellaneous Steel." Supporting angles and appurtenances shall be of the same material, unless specified otherwise.

Where shown on the Plans, grating and plate shall be of aluminum construction. Aluminum grating and plate shall be constructed of Aluminum Alloy 6016-T6, and supporting angles and appurtenances shall be of Aluminum Alloy 6063-T6.

W-85.03 Workmanship - Steel or Aluminum Grating and Plate

Grating and plate shall be accurately fabricated, free from warps, twists, or other defects which affect the appearance and serviceability. Grating shall be of the extruded type or the parallel bar type. Plate shall be of the raised lug, diamond pattern type.

Grating of the parallel bar type shall comprise parallel bearing bars, at least 3/16 inch thick and 1-1/2 inches deep, with clear spacing of not more than 1 inch, tied securely with transverse bars not less than 1/8 inch thick and 5/8 inch in depth, spaced not more than 2 inches on center or other approved equivalent rectangular pattern fabricated from separate straight bearing bars and tying cross members. At the ends of grating, the transverse bars shall be not more than 1-1/4 inches from the ends of the bearing bars. Grating of the extruded type shall be heavy duty, with a rectangular plain pattern. Grating shall have a permanent nonskid pattern on the upper surface. The grating shall be designed as individual sections and installed with each section readily removable and replaceable. The clearance at the ends or between sections of grating shall be a maximum of 1/4 inch. Adjacent units shall be neatly fitted together and their transverse members shall form an uninterrupted straight line. Fasteners shall be provided for each section of grating, anchoring the grating to the supporting angles. Fasteners shall not extend above the top plane of the grating.

Plate shall be a minimum thickness of 1/4 inch and shall be reinforced as shown or required. The plate shall be designed as individual sections and installed with each section readily removable and replaceable. The clearance at the ends or between sections of plate shall be a maximum of 1/4 inch. Adjacent units shall be neatly fitted together with

fasteners or hinges, shall be provided as shown or as required, and shall not extend above the top plane of the plate. All aluminum plate shall be of the bolt-down type.

Where holes are required for the passage of pipes, gate stems, or for other purposes, they shall be provided and grating and plate shall be reinforced where necessary to preserve its strength. Openings in, and ends of all grating shall be banded to the full depth of the grating with bars 3/16 inch thick. Bands shall be welded to all intersecting members.

W-85.04 Fiberglass Grating

When shown on the Plans, floor grating shall be of fiberglass. The fiberglass grating shall be fiberglass having reinforced construction to provide complete wetting of the glass by the resin. The fiberglass grating shall have a nonskid surface. Where hold-down fasteners are required, they shall be of Type 316 stainless steel. Fiberglass grating shall be as manufactured by American Grating, or equal.

Supporting angles, channels, and other structural shapes and appurtenances for fiberglass grating shall be of fiberglass and shall meet the requirements of the latest revision of ASTM Standards as follows:

ASTM D790	- Flexural Properties
ASTM D695	- Compressive Strength
ASTM D638	- Tensile Strength
ASTM D256	- Izod Impact
ASTM D732	- Shear Strength
ASTM D2583	- Barcol Hardness
ASTM D570	- Water Absorption
ASTM D1505	- Density
ASTM D792	- Specific Gravity
ASTM D495	- Arc Resistance
ASTM D149	- Dielectric Strength
ASTM D696	- Coefficient of Thermal Expansion

W-85.05 Workmanship - Fiberglass Grating

Floor grating shall be accurately fabricated, free from warps, twists, or other defects which affect the appearance and serviceability of the grating. Tops of bearing bars and cross members shall be in the same plane. There shall be no acute angles at joints between bearing bars and cross members. Grating shall comprise parallel bearing bars, at least 3/8 inch thick and 1 inch deep, with clear spacing of not more than 1 inch, with cross bars not less than 5/8 inch thick and 1 inch in depth, spaced not more than 4 inches on center or other equivalent rectangular pattern. The grating shall be made in a mold and of single piece construction so the reinforcing glass of the bearing bars are interwoven with the reinforcing glass of the cross bars. All cut or sanded surfaces shall be coated with resin with air inhibiting additives. All sections of floor grating adjacent to other sections shall have bearing bars of the same depth. At ends of grating, the cross bars shall be not more than 1-1/4 inches from the ends of shearing bars. The grating shall be designed as individual sections and installed with each section readily removable and replaceable. Clearance at the ends or between sections of grating shall be a maximum of 1/4 inch. Adjacent units shall be neatly fitted together and their transverse members shall form an uninterrupted straight line.

Floor grating shall be of the nonslip type.

Where holes are required for the passage of chutes or for other purposes, they shall be provided and the grating reinforced where necessary to preserve its strength.

W-85.06 Erection

Grating and plate shall be erected in place on supporting angles, as shown, and shall have a full and uniform bearing on the supports, precluding rocking movement. Wedges or similar shimming devices shall not be used. Individual grating panels and plate shall be locked securely in place with approved clamps or devices. Surfaces of aluminum supporting angles and anchors which will be in contact with concrete shall be painted as specified in the Workmanship and Materials section headed "Painting."

* * *

SECTION 89 - PIPE RAILINGS

W-89.01 General

Pipe railings include all labor, materials, equipment, and services required to fabricate, furnish, and install pipe railing as shown, specified, and required to complete the work. Pipe railings shall include, but not be limited to, the following: aluminum welded railings and handrails, anchors, bolts, sleeves, and all accessories and appurtenances required for the work.

Before fabrication of all pipe railings and posts and handrails is permitted, field dimensions locating the pipe sleeves shall be taken and submitted to the pipe railing fabricator. Working drawings submitted for approval must include certification that all dimensions were taken in the field; otherwise, drawings will not be acceptable.

Three samples of handrail and post intersections, indicating welded connection and finish specified, shall be submitted for approval.

W-89.02 Aluminum Railings

Aluminum railings and posts shall be 1-1/4-inch Schedule 40 aluminum pipe conforming to ASTM B241, 6063-T6. End posts shall be 1-1/4-inch Schedule 80 aluminum pipe.

Sleeves for posts shall be of nominal sizes indicated and shall be Schedule 5 stainless steel pipe conforming to ASTM A554 - MT304.

Chains shall be 3/16-inch trade size of Type 316 stainless steel electrically welded. Open eye swivel snaps, eye bolts, and accessories for fastening shall be stainless steel and shall have a working load limit of 230 pounds.

W-89.03 Workmanship and Installation of Railings

Pipe railings for platforms, stairways, and other locations indicated shall be of heights and strengths as required by the OSHA Standards and shall consist of two horizontal rails and toe guard or bottom rail where required by the OSHA Standards.

The handrails along walls shall consist of a single rail turned 90 degrees to terminate 1/8 inch from the walls. Brackets for aluminum handrails shall be manufactured, standard brackets made of 1-1/4- inch aluminum pipe welded to an aluminum flange plate and secured to the wall with two stainless steel adhesive anchor bolts. The aluminum handrails shall be spliced and welded to the aluminum bracket. The brackets for the FRP handrails shall be a solid, formed surface mount post base as manufactured by IMCO Reinforced Plastic, Inc. The FRP handrails shall be secured to the post base by coating the splice with a manufacturer's supplied adhesive and plastic bolts. The brackets shall be secured to the concrete walls with adhesive anchor bolts. Hollow walls shall be grouted solid at attachment locations. Terminal brackets shall not be more than 12 inches from the end of the handrails.

Aluminum railing post shall be recessed and set with a quick setting grout compound. The grout compound shall be Quik-Rod as manufactured by Preld Industries; Pol-Rok as manufactured by the Hallemite Mfg. Co.; or equal. The aluminum railings shall be set into 2-inch Schedule 5 stainless steel pipe sleeves. Where aluminum railing posts are required to be anchored to vertical concrete surfaces, a 6- by 6- by 1/4-inch thick aluminum plate shall be provided and anchored with four (4) stainless steel adhesive anchor bolts, 5/8-inch in diameter, and the bottom of the post shall be closed with a welded cap. Where aluminum railing posts are to be anchored to the top flange of a stair stringer, a

3/8-inch thick aluminum plate shall be welded to the bottom of the post and fastened to the stringer with two (2) stainless steel 1/2-inch diameter bolts.

FRP railing posts are to be secured to the concrete with a surface mount post base. The FRP post shall be attached to the FRP post base by coating the splice with a manufacturer supplied adhesive and a plastic bolt. Where FRP railing posts are to be anchored to the top flange of stair stringers, a FRP bracket of sufficient strength to meet the strength requirements of the guard rails, a 1,000 pound vertical or horizontal load shall be used. The fastenings for the brackets and the post shall be 316 stainless steel bolts.

Anchoring and spacing of posts for railings and mounting of handrails shall meet or exceed OSHA requirements. Spacing of posts and mounts shall not exceed 6 feet on centers. End post for aluminum railings shall be reinforced with Type 6061-T6 aluminum bars. Corner post shall not be allowed. Posts shall be set back according to standards.

Bends in aluminum pipe railings shall be made without the use of fittings where practical. Railing sections between splices shall not exceed 20 feet. Railing and posts shall be in the same plane. Aluminum pipe railings shall have continuous 360 degree welds at all intersections. All joints in aluminum railings shall be welded and ground smooth. All joints on FRP railings shall be mitered for a close fit and ground smooth. The joints on FRP railings shall be bolted and bonded with adhesive to prevent pull-out. Provisions shall be made for removable sections where shown and for expansion and contraction.

Aluminum railings shall be delivered to the job protected by polyethylene tubing with a minimum wall thickness of 0.05 inches. Tubing shall remain during construction and shall be removed only when directed by the Engineer. FRP railings shall be delivered to the job free of any surface blemishes. Any sections damaged during construction shall be removed and replaced at the Contractor's expense.

W-89.04 Fiberglass Reinforced Plastic (FRP) Railings

FRP railings and posts shall comply with OSHA, pp 1910.23 entitled "Guarding Floor and Wall Openings" and shall be able to withstand a 1,000 pound vertical or horizontal load on any part of the top rail. The maximum allowable deflection under a 200 pound concentrated vertical load shall be 3/16 inch.

The guardrail system shall use internal fittings for all connections and be 3 feet in height with a top rail, intermediate rail, and toe guard. The toe guard shall be channel shaped to assure horizontal and vertical stiffness without sag and shall run true with the guardrail. All joints shall be bonded and mechanically fastened using non-metallic hardware to prevent pull-out or rotation.

The guardrails shall be supplied in prefabricated sections complete with all incidental items such as rivets, couplings, inserts, closed ends, brackets, flanges, sleeves, fittings, bends, and adhesives required to field assemble the system. The manufacturer shall also supply a compatible resin system to field coat the edges cut in the field. Each piece, part, or unit shall be tagged with the manufacturer's drawing and part number to aid field assembly.

The FRP railing shall have a U.L. classification of 94 V-O, Class "I" flame spread, a flammability rating of 25 or less, and shall be a type suitable for continuous exposure to hydrogen sulfide.

The FRP railings shall meet or exceed the following minimum mechanical and physical properties:

Property (Coupon Value)	Unit	Longitudinal	Transverse
Ten. Strength	psi	30,000	7,000
Ten. Modulus	psi	2,500,000	800,000
Flex. Strength	psi	30,000	10,000
Flex Modulus	psi	1,000,000	800,000
Comp. Strength	psi	30,000	15,000
Comp. Modulus	psi	2,500,000	1,000,000
Shear Strength	psi	5,500	5,500
Barcol Hardness		50	
Density	#1 cu.in.	0.058-0.062	
Spec. Gravity		1.61-1.75	
Coefficient of Thermal Expansion	in/in/deg C	0.0000052	

Full Section Deflection Tests

Mod of Elasticity	psi	2,500,000
Ten. Strength	psi	20,000
Comp. Strength	psi	20,000

W-89.05 Finishes

Exterior aluminum pipe railings shall have a National Association of Architectural Metal Manufacturers (NAAMM) Architectural Class 1 AA-A41 clear coating.

Interior aluminum pipe railings shall have a NAAMM Architectural Class 2 AA-A31 clear coating.

The FRP items shall have an integral colored gelcoat. No secondary painting on FRP items shall be allowed.

W-89.06 Manufacturer's Representative

The services of a qualified representative of the manufacturer of the railings shall be provided to supervise and inspect the installation of the handrails.

W-89.07 Certification

The manufacturer of the FRP railings shall give the Engineer a Certificate of Manufacturer stating that the FRP railings supplied for this project meet or exceed these Specifications and the manufacturer shall have the working drawings signed by a Structural Engineer registered in the State of Florida.

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SECTION 92 - SLUICE GATES

W-92.01 General

Sluice gates include the furnishing and installation of all sluice gates. They shall be designed for seating or unseating pressures as specified, measured to the center of the gate. All sluice gates shall be the product of one manufacturer. Gates and operators shall be supplied with all the necessary parts and accessories for a complete, properly operating installation. Sluice gates supplied under this section shall be Series 20 Stainless Steel Flow Control Sluice Gates as manufactured by H. Fontaine Ltd. or approved equal.

W-92.02 Design

Sluice gates shall meet the requirements of AWWA C501, except as otherwise specified. The Contractor shall provide an affidavit of compliance with all applicable provisions of AWWA C501 and additions herein. Working drawings and materials specifications shall be provided in accordance with the General Provisions.

W-92.03 Frames

Frames shall be constructed of 316 stainless steel.structural members welded to form a rigid one-piece frame. The frame shall be of the flange back design suitable for mounting on a concrete wall and drilled to attach to the flange of a wall thimble. Square frames shall have bolting equivalent to round frames based on the total opening area. The guide slot shall be made of UHMWPE (ultra high molecular weight polyethylene). In no case shall the bolt spacing exceed 12 inches. The frame configuration shall be of the flush-bottom type and shall allow the replacement of the top and side seals without removing the gate frame from the concrete or wall thimble.

W-92.04 Guides and Seals

The guides shall be made of UHMWPE (ultra high molecular weight polyethylene) and shall be of such length as to retain and support at least two thirds (2/3) of the vertical height of the slide in the fully open position.

Side and top seals shall be made of UHMWPE of the self adjusting type. A continuous compression cord shall ensure contact between the UHMWPE guide and the gate in all positions. The sealing system shall maintain efficient sealing in any position of the slide and allow the water to flow only in the opened part of the gate.

W-92.05 Wall Thimbles

Wall thimbles shall be furnished by the gate manufacturer and shall be 316 stainless steel. Material thickness shall be of sufficient resistance to handle the operating forces.

W-92.06 Stem and Couplings

The operating stem shall be of 316 stainless steel designed to transmit in compression at least 2 times the related output of the operating manual mechanism with a 40 lbs effort on the crank or handwheel.

The stem shall have a slenderness ratio (L/r) less than 200. The threaded portion of the stem shall have machined cut threads of the Acme type.

Where a electric operator is used, the stem design force shall not be less than 1.25 times the output thrust of the electric

motor in the stalled condition.

For stems requiring more than one piece and with a diameter of 1-3/4" and larger, the different sections shall be joined together by solid bronze couplings. Couplings shall be grooved and keyed and shall be of greater strength than the stem.

W-92.07 Stem Guides

Stem guides shall be fabricated from 316L stainless steel. The guide shall be equipped with an UHMWPE bushing. Guides shall be adjustable and spaced in accordance with the manufacturer's recommendation. The L/r ratio shall not be greater than 200.

W-92.08 Stem Cover

Rising stem gates shall be provided with a clear polycarbonate stem cover. The stem cover shall have a cap and condensation vents and a clear mylar position indicating tape. The tape shall be field applied to the stem cover after the gate has been installed and positioned.

W-92.09 Yoke

Self contained gates shall be provided with a yoke made of 316 stainless steel structural members. The maximum deflection of the yoke shall be 1/360 of the gate's span.

W-92.10 Materials

Frame, yoke, stem guides, slide, stem extension stainless stell ASTM A-240 type 316L

Part	Material
Frame, yoke, stem guides, slide, stem extension	stainless steel ASTM A-240 type 316L
Side seals, stem guide liner	Ultra high molecular weight polyethylene (UHMWPE)
Compression Cord	Nitrile ASTM D-2000 M6BG 708, A14, B15, E014, E034
Bottom Seal	Neoprene ASTM D-2000 Grade 2 BC-510
Threaded stem	Stainless steel ASTM A-276 Type 316 or 303 MX
Fasteners	ASTM F593 and F594 GR2 for type 316
Pedestal, handwheel, crank	Tenzaloy Aluminum
Gasket (between frame and wall)	EPDM ASTM 1056
Stem Cover	Polycarbonate ASTM D-3935
Lift nut, couplings	Manganese bronze ASTM B584 UNS-C86500

W-92.11 Assembly and Erection

All parts entering into the sluice gates shall be carefully machined to jigs and templates and all like parts shall be interchangeable so that repair parts can be attached in the field without any fitting, chipping, or remachining. After the parts have been machined, the gates shall be completely assembled in the shop and there shall be no fitting or any departure from the dimensions on the shop drawings to make the parts fit together. Anchor bolt holes shall be drilled accurately to the layout called for on the drawings.

Sluice gates and appurtenances shall be accurately erected, free from distortion or undue strains.

Wall thimbles and anchor bolts to be embedded in concrete shall be placed before the concrete is placed and shall be supported and braced so that they will remain in perfect alignment during placing of concrete and thereafter. If the wall thimble is improperly placed, it shall be removed and replaced as directed at the Contractor's expense. When the frame is installed, the disc shall not be removed from the frame, but the complete assembly shall be installed together, to prevent springing the seats out of line. In bolting the frame to the wall thimble, no springing of the frame will be permitted. Wedges shall be properly adjusted. Stem guides shall be set so that the stems shall run smoothly, in perfect alignment. Care shall be taken to protect the equipment from mortar, concrete drippings, and other adhering substances.

W-92.12 Painting

Painting shall meet the requirements of the Workmanship and Materials section headed "Painting." Bright or rubbing surfaces shall not be painted, but shall be protected and left bright.

W-92.13 Testing

After being installed, sluice gates shall be tested in the presence of the Engineer for leakage, strength, opening and closing against the maximum heads practicable to obtain under operating conditions. All work of making the tests and all adjustments necessary to put the gates in satisfactory condition shall be performed by the Contractor at his own expense. Any leaks around the thimbles, frames, or gates shall be stopped. Leakage around discs shall not exceed the amounts allowed by AWWA C 501.

W-92.14 Operators

Operators for sluice gates shall meet the requirements of the Workmanship and Materials section headed "Valve and Gate Operators."

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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 9400- SURFACES PREPARATION & COATINGS

PART 1 - GENERAL

W-9400.01 – GENERAL

1.01 SUMMARY

This specification provides for the surfaces preparation and coatings application for the Screen and Grit Building No. 2 Bar Screen Replacement project. The coatings specified are products of Sika Corporation and are specifically approved for this contract. Other manufacturer's products that are suitable for application at a wastewater treatment plant and the Screen and Grit building environment may be acceptable as approved by the Engineer. The Contractor shall provide a complete package of manufacturer's literature describing the proposed coatings to the Engineer for review and approval. In general, the recommendations and requirements specified in the manufacturer's literature, as interpreted by the manufacturer's representative and approved by the Engineer, shall serve as the guideline for workmanship, delivery and storage of materials, application methods, equipment requirements, drying time and other aspects of the surface preparation and coatings application.

Surface preparation and coatings application shall strictly adhere to the manufacturer's specifications and recommendations; the surface preparation standards of the Society for Protective Coatings (SSPC) that are called for in this section; the best practices of current industry standards for industrial coatings; and the environmental rules and regulations required by the federal, state and local agencies.

1.02 REFERENCES

A. ASTM International (ASTM)
1. D 16 – Standard Terminology for Paint, Related Coatings, Material, and Applications.
2. D 4541 – Standard Test Method for Pull off Strength of Coatings Using Portable Adhesion Testers.

B. NACE International (NACE):
1. SP0178 - Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to Be Lined for Immersion Service.
2. SP0188-06 - Discontinuity (Holiday) Testing of Protective Coatings.

C. National Association of Pipe Fabricators (NAPF):
1. 500-03 - Surface Preparation Standard for Ductile Iron Pipe and Fittings Receiving Special External Coatings and/or Special Internal Linings.

D. Society for Protective Coatings (SSPC):
1. SP COM - Surface Preparation Commentary for Steel and Concrete Substrates.
2. SP-1 - Solvent Cleaning.
3. SP-2 - Hand Tool Cleaning.
4. SP-3 - Power Tool Cleaning.
5. SP-5 - White Metal Blast Cleaning. (100% containment required)
6. SP-6 - Commercial Blast Cleaning. (100% containment required)
7. SP-7 - Brush-Off Blast Cleaning. (100% containment required)
8. SP-10 - Near-White Blast Cleaning. (100% containment required)

E. U.S. Environment Protection Agency (EPA):
1. Method 24 - Surface Coatings.

1.03 SUBMITTALS

A. Shop drawings:
1. Schedule of proposed coating materials.
2. Schedule of surfaces to be coated with each coating material.

B. Product Data: Include description of physical properties of coatings including solids content and ingredient analysis, VOC content, temperature resistance, typical exposures and limitations, and manufacturer's standard color chips:
1. Regulatory requirements: Submit data concerning the following:
   a. Volatile organic compound limitations.
   b. Coatings containing lead compounds and PCBs.
   c. Abrasives and abrasive blast cleaning techniques, and disposal.

C. Certificates: Submit in accordance with requirements for Product Data.

D. Manufacturer's Instructions: Include the following:

1. Special requirements for transportation and storage.
2. Mixing instructions.
3. Shelf life.
4. Pot life of material.
5. Precautions for applications free of defects.
6. Surface preparation.
7. Method of application.
8. Recommended number of coats.
9. Recommended dry film thickness (DFT) of each coat.
10. Recommended total dry film thickness (DFT).
11. Drying time of each coat, including prime coat.
12. Required prime coat.
13. Compatible and non-compatible prime coats.
14. Recommended thinners, when recommended.
15. Limits of ambient conditions during and after application.
16. Time allowed between coats (minimum and maximum).
17. Required protection from sun, wind, and other conditions.
18. Touch-up requirements and limitations.
19. Minimum adhesion of each system submitted in accordance with ASTM D 4541.

E. Manufacturer's Representative's Field Reports:
1. Reports on visits to project site to view and approve surface preparation of structures to be coated.
2. Reports on visits to project site to observe and approve coating application procedures.
3. Reports on visits to coating plants to observe and approve surface preparation and coating application on items that are "shop coated."

F. Quality Assurance Submittals:
1. Quality Assurance plan.
2. Qualifications of coating applicator including List of Similar Projects.
3. NACE International qualified inspector.

W-9400.02 - CONTRACTOR'S QUALIFICATIONS

1.04 QUALITY ASSURANCE

The surface preparation and coatings application contractor shall demonstrate to the Engineer that he is experienced in all phases of the work described. The Contractor shall provide a resume of similar projects that he has successfully completed with the names and contact information for responsible persons who can verify the standard of performance for each project.

1.05 Quality Assurance Submittals:

1. Quality Assurance plan.
2. Qualifications of coating applicator including List of Similar Projects.
3. NACE International qualified inspector.

PART 2 - PRODUCTS

W-9400.03 – PRODUCTS

The following products are specifically approved for the Screen and Grit Bldg. No. 2 Bar Screen Replacement project:

Concrete Polymer Paste (CPP) – Structural protective system and bonding agent for PVC t-lock liner systems

Thiokol FEC-2515 NS Coating – A two component, flexible non-skid coating to be applied to digester cover roof.

Sika Armatec 110 EpoCem - Bonding agent and reinforcement protection

SikaRepar 224 – One-component, cementitious, sprayable mortar for structural repair

SikaTop 123 Plus – Two-component, polymer-modified, cementitious, non-sag mortar plus FerroGard 901 penetrating corrosion inhibitor

SikaGard 75 – Special epoxy/cement combination mortar

SikaGard 62 – High-build, protective, solvent-free, colored epoxy coating

SikaFloor Quartzite 81 – Moisture vapor resistant decorative quartz system

SikaFloor 81 – Self-leveling, epoxy-cement slurry for resurfacing and water vapor transmission suppression (used in the SikaFloor Quartzite 81 system)

SikaFloor 203 – Medium build clear epoxy binder/coating

SikaFloor 215 – Clear epoxy topcoat

SikaFloor 315 – Abrasion resistant aliphatic polyurethane

W-9400.04 - MANUFACTURER'S REPRESENTATIVE

The Contractor shall provide the services of the coating manufacturer's authorized representative. The representative shall be available on a regular basis to take dry film thickness measurements and provide other technical services as required to assure the Engineer that the coatings are applied according to

specifications. The Contractor shall consult the manufacturer to determine the recommended schedule of thickness readings and other services. All services and reports generated by the manufacturer's representative shall be provided at no additional cost to the City.

PART 3 - EXECUTION

W-9400.05 - WORK METHODS AND WORKING CONDITIONS

Screen and Grit Building No. 2 will be taken out of service and will remain out of service until the work has been completed. The surface preparation and coatings contractor shall schedule the work and maintain access to Plant facilities as required to allow for regular Plant operations and maintenance.

The Contractor shall provide all labor, equipment and materials required to complete the work described. Equipment shall include lighting, scaffolding, ventilating and safety equipment, tarps, shrouds and specialized equipment required for the surface preparation and coatings application.

Coatings application shall be by brush and roller. The Contractor shall obtain the Engineer's approval for spray application and demonstrate the ability to completely contain overspray and protect adjacent facilities.

All debris resulting from surface preparation shall be removed from City property and disposed of in accordance with environmental regulations. If sand blasting is utilized to achieve the necessary substrate, 100% of the material shall be contained and disposed of as approved by the Engineer. Spills, drips and overspray shall be avoided. Results of spills, drips and overspray shall be cleaned up by the Contractor as determined by the Engineer.

3.01 CONTRACT REQUIRMENTS

The specific surface preparation methods and coatings for each of the areas or items to be coated shall be as described below:

Concrete Channel Restoration

1. Remove all loose and/or damaged PVC T-Lock liner within specified limits (see sheet 7)
2. Remove all unsound concrete. Mechanically clean (i.e. water or sand blast with 100% containment) all existing concrete that will be patched to a CSP-6 surface profile.
3. Exposed rebar should be mechanically cleaned to remove all rust and scale.
4. Apply 2 coats of Sika Armatec 110 at 20 mils per coat to all exposed rebar prior to patching spalls.
5. Repair spalls using low pressure spray equipment with SikaRepair 224 repair mortar or using hand applied technique with SikaTop 123 Plus. Repairs greater than 3" depth shall receive epoxy anchored #3 rebar embedded 6" minimum at spacing not to exceed 6".
6. Wet cure the repaired areas for a minimum of 1 week.
7. Mechanically clean (i.e. water or sand blast) all existing concrete that will be coated to a CSP-4 surface profile.
8. Apply a minimum of 1 coat of Sikagard 75 at 80 mils to all surfaces to be coated.
9. Allow the Sikagard 75 to cure for 1 day. The Sikagard 75 must be overcoated within 3 days after application.

10. Apply a minimum of 3 coats of Sikagard 62 epoxy coating for a minimum thickness of 25 mils. Subsequent coats of Sikagard 62 epoxy may be applied as soon as the previous coat of Sikagard 62 epoxy is tack-free, but must be applied within 48 hours.
11. Apply a 4" wide 7 mil minimum thickness Concrete Polymer Paste (CPP) overlapping transition coat between good PVC t-lock liner and the proposed SikaGard 62.

Concrete Floor Restoration

1. Mechanically clean (i.e. water or sand blast) all existing concrete that will be coated to a CSP-3 surface profile.
2. Prime the concrete substrate with the Sikafloor 81 (A and B liquid components only) at 200-400 sf/gal depending on surface porosity.
3. After allowing the prime coat of Sikafloor 81 a minimum of 1 hour maximum of 3 hours to dry, apply a minimum of 1 coat of Sikafloor 81 (A + B + C components) self-leveling mortar at 100 mils to all surfaces to be coated.
4. While the Sikafloor 81 is still wet, broadcast to rejection with 100-150 pounds of pre-blended colored quartz aggregate per 100 sf (Granite color). Allow 24 hours to dry. Remove excess quartz aggregate.
5. Apply a body coat of Sikafloor 203 epoxy at 100 sf/gal.
6. While the Sikafloor 203 epoxy is still wet, broadcast to rejection with 50-60 pounds of pre-blended colored quartz aggregate per 100 sf (Granite color). Allow 24 hours to dry. Remove excess quartz aggregate.
7. Apply a grout coat of Sikafloor 215 at 100 sf/gal. Allow grout coat a minimum of 24 hours to dry.
8. Apply a top coat of Sikafloor 315 urethane at 400-450 sf/gal. Allow 24 hours to dry before foot traffic

END OF SECTION