



CITY OF HOUSTON

INVITATION TO BID

Issued: March 14, 2008

Bid Opening:

Sealed bids, in duplicate, will be received by the City Secretary of the City of Houston, in the City Hall Annex, Public Level, 900 Bagby, Houston, Texas 77002 until **10:30 A.M. Thursday, April 3, 2008**, and all bids will be opened and publicly read in the City Council Chamber, City Hall Annex, Public Level, 900 Bagby at 11:00 A.M. on that date for the purchase of:

KEEGANS BAYOU WASTEWATER TREATMENT PLANT SKIMMER REPLACEMENT for

THE PUBLIC WORKS & ENGINEERING DEPARTMENT

Bid No. S30-C22837

NIGP Code: 913-91

Buyer:

Questions regarding this solicitation should be addressed to Richard Morris, Senior Procurement Specialist, at **713-247-1772** or e-mail to **richard.morris@cityofhouston.net**

Electronic Bidding:

In order to submit a bid for the items associated with this procurement, you must fill in the pricing information on the "**PLACE BID**" page.

Prebid Conference:

A Pre-Bid Conference will be held for all Prospective Bidders in the Strategic Purchasing Division, Concourse Level (Basement), Conference Room #2, City Hall, 901 Bagby, at **10:00 a.m. on Monday, March 24, 2008**. The site visit will be scheduled at the pre-bid conference.

All Prospective Bidders are urged to be present. It is the bidder's responsibility to ensure that they have secured and thoroughly reviewed all aspects of the solicitation documents prior to the Pre-Bid Conference. Any revisions to be incorporated into this solicitation document arising from discussions before, during and subsequent to the Pre-Bid Conference will be confirmed in writing by Letter(s) of Clarification prior to the bid due date. Verbal responses will not otherwise alter the specifications, terms and conditions as stated herein.

Bidding forms, specifications, and all necessary information should be downloaded from the Internet at www.houstontx.gov/purchasing/index.html. By registering and downloading this solicitation document, all updates to this solicitation document will be automatically forwarded via e-mail to any registered bidders. This information may also be obtained from the Supplier Assistance Desk, Strategic Purchasing Division, 901 Bagby, Concourse Level, Houston, Texas 77002.

The place of the bid opening may be transferred in accordance with Paragraph (b), (5) of Section 15-3 of The Code of Ordinances, Houston, Texas. The bid-opening meeting may be rescheduled in accordance with Paragraph (b), (6) of said Section 15-3.

The City reserves the right to reject any or all bids, or to accept any bid or combination of bids deemed advantageous to it.

City employees are prohibited from bidding on this solicitation in accordance with the Code of Ordinances Section 15-1.

***CONTENTS:**

- A. OFFER
- B. SCOPE OF WORK/SPECIFICATIONS
- C. BOND FORMS/GENERAL & SUPPLEMENTAL CONDITIONS

*NOTE 1: Actual page numbers for each section may change when the solicitation document is downloaded from the Internet or because of letters of clarification. Therefore, bidders must read the solicitation document in its entirety and comply with all the requirements set forth therein.

*NOTE 2: **To be considered for award please submit the electronic bid form and the forms listed in section A, including the signature page, which must be signed by a company official authorized to bind the company and a 10% Bid Bond.**

SECTION A



FORMAL ONE-TIME BID

**MODIFY THE DISCHARGE LINE AT THE ALMEDA SIMS EAST LIFT STATION
for
THE PUBLIC WORKS & ENGINEERING DEPARTMENT
Bid No. S25-C22487
NIGP Code: 913-78**

To The Honorable Mayor
and City Council Members
of the City of Houston, Texas (the "City"):

The undersigned hereby offers to provide services necessary to replace skimmers at the Keegans Bayou Wastewater Treatment Plant located at 9401 White Chapel, F.O.B. destination point Houston, Texas, in accordance with the City's Specifications and General Terms & Conditions and/or samples/drawings provided herein. When issued by the City of Houston, Letters of Clarification shall automatically become part of this bid document and shall supersede any previous specifications or provisions in conflict with Letters of Clarification. It is the responsibility of the bidder to ensure that it has obtained all such letters. By submitting a bid on this project, bidder shall be deemed to have received all Letters of Clarification and to have incorporated them into the bid.

The City may accept this bid offer by issuance of a Notice of Award Letter and/or a Purchase Order at any time on or before the 120th day following the day this Official Bid Form is opened by the City. This offer shall be irrevocable for 120 days after bid opening or for 90 days after City Council awards the bid, whichever comes last, but this period may be extended by written agreement of the parties.

The City reserves the right to INCREASE quantities during the twelve-month period following the issuance of the first purchase order subject to agreement in writing by the Prime Contractor/Supplier to honor the same bid price.

The City reserves the option, after bids are opened, to adjust the quantities listed on the electronic bid form upward or downward, subject to the availability of funds, and/or make award (s) on a line item basis.

SECTION A

Documents/forms must be downloaded from the City's Website
<http://www.houstontx.gov/purchasing/index.html>

Additional Required Forms to be Included with this bid:

In addition to the electronic Bid Form and the Official Signature Page, the Forms listed in Table 1 **must be completed and submitted to the Office of the City Secretary on or before the date and time the bid is due:**

Table 1
Affidavit of Ownership
Fair Campaign Ordinance
Statement of Residence
Conflict of Interest Questionnaire
10% Bid Bond
Contractor References
Pay or Play Health Insurance Program Acknowledgement Form 1A

Table 2 lists other documents and forms that should be viewed/downloaded from the City's website, but are not required to be submitted with the bid. The City will request these forms, as applicable, to be completed and submitted to the City by the recommended/successful bidder:

Table 2
Daily Work Sheet
Drug Forms
Sub Contractor
EEOC
Construction Addendum
Construction Affirmative Action Compliance
Construction Insurance
Construction Insurance OCP
Construction 2006 Engineering Wage Rate
Pay or Play Health Insurance Program

General Conditions at the following website: (Doc 00700)
[www.publicworks.cityofhouston.gov/documents/
Specifications/Front%20End%20\(Div00\)/Standard/](http://www.publicworks.cityofhouston.gov/documents/Specifications/Front%20End%20(Div00)/Standard/)

Drawings if posted on-line are available at
http://purchasing.houstontx.gov/bid_download.aspx

PERMITS:

Successful Contractor shall be responsible for securing any and all permits for proposed work. Any fee charged for these permits should be the responsibility of the Contractor and not the City of Houston.

CITY BUILDING CODES:

All work performed or equipment installed shall be in strict accordance with the City of Houston Building Codes. The Contractor will immediately correct any deficiencies discovered during work or after completion. Failure to correct deficiencies will result in the City having corrections made at the Contractor's expense.

PERFORMANCE BOND and PAYMENT BOND:

The successful Contractor(s) shall be required to provide a Performance and Payment Bond in the total amount (100%) of the Contract if the award is in excess of \$25,000.00.

The Performance and/or Payment Bond shall be in the same form as that distributed by the City, and attached hereto, all duly executed by this bidder (as "Principal") and by an incorporated surety company licensed to do business in the State of Texas. If the amount of the bond is greater than \$100,000.00 the surety must hold a certificate of authority from the United States Secretary of the Treasury.

The Contractor(s) shall be required to provide a Performance and/or Payment Bond as outlined above, which will be delivered to the City Purchasing Agent of the City, on or before the tenth (10th) day following the day the bidder receives notice from the City.

BID BOND:

The Contractor shall be required to provide and submit with the bid a Bid Bond in the amount of 10% of the total amount bid by the Contractor. The Bid Bond shall be in the same form as that distributed by the City, and attached hereto, all duly executed by this Bidder (as "Principal") and by a corporate surety company licensed to do business in the State of Texas, and if the amount of the bond is greater than \$100,000.00 the surety must hold a certificate of authority from the United States Secretary of the Treasury, or a Cashier's or a Certified check in a like amount. Company or personal checks are not acceptable.

MAINTENANCE BOND:

The Contractor shall furnish a maintenance bond in the total (100%) bid amount in the form required by the City (samples attached). One bond, also referred to as the One Year Maintenance Bond, will be conditioned upon Contractor's repair, replacement or restoration of any work or any portion of the work which is found to be defective or fails in any way to comply strictly with this contract or the plans and specifications for such work within a period of one (1) year from the date of acceptance of such work by the City Council or after the date that the "CO", or his designee in writing, determines, in a written notice to the Contractor, to be the date upon which the project is both substantially complete and available for the full and beneficial occupancy or use of the City.

QUALITY AND WORKMANSHIP

The bidder must be able to demonstrate upon request that it has performed satisfactorily, services similar to the services specified herein. The bidder will provide records of warranty and repair services performed for others upon request. The City of Houston shall be the sole judge whether the services performed are similar to the scope of services specified herein.

CONTRACTOR'S QUESTIONNAIRE

In order to receive bid award consideration, the bidder must be able to demonstrate that they are currently providing or have had at least one contract, for skimmer replacement services that is similar in size and scope to this contract. The reference(s) should be included in the space provided below. Please attach another piece of paper if necessary. If references are not included with the bid, the bidder shall be required to provide such references to the City of Houston within five working days from receipt of a written request from the City of Houston to do so. **Bidder's capability and experience shall be a factor in determining the Contractor's responsibility.**

1. Name: _____

Address: _____

City & State: _____

Name & Phone Number of Contact: _____ Years of Services: _____

2. Name: _____

Address: _____

City & State: _____

Name & Phone Number of Contact: _____ Years of Services: _____

3. Name: _____

Address: _____

City & State: _____

Name & Phone Number of Contact: _____ Years of Services: _____

SECTION B



**CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION DIVISION**

**PROJECT MANUAL
KEEGANS BAYOU WWTP SKIMMER REPLACEMENT
WBS No. R-000019-0039-3**

VOLUME 1 OF 1

Divisions 00 through 16

NOVEMBER 2007

2925 Briarpark, Suite 850
Houston, Texas 77042

Section 01110
SUMMARY OF WORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Summary of the Work including work by the City, City-furnished Products, work sequence, future work, Contractor use of Premises, special conditions for substantial completion and City occupancy.

1.02 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work of the Contract is for construction of Keegans Bayou Wastewater Treatment Plant (WWTP) Skimmer Replacement as shown on Attachment A Sketches. Work of the contract includes, but is not limited to the following:
 - 1. Removal of Skim-Pak Model 18500 floating skimmers by Douglas Environmental, 4-inch piping, plug valves and appurtenances. (Reference: Specification Section 02220 – Demolition)
 - 2. Installation of 6-inch ductile iron piping, 6-inch flexible hose with cam lock quick disconnect, plug valves, and support brackets.
 - 3. Installation of Skim-Pak Model 19500-SH floating skimmers (Reference Attachment B) by Douglas Environmental, 6-inch stringer pipe and back float. Skim-Pak shall be installed in accordance with the manufacturer's recommendations. Contractor shall submit installation instructions from the manufacturer prior to installation. Manufacturer or his representative shall visit the site and submit a written certification that the equipment installation and operation are acceptable.
 - 4. Installation of 1-inch flushing cocks on 6-inch piping.
 - 5. Enlargement of opening in fiberglass reinforced plastic (FRP) baffle wall to ensure proper installation and operation of floating skimmer.
- B. To maintain plant flows, one of the following must occur at all times:
 - 1. At least one chlorine contact basin shall remain on-line with all plant flow being discharges over the weir.
 - 2. Both chlorine basins shall remain half-full with all plant flow being pumped over the weirs using diversion pumping.
- C. Contractor is to coordinate work schedule with the City so that work is performed during low flow periods. Contractor is to schedule work so that both chlorine contact basins will be operational during peak flow periods. Contractor shall coordinate with the City to determine typical peak flow times and durations.
- D. Contractor shall be capable of stopping work and bringing both basins on-line for operation during a wet weather event.

1.03 CITY-FURNISHED PRODUCTS

- A. Items Furnished by the City for Installation and final connection by Contractor: Water meter.
- B. Contractor shall furnish labor, equipment rigging, and all appurtenances to provide the following services:
 - 1. Arrange and pay for Product delivery to the site.
 - 2. Receive and unload Products at the site; jointly with the City, inspect for completeness or damage.
 - 3. Handle, store, Install, and finish Products.
 - 4. Repair or replace damaged items.

1.04 WORK SEQUENCE

- A. Construct the Work in Phases during the construction period; coordinate construction schedule and operations with the City in order to keep down time of chlorine contact basins within low flow time periods:
 - 1. No Phases for this Project.
- B. For projects with no Phases, do not disturb more than 50% of total project linear feet of disturbed right-of-way and easement until site restored in accordance with Section 01740 – Site Restoration.
- C. Coordination of the Work: Refer to Section 01312 - Coordination and Meetings.

1.05 CONTRACTOR USE OF PREMISES

- A. Comply with procedures for access to the site and Contractor's use of rights-of-way as specified in Section 01145 - Use of Premises.
- B. Construction Operations: Limited to the City's rights-of-way provided by the City and areas shown or described in the Contract documents.
- C. Utility Outages and Shutdown: Provide a minimum of 48 hours notice to the City and private utility companies (when applicable), excluding weekends and holidays, in advance of required utility shutdown. Coordinate all work as required.

1.06 WARRANTY

- A. Comply with warranty requirements in accordance with Document 00700 - General Conditions.

1.07 ADDITIONAL CONDITIONS FOR SUBSTANTIAL COMPLETION

- A. In addition to requirements outlined in Document 00700 – General Conditions, for Contractor to be substantially complete with the Work and call for inspection by Project Manager to confirm, the following conditions must be met or completed:
 - 1. All testing shall be completed and accepted by Project Manager.
 - 2. Draft O&M manuals shall be delivered to Project Manager.

- 3. Training shall be conducted, utilizing draft O&M manuals.
- 4. All pay items complete report.

B. No additional condition described in Paragraph 1.07 may be included in Contractor's punch list.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION
Section 02220

DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Demolishing and removing existing equipment and materials.
- B. Disposing of demolished materials and equipment.

1.02 MEASUREMENT AND PAYMENT

A. Unit Prices

- 1. Measurement for demolition is on a lump sum basis for each contiguous area, including submittal of proposed demolition and removal schedule.

1.03 SUBMITTALS

- A. Submittals shall conform to requirements of Section 01330 - Submittals.
- B. Submit proposed methods, equipment, materials and sequence of operations for demolition of structures. Describe coordination for shutting off, capping, and removing temporary utilities. Plan operations to minimize temporary disruption of utilities to existing facilities.
- C. Submit proposed demolition and removal schedule for approval. Notify Project Manager in writing at least 48 hours before starting demolition.

1.04 OWNERSHIP OF MATERIAL AND EQUIPMENT

- A. Materials and equipment designated for reuse or salvage are listed in Section 01110 - Summary of Work. Protect items designated for reuse or salvage from damage during demolition, handling and storage. Restore damaged items to satisfactory condition.

- B. Materials and equipment not designated for reuse or salvage become the property of the Contractor.

1.05 STORAGE AND HANDLING

- A. Store and protect materials and equipment designated for reuse until time of installation.
- B. Deliver items to be salvaged to City property storage areas indicated on Drawings. Items will be unloaded by City personnel.
- C. Remove equipment and materials not designated for reuse or salvage and all waste and debris resulting from demolition from site. Remove material as work progresses to avoid clutter.

1.06 ENVIRONMENTAL CONTROLS

- A. Minimize spread of dust and flying particles. If required by governing regulations, use temporary enclosures and other suitable methods to prevent the spread of dust, dirt and debris.
- B. Use appropriate controls to limit noise from demolition to levels designated in City ordinances.
- C. Do not use water where it can create dangerous or objectionable conditions, such as localized flooding, erosion, or sedimentation of nearby ditches or streams.
- D. Stop demolition and notify Project Manager if underground fuel storage tanks, asbestos, PCB's, contaminated soils, or other hazardous materials are encountered.
- E. Dispose of removed equipment, materials, waste and debris in a manner conforming to applicable laws and regulations.

PART 2 PRODUCTS

2.01 EQUIPMENT AND MATERIALS FOR DEMOLITION

- A. Use equipment and materials approved under Paragraph 1.03, Submittals.
- B. Fires are not permitted.

PART 3 EXECUTION**3.01 EXAMINATION**

- A. Prior to demolition, make an inspection with Project Manager to determine the condition of existing structures and features adjacent to items designated for demolition.
- B. Project Manager will mark or list existing equipment to remain the property of the City.
- C. Do not proceed with demolition or removal operations until after the joint inspection and subsequent authorization by Project Manager.

3.02 PROTECTION OF PERSONS AND PROPERTY

- A. Provide safe working conditions for employees throughout demolition and removal operations. Observe safety requirements for work below grade.
- B. Maintain safe access to adjacent property and buildings. Do not obstruct roadways, sidewalks or passageways adjacent to the work.
- C. Perform demolition in a manner to prevent damage to adjacent property. Repair damage to City property or adjacent property and facilities.
- D. The Contractor shall be responsible for safety and integrity of adjacent structures and shall be liable for any damage due to movement or settlement. Provide proper framing and shoring necessary for support. Cease operations if an adjacent structure appears to be endangered. Resume demolition only after proper protective measures have been taken.
- E. Erect and maintain enclosures, barriers, warning lights, and other required protective devices.

3.03 UTILITY SERVICES

- A. Follow rules and regulations of authorities or companies having jurisdiction over communications, pipelines, and electrical distribution services.
- B. Notify and coordinate with utility company and adjacent building occupants when temporary interruption of utility service is necessary.

3.05 DISPOSAL

- A. Remove from the site all items contained in or upon the structure not designated for reuse or salvage. Conform to requirements of Section 01504 - Temporary Facilities and Controls or Section 01576 - Waste Material Disposal.

- B. Follow method of disposal as required by regulatory agencies.

3.07 MECHANICAL WORK ITEMS

- A. Mechanical removals consist of dismantling and removing existing piping, pumps, motors, water tanks, equipment and other appurtenances. It includes cutting, capping, and plugging required to restore use of existing utilities.
- B. Remove existing process, water, chemical, gas, fuel oil and other piping indicated to be removed on Drawings. Take out piping to the limits shown. Piping not indicated on Drawings shall be removed to the nearest solid support, capped, and the remainder left in place even though it does not interfere with new work. Purge chemical and fuel lines and tanks. Verify that such lines are safe prior to removal or capping.
- C. Where piping that is to be removed passes through existing walls, cut and cap piping on each side of the wall. Use cap appropriate for pipe material to be capped. Provide fire-rated sealant for walls classified as fire-rated.
- D. When underground piping is to be altered or removed, cap the remaining piping. Abandoned underground piping may be left in place unless it interferes with new work or is shown or specified to be removed. Piping less than 15 inches in diameter may be plugged and abandoned in place. For piping 15 inches in diameter and greater to be abandoned, fill with sand, pressure grout or other approved method and plug with concrete or brick masonry bulkhead.
- E. Remove waste and vent piping to points shown. Plug pipe and cleanouts and plugs. Where vent stacks pass through an existing roof that is to remain, remove the stack and patch the hole in the roof, making it watertight. Comply with requirements of existing roof installer so as to maintain roof warranty.
- F. Conform to applicable codes when making any changes to plumbing and heating systems.
- G. Where concrete corings occur through basin walls, contractor shall catch debris near corings. Any debris that falls into the basin shall be removed immediately.

END OF SECTION

Section 09901
PROTECTIVE COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preparing surfaces, providing adequate conditions for proper workmanship, and furnishing and applying the protective coating materials required for metallic, concrete, masonry and plastic surfaces.
- B. Color code painting of piping and piping identification signs and markers.

1.02 UNIT PRICES

- A. No separate payment will be made for protective coatings unless specifically listed in Document 00410 – Bid Form. Include payment for protective coatings in unit prices for items to which coatings are applied.
- B. Measurement for protective coatings, when included as a separate pay item, is on a square-foot basis for completed protective coating systems.
- C. Refer to Section 01270 – Measurement and Payment for unit price procedures.

1.03 REFERENCES

- A. ANSI A13.1 – Color Schedule
- B. ANSI/AWWA C213 – Fusion-bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines.
- C. Federal specification TT-P-28 – Paint, Aluminum, Heat Resisting 1200 degrees F).
- D. Federal Standard 595A – Federal Standard Colors.
- E. Military Specification DOD-P-23236 – Paint Coating Systems, Steel Ship Tank, Fuel and Salt Water Ballast, Class 2.
- F. NSF Standard 61 – Drinking Water System Components – Health Effects.
- G. SSPC-PA 1 – Paint Application Specification No. 1 - Shop, Field and Maintenance Painting.
- H. SSPC-PA 2 – Paint Application Specification No. 2 – Measurement of Dry Paint Thickness with Magnetic Gages.
- I. SSPC-Paint 16 – Coal Tar Epoxy-Polyamide Black (or Dark Red) Paint.
- J. SSPC-SP 1 – Solvent Cleaning.
- K. SSPC-SP 2 – Hand Tool Cleaning.
- L. SSPC-SP 3 – Power Tool Cleaning.
- M. SSPC-SP 5/NACE 1 – White Metal Blast Cleaning.
- N. SSPC-SP 6/ NACE 3 – Commercial Blast Cleaning.
- O. SSPC-SP 7/NACE 4 - Brush-Off Blast Cleaning.
- P. SSPC-SP 10/NACE 2 – Near White Metal Blast Cleaning.
- Q. SSPC-SP 11 – Power Tool Cleaning to Bare Metal.
- R. SSPC-VIS 1-89 – Visual Standard for Abrasive Blast Cleaned Steel.
- S. SSPC-VIS 3 – Visual Standard for Power-and Hand-Tool Cleaned Steel.

- T. SSPC-QP 1 – Standard Procedure for Evaluating Qualifications of Painting Contractors
- U. SSPC-QP 2 - Standard Procedure for Evaluating Qualifications of Painting Contractors to Remove Hazardous Paint.
- V. SSPC-SP12/NACE 5 – Surface Preparation and Cleaning of Steel and Other Hard Materials by High- and Ultrahigh-Pressure Water Jetting Prior to Recoating.

1.04 DEFINITIONS

- A. Paint, coatings, or finishes as used in this Section include surface treatments, emulsions, enamels, paints, epoxies, polyurethanes, acrylics, zincs, and other protective coatings with the exceptions of galvanizing or anodizing, whether used as a pretreatment, primer, intermediate coat, or finish coat.
- B. DFT means minimum dry film thickness.
- C. VOC means Volatile Organic Components

1.05 PERFORMANCE REQUIREMENTS

- A. See the Drawings and other Specifications to determine how coatings under this Section will be applied. Paint or coat new and modified surfaces in conformance with this Section.
- B. Coating system schedules summarize surfaces to be coated, required surface preparation, and coating systems to be applied. Coating notes on Drawings are used to show exceptions to schedules, to show or extend limits of coating systems, or to clarify or show details for application of coating systems.
- C. Do not apply protective coatings to the following surfaces unless specifically named or shown to be coated;
 - 1. Concrete.
 - 2. Stainless steel, bronze, or brass.
 - 3. Machined surfaces.
 - 4. Grease fittings.
 - 5. Glass.
 - 6. Equipment nameplates.
 - 7. Platform gratings, stair treads, door thresholds, and other walk surfaces.
 - 8. Galvanized steel electrical conduit and associated galvanized and factory-coated junction boxes and electrical panels.
 - 9. Galvanized surfaces inside buildings and not exposed to view.
 - 10. Manhole and valve covers and rings, storm water inlet gratings, covers, and frames.
- D. Provide decorative and protective coatings for interior architectural surfaces such as wood, gypsum board, and masonry in accordance with Section 09900 – Painting.

1.06 SUBMITTALS

- A. Make submittals in accordance with Section 01330 – Submittal Procedures.

- B. Submit the following information at least 10 days prior to protective coating work.
1. Coating Materials List: Eight copies of a coating materials list naming the manufacturer and the coating number, keyed to the coating systems described in this Section. Submit the list prior to or at the time of sample submittal.
 2. Paint Manufacturer's Information: For each coating system to be used, submit the following data:
 - a) Paint manufacturer's Product Data Sheet for each product proposed, including statements on the suitability of the material for the intended use.
 - b) Technical and performance information that demonstrates compliance with the system performance and material requirements.
 - c) Paint manufacturer's instructions and recommendations on surface preparation, application and curing.
 - d) Colors available for each product, where applicable.
 - e) Compatibility of shop and field applied coatings, where applicable.
 - f) Material Safety Data Sheets for each product used.
 - g) VOC of each paint or coating proposed, stated in grams per litre.
 3. Samples
 - a) Submit color samples of paint, finishes, and other coating materials on 8-1/2 inch by 11-inch sheet metal or heavy cardstock. Have each sheet completely coated over its entire surface with one protective coating material, type, and color.
 - b) Provide two sets of color samples to match each color selected by the City Engineer from the manufacturer's standard color sheets. If custom-mixed colors are indicated, prepare color samples using color formulations prepared to match the color samples furnished by the City Engineer.
 - c) Submit one 15-pound sample of each abrasive proposed to be used for surface preparation for submerged and severe service coating systems.

1.07 QUALIFICATIONS

- A. Where protective coatings are to be applied by a Contractor, employ a Contractor who possesses a valid state license as required for performance of painting and coating work called for in this Specification.
- B. Submit 5 references, which show that the painting Contractor has previous successful experience with the indicated or comparable coating systems. Include the name, address, and the telephone number for the owner of each installation for which the painting Contractor provided the protective coating. As an alternative, submit proof of certification in accordance with SSPC-QP 1.
- C. For any project which involves removal or repair of lead based paints, submit proof of certification in accordance with SSPC-QP 2.

1.08 ENVIRONMENTAL RESTRICTIONS

- A. Ventilate area where coating is being applied. Post and enforce NO SMOKING OR OPEN FLAME signs until coating has cured.

- B. Provide lighting level of 80-foot candles (860 1x) measured mid-height at substrate surface.
- C. Restrict worker access and construction traffic from area where coating is being applied or is cured.
- D. Comply with City of Houston and all applicable OSHA confined space entry regulations including but not limited to OSHA Permit-Required Confined Space Standard 1910.146.

1.09 WARRANTY INSPECTION AND MAINTENANCE

- A. **Warranty Inspection:**
A warranty inspection may be conducted during the eleventh month following completion of coating and painting. The Contractor and a representative of the coating material manufacturer along with a NACE Certified Coating Inspector acting as the representative of the City Engineer, shall attend this inspection.
The City Engineer may, by written notice to the Contractor, reschedule the warranty inspection to another date within the one-year correction period, or may cancel the warranty inspection altogether. Cancellation of the warranty inspection does not relieve the Contractor of his responsibilities under the Contract Documents.
Repair defective work discovered during the warranty inspection in accordance with these Specifications.
- B. **Extended Maintenance of Chemical Tank Lining Systems:** Promptly repair defects in the chemical resistant sheet lining system for a period of 2 years after the lining has been placed into service. Such maintenance includes repair of the chemical tank and any equipment or facilities damaged by the corrosive action of the chemicals.

PART 2 PRODUCTS

2.01 COATINGS CRITERIA

- A. **Suitability:** Use suitable coating materials as recommended by the manufacturer. Recommendations must be accompanied by test methods used to determine suitability and results of these tests.
- B. **Compatibility:** In any coating system, use only compatible materials from a single manufacturer. Give particular attention to compatibility of primers, intermediate coats and finish coats. If necessary, apply a barrier coat or tie coat between existing prime coat and subsequent field coats to ensure compatibility.
- C. **Containers:** Supply coating materials in sealed containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, and name of manufacturer, all plainly legible at the time of use.
- D. **Colors:** Use colors and shades of colors of all coats of paint as indicated on the coating schedules or as selected by the City Engineer. Make each coat a contrasting shade to the previous and following coats to facilitate inspection of surface coverage of each coat. The City Engineer will select finish colors from the manufacturer's standard color samples.

E. Substitute or Equal Products:

1. To establish equality under Section 01630 – Product Substitution Procedures, furnish satisfactory documentation from the manufacturer of the proposed substitute product that the material meets the indicated requirements and is equivalent or better in the following properties:
 - a) Resistance to abrasion and physical damage.
 - b) Resistance to chemical attack.
 - c) Life expectancy.
 - d) Ability to recoat in the future.
 - e) Solids content by volume.
 - f) Dry film thickness per coat.
 - g) Compatibility with other coatings.
 - h) Suitability for the intended service.
 - i) Temperature limitations in service and during application.
 - j) Type and quality of recommended undercoats and topcoats.
 - k) Ease of application.
 - l) Ease of repairing damaged areas.
 - m) Stability of colors.
 - n) VOC content expressed in grams per litre.
2. For substitutions, submit protective-coating materials which are standard products produced by recognized manufacturers who are regularly engaged in production of such materials for essentially identical service conditions. Where requested, provide the City Engineer with the names of not less than 10 successful applications of the proposed manufacturer's products, which comply with these requirements. Applications must be in similar service environments to the job being contracted.

2.02 INDUSTRIAL COATING SYSTEMS

- A. Material Sources: Each of the following manufacturers is capable of supplying many of the specified industrial coating materials. Where manufacturers and paint numbers are listed, it is to show the type and quality of coatings that are required. Proposed substitute materials will be considered as indicated under paragraph 2.01.5. Provide industrial coating materials that have a record of satisfactory performance in industrial plants, manufacturing facilities, and water and wastewater treatment plants.
1. Ameron International
 2. Carboline Coatings Company
 3. ICI/Devoe Coatings
 4. Sigma Coatings USA, Inc.
 5. Hempel Coatings USA, Inc.
 6. AKZO/International Coatings
 7. Tnemec Company
- B. System 1 – Aliphatic Polyurethane Finish Coat: Use a two-component aliphatic acrylic polyurethane coating. Provide superior color and gloss retention, resistance to splash from acid and alkaline chemicals, resistance to chemical fumes and severe weathering, and have a minimum solids content of 58 percent by volume. As primer, use a rust inhibitive 2-component epoxy coating with minimum solids content of 66 percent by volume.
1. Prime Coat:

- a) DFT = 4-6 mils (100-150 microns).
 - b) Products: Ameron 385, Carboline 893, Tnemec 69, VyGuard V75, or equal.
 2. Finish Coats (one or more):
 - a) DFT = 2-4 mils (50-100 microns).
 - b) Products: Ameron 450 GL, Carboline 134 HG, Tnemec 74, VyGuard V54, or equal.
 3. Total System = 6-10 mils (150-250 microns).
 4. Apply more than one finish coat as necessary to produce a finish with uniform color and texture.
- C. System 2 – Inorganic Zinc/Epoxy Polyurethane: For prime coat, use a 2-component water or solvent-based inorganic zinc silicate which contains at least 85 percent of metallic zinc by weight in the dried film, and is recommended by the coating manufacturer as a primer for this system. As intermediate coat, use a high-build, 2-component epoxy with a solids content of at least 70 percent by volume. For finish coats, use a 2-component aliphatic acrylic or polyester polyurethane coating material that provides superior color and gloss retention, resistance to chemical fumes and severe weathering, and a minimum solids content of 58 percent by volume.
 1. Prime Coat:
 - a) DFT = 2.5-4.0 mils (65-100 microns).
 - b) Products: Ameron Dimetcote 21-5 or 21-9, Carbozinc 11 or D7WB, VyGuard 13F6 or 13F7, or equal.
 2. Intermediate Coat:
 - a) DFT = 4-6 mils (100-150 microns).
 - b) Ameron 385, Carboline 893, VyGuard V75, or equal.
 3. Finish Coats (one or more):
 - a) DFT = 2.5 to 4.0 mils (65-100 microns).
 - b) Ameron 450 GL, Carboline 134 HG, VyGuard V54, or equal.
 4. Total System DFT = 9-14 mils (225-600 microns).
 5. Apply intermediate coat in excess of 4 mils (100 microns) DFT using the mist coat/full coat technique to completely cover the inorganic zinc primer and prevent bubbling of the epoxy or polyurethane finish coat.
 6. Apply more than one finish coat as necessary to produce a finish with uniform color and texture.
 7. If inorganic zinc primer is used as a pre-construction or shop-applied primer, and there are damaged or uncoated areas, spot blast the damaged area with abrasive to an SSPC-SP 10 Near White Metal Standard and then coat with the specified material.
- D. System 3 – Inorganic Zinc: Use a 2-component water-based inorganic zinc silicate which contains at least 85 percent of metallic zinc by weight in the dried film.
 1. Prime Coat and Finish Coat (one).
 - a) DFT = 2.5 to 4.0 mils (65-100 microns).
 - b) Products: Ameron Dimetcote 21-5, Carbozinc D7WB, VyGuard 13F6 or 13F7, or equal.
 2. Total System DFT = 2.5 to 4.0 mils (65-100 microns).
- E. System 4 – Acrylic Latex: Use a single component, water-based acrylic latex with a fungicide additive having a minimum solids content of 35 percent by volume. Apply a prime coat as recommended by manufacturer. Select coating material, which is available in ANSI safety colors.
 1. Prime Coat:

- a) DFT = 2-3 mils (50-75 microns).
 - b) Products: Carboline D3358, Ameron 148, Hemucryl 1803.
 2. Finish Coats (2 or more):
 - a) DFT = 6-8 mils (150-200 microns).
 - b) Products: Carboline D3359, Ameron 220, Hemucryl 4803, or equal.
 3. Total System DFT = 8-11 mils (200-275 microns).
- F. System 5 – Epoxy: Use a two-component, rust inhibitive, polyamide-cured epoxy coating material with a recoatable finish that is available in a wide selection of colors. Coating shall have a minimum solids content of 66 percent by volume and shall be resistant to service conditions of condensing moisture, splash and spillage of lubricating oils, and frequent washdown and cleaning.
 1. Prime Coat:
 - a) DFT = 3-5 mils (75-125 microns).
 - b) Products: Ameron 385PA, Carboline 193, Tnemec 69, VyGuard V75, or equal.
 2. Prime Coat (where shop applied):
 - a) DFT = 3-5 mils (75-125 microns).
 - b) Products: Ameron 370, Carboline 193, Tnemec 161, VyGuard V75, or equal.
 3. Finish Coats (2 or more):
 - a) DFT = 5- 7 mils (125-175 microns).
 - b) Products: Ameron 385, Carboline 893, Tnemec 69, VyGuard V75, or equal.
 4. Total System DFT = 8-12 mils (200-300 microns).
- G. System 6 – Aliphatic Polyurethane, Fiberglass: Use a two-component aliphatic polyurethane coating material with superior color and gloss retention, resistance to splash from acid and alkaline chemicals, and resistance to chemical fumes and severe weathering. Use a primer, tie coat, or mist coat as recommended by the manufacturer.
 1. Prime Coat (Tie Coat): Ameron 385, Carboline 893, Tnemec P66, VyGuard V75, or equal.
 2. Finish Coats (2 or more):
 - a) DFT = 2-4 mils (50-75 microns).
 - b) Products: Ameron Amersfield, Carbothane 134 HG, Tnemec 74, VyGuard V54, or equal.
- H. Section 7 – Alkyd Enamel: Use a high quality, gloss, or semi-gloss, medium long oil alkyd finish with a minimum solids content of 49 percent by volume. Apply primer as recommended by manufacturer.
 1. Prime Coat:
 - a) DFT = 2-3 mils (50 to 75 microns).
 - b) Products: Ameron 5105, Carboline AD29, Tnemec P4-55, VyGuard 13R29, or equal.
 2. Finish Coats (2 or more):
 - a) DFT = 2-4 mils (50-75 microns).
 - b) Products: Ameron 5401HAS, Carboline GP62, Tnemec 2H, VyGuard V20, or equal.
 3. Total System DFT = 4-7 mils (100-175 microns).
- I. System 8 – Aluminum Metal Isolation: Use one coat of a high-build polyamide epoxy paint.

1. Products: Tnemec P66, Ameron 385, Carboline 893, Tnemec P66, VyGuard V75, or equal.
 2. Total System DFT = 6-8 mils (150-200 microns).
- J. System 9 – Aluminum Silicone Resin: Use an aluminum silicone resin material suitable for a service temperature of up to 1000 degrees F (538 degrees C). Coating shall comply with Federal Specification DOD-P-28.
1. Prime Coat and Finish Coat (2 or more):
 - a) DFT = 2-4 mils (50-100 microns).
 - b) Products: Tnemec 39-1061, Ameron 878, Carboline 4631, VyGuard V437A1, or equal.
 - c) Total System DFT = 2-4 mils (50-100 microns).
 - d)
- K. System 10 – Zinc Rich Epoxy: Use a polyamide Epoxy resin material which contains at least 76 percent zinc in the dried film.
1. Prime Coat and Finish Coat (2 or more):
 - a) DFT = 3-5 mils (75-125 microns).
 - b) Products: Ameron 68HS, Carboline 858, VyGuard 13F4, or equal.
 - c) Total System DFT = 3-5 mils (75-125 microns).

2.03 SUBMERGED AND SEVERE SERVICE COATING SYSTEMS

- A. Material Sources: The manufacturers listed in this paragraph are materials, which satisfy the material descriptions of this paragraph and have a documented successful record for long-term submerged or severe service conditions. Proposed substitute products will be considered as indicated under paragraphs 2.01.5.
- B. System 100 – Amine-Cured Epoxy: Use a high-build amine-cured epoxy with a solids content of at least 80 percent by volume. Coating shall be suitable for long-term immersion in potable water and municipal wastewater. For potable water service, select a coating material listed in the NSF 61 Standard.
1. Prime Coat and Finish Coats (3 or more):
 - a) DFT = 16-19 mils (400 to 475 microns).
 - b) Products: Ameron Amercoat 395, Carboline 891, Tnemec 139, or equal.
 2. For coating of valves and non-submerged equipment, DFT = 12-14 mils (300-350 microns).
- C. System 101 – Polyamide Cured Epoxy: Use a high-build, polyamide epoxy resin with a solids content of at least 56 percent by volume. Coating shall be suitable for long-term immersion in potable water and municipal wastewater. For potable water service, select a coating material listed under NSF 61 Standard.
- Prime Coat and Finish Coats (3 or more):
- a) DFT = 12-14 mils (300-350 microns).
 - b) Products: Tnemec 20, VyGuard 78PR, or equal.
- D. System 102 – Coal Tar Epoxy: Use a high-build 2-component amine or polyamide-cured coal tar epoxy with a solids content of at least 68 percent by volume. Coating shall be suitable for long-term immersion in wastewater and for coating of buried surfaces. Coating shall conform to Mil Spec DOD-P-23236, or to SSPC Paint 16. Prime coats are for use as a shop primer only. Omit prime coat when both surface preparation and coating are performed in the field.

1. Prime Coat: DFT = 1.5-2.5 mils (38-65 microns).
 - a) Products: Ameron Amercoat 83HS, Tnemec P66, VyGuard V75, or equal.
 2. Finish Coats (2 or more):
 - a) DFT = 14-18 mils (350-450 microns).
 - b) Products: Ameron 78HB, Carbomastic 14, Tnemec 46H413, VyGuard 64, or equal.
 - c) Total System DFT = 15.5-20.5 mils (387-513 microns).
- E. System 103 – Fusion Bonded Epoxy: Use a 100 percent powder epoxy applied in accordance with ANSI/AWWA C213, except that surface preparation shall be as specified in the coating system schedule of this Section. Apply the coating using the fluidized bed process.
1. Liquid Epoxy: For field repairs, use a 100 percent solids liquid epoxy as recommended by the powder epoxy manufacturer to provide a DFT of 15-17 mils (375-425 microns).
 2. Powder Coating:
 - a) DFT = 15-17 mils (375-425 microns).
 - b) Products: Scotchkote 134 or 206N, Napgard 7-0008 or 7-2500, or equal.
 - c) Total System DFT = 15-17 mils (375-425 microns).
 - d) For coating of valves, DFT = 11-12 mils (275-300 microns).
- F. System 104 – Chemical Resistant Sheet Lining:
1. Materials: Use natural rubber, chlorobutyl rubber, ethylene propylene diene monomer (EPDM) rubber, chloroprene polymer (neoprene) rubber, or chlorosulfonated polyethylene (Hypalon) rubber sheet lining material. Submit shop drawings containing technical information that confirms the suitability of the lining material system for long-term immersion in each chemical to be stored. Service temperatures are expected to be up to 150 degrees F (65 degrees C).
 - a) Neoprene Sheet Lining Material: Use a synthetic rubber formulated for steam curing at atmospheric pressure. Provide a minimum lining thickness of 3/16 inch. Supply B.F. Goodrich compound 59688, or equal.
 - b) Chlorobutyl Sheet Lining Material: Use a synthetic rubber formulated for steam curing at atmospheric pressure. Supply B.F. Goodrich compound 60924, or equal.
 - c) Natural Rubber (soft) Sheet Lining Material: Use a soft natural rubber formulated for steam curing at thickness at atmospheric pressure. Provide a minimum lining thickness of 3/16 inch. Supply B.F. Goodrich compound 83160, or equal.
 - d) Natural Rubber (hard) Sheet Lining Material: Use a hard, natural rubber resistant to oxidizing agents and formulated for autoclave curing. Provide a minimum lining thickness of 3/16 inch. Supply B.F. Goodrich compound 8631, or equal.
 - e) EPDM Sheet Lining Material: Use synthetic rubber suitable for use as a lining for 50 percent sulphuric acid solution and formulated for autoclave or steam curing under pressure.
 - f) Hypalon Sheet Lining Material: Use synthetic rubber suitable for use as a lining for 50 percent sulfuric acid solution.
 2. Primers: Use primers, adhesives, activators, accelerators, and other necessary materials as recommended by the sheet material manufacturer.
 3. Metal Surface Preparation: Prior to abrasive blast cleaning, prepare the base metal as required by the sheet lining material manufacturer's installation instructions. If the instructions differ from these specifications, provide the highest degree of cleaning and surface preparation required by either instructions or specifications. Perform abrasive blast cleaning in accordance with this section.

4. Installation: Install lining materials in accordance with the material manufacturer's written installation instructions. Line interior surfaces including piping, vents, fittings, flange faces, manhole covers, and blind flanges.
 5. Testing: Test the lining system for holidays in accordance with this Section before and after curing.
 6. Curing: Cure the lining system by steam using the time and temperature as required by the material manufacturer.
- G. System 105 – Vinyl Ester: Use vinyl ester resin coating material with an inert flake pigment. Coating shall be suitable for immersion service in 30 percent hydrochloric acid and 30 percent sulfuric acid solutions.
1. Coating (2 or more coats):
 - a) DFT = 40-45 mils (1000-1125 microns).
 - b) Products: Plasite 4100, or equal.
 - c) Prime Coat: As recommended by the material manufacturer.
- H. System 106 – 100% Solids Epoxy: Use a solventless epoxy resin coating suitable for severe service areas subject to splash, spillage or intermittent immersion in wide range of industrial chemicals, and wastewater run-off. Coating shall be able to resist normal abrasion from rolling vehicles.
1. Coating (2 or more coats):
 - a) DFT = 15-20 mils (325-500 microns).
 - b) Products: Ameron , Carboline.
 - c) Prime Coat: As recommended by manufacturer.
- I. System 107 – 100% solids Epoxy Sealer: Use a clear, unpigmented solventless epoxy suitable for application over marginal surfaces including damp surfaces, tight rust and tight old coatings. Coating shall be able to serve as primer for alkyd, acrylic, epoxy, and polyurethane finish coats.
1. Coating (1 coat only):
 - a) DFT = 1-2 mils (25-50 microns).
 - b) Products: ICI/Devoc 167 PrePrime, Carboline Rust Bond, or equal.

PART 3. EXECUTION

3.01 MANUFACTURER'S SERVICES

- A. Require the protective coating manufacturer to furnish a qualified technical representative to visit the project site for technical support as may be necessary to resolve field problems attributable to or associated with manufacturer's products.
- B. For submerged and severe service coating systems, require the paint manufacturer to furnish the following services:
1. At least 6 hours of on-site instruction on the proper surface preparation, use, mixing, application, and curing of the coating systems.
Observe the start of surface preparation, mixing, and application and curing of the coating systems.

Require the services of a NACE Certified Coating Inspector at all times during the surface preparation, mixing, application, curing and testing of all coatings applied in submerged or acid spill areas.

3.02 WORKMANSHIP

- A. Use skilled craftsmen and experienced supervision. For all jobs involving lead based paint removal or repair, require the presence of a certified Competent Person, Lead per OSHA requirements.
- B. Apply coating to produce an even film of uniform thickness. Give special attention to edges, corners, crevices, and joints. Ensure thorough cleaning and an adequate thickness of coating material. Apply coatings to produce finished surfaces free from runs, drips, ridges, waves, laps, brush marks, and variations in color, texture and finish. Effect complete hiding so that the addition of another coat would not increase the hiding. Give special attention to ensure that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas. Apply a brushed stripe coat to all edges and welds after priming submerged or severe service areas.
- C. Remove, mask or otherwise protect hardware, lighting fixtures, switch plates, machined surfaces, couplings, shafts, bearings, name plates on machinery, and other surfaces not to be painted. Provide drop cloths to prevent coating materials from falling on or marring adjacent surfaces. Protect the working parts of mechanical and electrical equipment from damage during surface preparation and coating operations. Mask openings in motors to prevent entry of coating or other materials.
- D. Do not damage adjacent work during blast cleaning operations. Conduct spray painting under carefully controlled conditions. Promptly repair any damage to adjacent work or adjoining property occurring from blast cleaning or coating operations.
- E. Coordinate cleaning and coating so that dust and other contaminants from the cleaning process will not fall on wet, newly-coated surfaces.

3.03 SURFACE PREPARATION STANDARDS

- A. The following referenced surface preparation standards of the Society for Protective Coatings (SSPC) form a part of this Specification:
 1. Solvent Cleaning (SSPC-SP1): Removal of oil, grease, soil, drawing and cutting compounds, and other soluble contaminants from steel surfaces by cleaning with solvent, vapor degreasing, emulsion or alkaline cleaners, or steam.
 2. Hand Tool Cleaning (SSPC-SP2): Removal of all loose rust, loose mill scale, loose paint, and other loose detrimental foreign matter by hand chipping, scraping, sanding, and wire brushing.
 3. Power Tool Cleaning (SSPC-SP3): Removal of loose rust, loose mill scale, loose paint, and other loose detrimental foreign matter, by rotary or impact power tools, power wire brushing, or power abrading.

4. White Metal Blast Cleaning (SSPC-SP5/NACE 1): Removal of all visible oil, grease, soil, dust, dirt, mill scale, rust, coating, oxides, corrosion products, and other foreign matter by blast cleaning.
5. Commercial Blast Cleaning (SSPC-SP6/NACE 3): Removal of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products, and other foreign matter, except that random staining shall be limited to no more than 33 percent of each unit area of surface.
6. Brush-Off Blast Cleaning (SSPC-SP7/NACE 4): Removal of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose coating, all of which shall be considered tightly adherent if they cannot be removed by lifting with a dull putty knife.
7. Near-white Blast Cleaning (SSPC-SP10/NACE 1): Removal of all visible oil, grease, dirt, mill scale, rust, coating, oxides, corrosion products, and other foreign matter, except that random staining shall be limited to no more than 5 percent of each unit area of surface.

3.04 METAL SURFACE PREPARATION (UN GALVANIZED)

- A. Provide the minimum abrasive-blasted surface preparation as indicated in the coating system schedules at the end of this Section. Where there is a conflict between these specifications and the coatings manufacturer's printed recommendations for the intended service, the higher degree of cleaning applies.
- B. Perform metal surface preparation in conformance with the current SSPC/NACE Standards and this Section. Blast cleaned surfaces must match standard samples in SSPC-VIZ 1.
- C. Remove oil, grease, welding fluxes, and other surface contaminants prior to blast cleaning using solvent cleaning as per SSPC-SP1.
- D. Have sharp edges rounded or chamfered and burrs, surface defects, and welded splatter ground smooth prior to blast cleaning.
- E. Select the type and size of abrasive to produce a surface profile that meets the coating manufacturer's recommendation for the particular coating and service conditions. As abrasives for submerged and severe service coating systems use clean, hard, sharp cutting crushed slag. Do not use automated blasting systems and metal shot or grit for surfaces that will be in submerged service, even if subsequent abrasive blasting is planned with hard, sharp-cutting slag.
- F. Do not reuse abrasive except when an automated blasting system is used for surfaces that will be in non-submerged service. For automated blasting systems, use clean, oil-free abrasives. In the abrasive mix use at least 50 percent steel grit. Replenish abrasive mix with new shot/grit combination as necessary to maintain the anchor profile within ½ mil (13 microns) of the specified profile.
- G. Comply with the applicable federal, state, and local air pollution control regulations for blast cleaning.
- H. For air-blast cleaning, supply compressed air at adequate pressure from well-maintained compressors equipped with oil and moisture separators which delivers oil and water-free air as

checked with white blotter, white cloth, or plastic sheets at the beginning of each blasting sequence.

- I. Clean surfaces of dust and residual particles of the cleaning operation using dry air-blast cleaning, vacuuming, or another approved method prior to painting. Vacuuming must be the final cleaning method immediately prior to painting areas that will go into submerged service.
- J. In enclosed areas and other areas where dust may settle, vacuum the surface clean and wipe it with a tack cloth.
- K. Remove damaged or defective coating by the specified blast or power tool cleaning to meet the clean surface requirements before recoating.
- L. If the specified abrasive blast cleaning will damage adjacent work, the area to be cleaned is less than 100 square feet, and the coated surface will not be in submerged service, then SSPC-SP2 – Hand Tool Cleaning or SSPC-SP3 – Power Tool Cleaning, may be used. If the coated area to be cleaned is less than 100 square feet, and will be in submerged service, then SSPC-SP11 Power Tool Cleaning to Bare Metal may be used.
- M. Completely remove shop-applied coatings of unknown composition before the specified coatings are applied. Examine valves, castings, ductile or cast iron pipe, and fabricated pipe or equipment for the presence of shop-applied temporary coatings. Completely remove temporary coatings by solvent cleaning per SSPC-SP1 method before starting abrasive blast cleaning. Alternate cleaning methods such as Baking Soda Blasting or Sponge Jet Blasting may be used as appropriate.
- N. Use the solvent cleaning method (SSPC-SP1) to clean shop-primed equipment in the field before finish coats are applied.

3.05 SURFACE PREPARATION FOR GALVANIZED FERROUS METAL

- A. For galvanized ferrous metal use the alkaline cleaning method per SSPC-SP1 to remove oil, grease, and other contaminants detrimental to adhesion of protective coatings. Alternate methods with biodegradable surfactant type cleaners followed by fresh water washing may be used as appropriate.
- B. Apply pretreatment coatings of surfaces in accordance with the printed recommendations of the coating manufacturer.

3.06 SURFACE PREPARATION OF FERROUS SURFACES WITH EXISTING COATINGS

- A. Preparatory Cleaning: Remove grease, oil, heavy chalk, dirt, or other contaminants by solvent or detergent cleaning prior to abrasive blast cleaning. Determine the generic type of the existing coatings by laboratory testing.
- B. Abrasive Blast Cleaning: Provide the degree of cleaning specified in the coating system schedule for the entire surface to be coated. If the degree of cleaning is not indicated in the schedule, remove deteriorated coatings by abrasive blast cleaning to meet the requirements of SSPC-SP6 Commercial Blast Cleaning. Clean areas of tightly adhering coatings to meet the

requirements of SSPC-SP7 Brush-Off Blast Cleaning, with the remaining thickness of pre-existing coating not to exceed 3 mils.

- C. Incompatible Coatings: If coatings to be applied are not compatible with existing coatings, apply intermediate coatings conforming to the paint manufacturer's recommendation for the indicated coating system or completely remove the existing coating prior to abrasive blast cleaning. Make a small trial application for compatibility prior to painting large areas. Allow the trial application to cure for 7 days at 50 degrees F (10 degrees C) or higher before determining compatibility.
 - D. Unknown Coatings: Completely remove coatings of unknown composition prior to application of new coatings.
 - E. Water Jetting or Wet-abrasive Blast Cleaning: Where specified or where job site conditions do not permit dry-abrasive blasting for industrial coating systems due to dust or air pollution considerations, water jetting or wet-abrasive blasting may be used. In both methods, use inhibitors approved by the manufacturer of the coating system, which will be applied over the cleaned area. Begin the coating application as soon as the surface has dried, and before the formation of any flash rusting. Perform water jetting with or without abrasive injection, as appropriate to achieve the specified degree of surface cleanliness. Do not use water-jetting methods for submerged or severe-service coating systems, unless specified for that area.
- 3.07 PLASTIC, FIBERGLASS, AND NONFERROUS METALS SURFACE PREPARATION
- A. Unless otherwise indicated, for equipment, or parts of equipment which are not submerged in service, shop-prime them, and then finish-coat them in the field after installation. For methods, materials, application equipment, and other details of shop painting, comply with this Section. If the shop primer requires topcoating within a specified period of time, apply the finish coating in the shop and then touch-up the paint after installation.
 - B. Perform surface preparation and coating work in the field for equipment, or parts and surfaces of equipment which are submerged or inside an enclosed hydraulic structure when in service, with the exception of pumps and valves.
 - C. For certain pieces of equipment, it may be undesirable or impractical to apply finish coatings in the field. Such equipment may include engine generator sets, equipment such as electrical control panels, switch gear or main control boards, submerged parts of pumps, ferrous metal passages in valves, or other items where it is not possible to obtain the required quality in the field. For such equipment, prime and finish-coat in the shop and touch-up in the field after installation. Use the identical material for touch-up that was used for shop painting. Require the manufacturer of each such piece of equipment to certify as part of its shop drawings that the surface preparation is in accordance with these specifications. Submit the coating material product data sheet with the shop drawings for the equipment.
 - D. For certain small pieces of equipment, the manufacturer may have a standard coating system, which is suitable for the intended service conditions. In such cases, the final determination of suitability will be made during review of the shop drawing submittals. Equipment of this type generally includes only indoor equipment such as instruments, small compressors, and chemical metering pumps.

- E. Protect shop-painted surface during shipment and handling. Protect surfaces with padding or blocking. Lift equipment with canvas or nylon slings. Do not expose primed surface to the weather for more than 2 months before being topcoated, or less time if recommended by the coating manufacturer.
- F. Repair damage to shop-applied coatings in accordance with this Section and the coating manufacturer's printed instructions.
- G. Make certain that the shop primers and field topcoats are compatible and meet the requirements of this Section. Submit copies of applicable coating manufacturer's product data sheets with equipment shop drawings.

3.08 APPLICATION OF COATINGS

- A. Apply protective coatings to steel substrates in accordance with SSPC-PA1 – Paint Application Specification No. 1. Shop, Field and Maintenance Painting.
- B. Inspect cleaned surfaces and each coat prior to succeeding coats. Schedule inspections with the City Engineer in advance.
- C. Paint blast-cleaned ferrous metal surfaces before rusting or other deterioration of the surface occurs. Limit blast cleaning to only those surfaces that can be coated in the same working day unless the area to be coated is protected by humidity control equipment set to maintain humidity below 50 percent at all times.
- D. Apply coatings in accordance with the manufacturer's instructions and this Section, whichever has the most stringent requirements.
- E. Give special attention to edges, angles, weld seams, flanges, nuts and bolts, and other places where insufficient film thickness is likely to occur. Use stripe painting by brush, after application of the primer, for these areas.
- F. Give special attention to materials, which will be joined so closely that proper surface preparation and application are not possible. Coat such contact surface prior to assembly or installation. Only inorganic zinc primers may be used on faying surfaces.
- G. Apply finish coats, including touch-up and damage repair coats, in a manner, which will present uniform texture and color-matched appearance.
- H. Do not apply coatings under the following conditions:
 - 1. Temperature outside of the manufacturer's recommended minimum and maximum range.
 - 2. Dust or smoke laden atmosphere.
 - 3. When the substrate or air temperature is less than 5 degrees F (3 degrees C) above the dew point.
 - 4. When air temperature is expected to drop below 40 degrees F (14 degrees C) or less than 5 degrees F (3 degrees C) above the dew point within 8 hours after application of the coating.
 - 5. When wind conditions are in excess of 15 MPH or dust laden.

- I. Determine the dew point by use of a sling psychrometer in conjunction with the U.S. Department of Commerce, Weather Bureau psychrometric tables.
- J. For steel piping which will not be buried, have the surface abrasive blast cleaned and primed before installation.
- K. Apply finish coats after concrete, masonry, and equipment installation is complete and the work areas are clean and dust free. Concrete must have cured for a minimum of 28 days @ 75 degrees F (24 degrees C) unless an approved epoxy sealer has been applied to green concrete within 12 hours of finishing the concrete.

3.09 CURING OF COATINGS

- A. Maintain curing conditions in accordance with the recommendations of the coating material manufacturer and this Section, whichever is the most stringent. Complete curing before placing the coating systems into service.
- B. In the case of enclosed areas, forced air ventilation using heated air may be required until the coatings have fully cured.
- C. Forced Air Ventilation of Enclosed Hydraulic Structures: Forced air ventilation is required for the application and curing of coatings on the interior surfaces of enclosed hydraulic structures. During application and curing periods, continuously exhaust air from the lowest level of the structure using portable ducting to force air into all compartments or around baffles of the structure. After interior coating operations have been completed, provide a final curing period that meets the minimum temperature and time requirements of the manufacturer of the coating system being applied, while operating the forced air ventilation system continuously.

3.10 SHOP AND FIELD INSPECTION AND TESTING

- A. Give the City engineer a minimum of 3 days advance notice of the start of any field surface preparation work or coating application work, and a minimum of 7 days advance notice of the start of any shop surface preparation work.
- B. Perform surface preparation and coating applications in the presence of the City Engineer, or his appointed NACE certified coating inspector, unless the City Engineer has granted prior approval to perform the work in their absence.
- C. Inspection by the City Engineer or the NACE certified inspector, or the waiver of inspection of any particular portion of the work, does not relieve the Contractor of his responsibility to perform the Work in accordance with these Specifications.
- D. Erect and move scaffolding where requested by the City Engineer to facilitate inspection. Provide additional illumination to light areas to be inspected. Remove or grind smooth all scaffolding clips welded to the structure prior to surface preparation of the structure.

- E. Until final acceptance of the coatings, furnish inspection devices in good working condition for the detection of holidays and measurement of dry-film thickness (DFT) of protective coatings. Make DFT gauges available for the City Engineer's use while coating is being done, until final acceptance of such coatings. Provide the services of a NACE certified coating inspector for all holiday detection work until the final acceptance of such coatings. Operate holiday inspection devices in the presence of the City Engineer.
- F. Perform holiday tests on coated ferrous surfaces inside a steel reservoir, other surfaces that will be submerged in water or other liquids, or surfaces which are enclosed in a vapor space in such structures. Holiday tests shall be performed on surfaces coated with any of the submerged and severe service coating systems. Mark and repair or recoat areas which contain holidays in accordance with the coating manufacturer's printed instructions and then retest. **DO NOT PERFORM HOLIDAY TESTING AFTER STRUCTURE HAS BEEN SUBMERGED.**
 - 1. Coatings with Thickness Exceeding 20 mils (500 microns): For surfaces having a total DFT exceeding 20 mils (500 microns); use a pulse-type holiday Detector such as Elcometer 136, or equal. Adjust and operate in accordance with NACE RPO 188.
 - 2. Coatings with Thickness of 20 mils (500 microns) or Less: For surfaces having a total DFT of 20 mils or less, use Elcometer 269 non-destructive type holiday detector, or equal. Instrument must operate at less than 75 volts. For thicknesses between 10 and 20 mils (250 and 500 microns) and a non-sudsing type wetting agent such as Kodak Photo-Flo, or equal may be added to the water prior to wetting the detector sponge. For submerges or severe service areas, the residue of the wetting agent must be removed with clean, fresh water prior to application of any additional coats of coating.
- G. Film Thickness Testing: On ferrous metals, measure the DFT in accordance with SSPC-PA2 Measurement of Dry Film Thickness with magnetic gauges using either a pull-off type gauge (Elcometer 211) or constant pressure gauge (Elcometer 345F), or equal. Test each coat for the correct thickness. Calibrate the DFT gauge at the beginning of each workday or shift in accordance with the directions of the manufacturer of the gauge. Do not take measurements until at least 8 hours after coating application. On non-ferrous metals, measure the DFT with positive pressure eddy current gages (Elcometer 345N) or equal.
- I. Surface Preparation: Evaluation of blast-cleaned surface preparation work will be based upon comparison with photographic samples contained in SSPC-VIZ 1. Evaluation of surface profile will be based upon the use of TesTex pressure sensitive tapes.

3.11 PAINTING AND IDENTIFICATION OF PIPING

- A. Painting and Color Coding:
 - 1. Use colors and signs to identify all piping which is exposed to view in buildings or tunnels, above suspended ceilings or exposed above grade, and all outdoor piping. Identify each pipe by a color complying with the following schedule of colors and by applied markers.
 - 2. Coat pipes in the number of coats and type of material specified. Base coats for pipeline painting may be a neutral color. Make each succeeding base coat a contrasting color. For the final coat, comply with the pipe identifying color schedule.
 - 3. Apply pipe identification markers to exposed piping, except for the following pipe at wastewater lift stations:
 - a. Discharge piping for wastewater pumps.

- b. Vent piping.
- c. Any piping inside wet wells.

B. Pipe Identification Markers:

1. Identify all pipes with applied signs or markers at 15-foot centers, at both sides of penetrated walls or floors, adjacent to valves, at connected equipment, at branch fittings, and in congested pipe layouts.
 - a. Apply markers consisting of signs with legends as follows:

OUTSIDE DIAMETER OF PIPE OR COVERING (INCHES)	LENGTH OF COLOR FIELD (INCHES)	SIZE OF LETTERS (INCHES)
3/4 to 1- 1/4	8	1/2
1- 1/2 to 2- 3/8	8	3/4
2- 1/2 to 5- 7/8	12	1- 1/4
6 to 7- 7/8	12	1- 1/4
8 to 10	24	2- 1/2
Over 10	32	3- 1/2

- b. As pipe markers use semi-rigid outdoor grade acrylic plastic, Seton Name Plate Corp. SetMark, or equal. Use Type SNA for outside diameters 3/4 through 5- 7/8 inches and Type STR for 6-inch outside diameter or larger. For pipes or pipe covering less than 3/4-inch in diameter, use applied marker of brass identification tags 1-1/2 inches square with depressed letters 1/4-inch high, black-filled. Apply tightly to pipeline with metal or plastic straps.

C. Pipe Identification Color Schedule:

1. For pipe coatings, use the colors listed in the following pipe identification color schedule:PIPE IDENTIFICATION COLOR SCHEDULE

PIPING SYSTEM	COLOR	FED. STD. NO.
Fire Mains	Red	11105
Oxygen	Orange	12246
Sodium Hypochlorite	Yellow	13655
Raw Polymer	Pink	11156
Diluted Polymer	Purple	17142
Natural Gas	Yellow	13655
Heating Water	Pink	11158
Domestic Hot	Lt. Pink	11668
Potable Water	Blue	15102
Non-Potable Water	White	17875
Instrument Air	Green	14187
Plant Air	Dk. Green	14110
Raw Sewage	Gray	16473
Grit	Dk. Gray	16187
Cyclone Return	Gray	16473
Classifier Return	Gray	16473
PIPING SYSTEM	COLOR	FED. STD. NO.
Heavy Solids	Dk. Brown	10080
Return Sludge	Brown	10091
Waste Sludge	Yellow-Brown	10266

Scum	Lt. Brown	10334
Chilled Water Supply (CWS)	Blue-Green	14329
Chilled Water Return (CWR)	Blue-Green	14325
Condensing Water Supply (Cond-WS)	Lt. Green	14533
Condensing Water Return (Cond-WR)	Lt. Green	14533
Deionized Water (DW)	Lt. Blue	15526
Vacuum (Vac)	White	17875
Vent	Lt. Gray	16492

2. Use colors for the applied signs and markers in accordance with the color schedule, except for brass identification tags, which are colored as indicated in paragraph 3.14.2.2.
3. For final colors used for pipe identification conforming to Federal Std.595A.
 - a. For pipe identification colors not listed above, follow American National Standard (ANSI A13.1-81) Color Schedule:
 1. Materials inherently hazardous, flammable or explosive; chemically active or toxic; extreme temperature or pressure; radioactive: Yellow Field with Black Letters.
 2. Material of inherently low hazard – liquid or liquid admixture: Green Field with White Letters; gas or gaseous admixture: Blue Field with White Letters.
 3. Fire quenching materials, water, foam, carbon dioxide, Halon, etc.: Red Field with White Letters.

3.12 COATING SYSTEM SCHEDULES – FERROUS METALS

A. Coating System Scheduled, Ferrous Metal – Not Galvanized

SCHEDULE NO. AND APPLICATION	SURFACE PREPARATION	SYSTEM NO./ DESCRIPTION
FM-1: Surfaces indoors and outdoors, exposed or covered, except those listed below.	Near White Metal blast cleaning SSPC-SP10/NACE 2	(2) Inorganic zinc/epoxy/ polyurethane
FM-2: Surfaces in chlorination room, chlorine storage room, sodium hypochlorite storage room	Near White Metal blast cleaning SSPC-SP10/NACE 2	(100) Amine-cured epoxy
FM-3: Surfaces of pumps and equipment & other ferrous surfaces submerged or intermittently submerged in potable water, utility water, and wastewater, including surfaces lower than 2 feet above high-water level in hydraulic structures, and surfaces inside enclosed hydraulic structures, pump state wet wells, and vents (excluding shop-coated valves, couplings, and pumps).	White Metal Blast Cleaning SSPC-SP5/ NACE 1	(100) Amine-cured epoxy
FM-4: Surfaces exposed to high temperature between 150 and 600 degrees F (65 and 315 degrees C).	Near White Metal blast cleaning SSPC-SP10/NACE 2	(3) Inorganic Zinc, water-based
FM-5: Surfaces exposed to high temperature between 600 and 1000 degrees F.	Near White Metal blast cleaning SSPC-SP10/NACE 2	(9) Aluminum silicon resin
FM-6: Where indicated, ferrous surfaces in water passages of valves 4-inch size and larger, exterior	White Metal Blast Cleaning SSPC-SP5/	(101) Polyamide-cured epoxy

surfaces of submerged valves.	NACE 1	
FM-7: Where indicated, ferrous surfaces in water passages of pumps which have discharge size of 4 inches or larger; exterior, submerged surfaces of pumps.	White Metal Blast Cleaning SSPC-SP5/ NACE 1	(101) Polyamide-cured epoxy
FM-8: Ferrous surfaces of sleeve couplings.	White Metal Blast Cleaning SSPC-SP5/ NACE 1	(103) Fusion-bonded epoxy
FM-9: Ferrous surfaces of sluice gates, flap gates, and shear gates, including wall thimbles.	White Metal Blast Cleaning SSPC-SP5/ NACE 1	(101) Polyamide-cured epoxy
FM-10: Structural steel, miscellaneous metal work, and supports for prefabricated metal buildings, not exposed to view in finished building.	Commercial Blast Cleaning (SSPC-SP6/NACE 3	(10) Zinc Rich Epoxy
FM-12: Ferrous metal exposed to view, inside and outside of buildings.	Near White Metal blast cleaning SSPC-SP10/NACE 2	(2) Inorganic zinc/ epoxy/polyurethane
FM-13: Surfaces of indoor equipment, not submerged.	Commercial Blast Cleaning SSPC-SP6/ NACE 3	(5) Epoxy, equipment
FM14: Exterior (exposed) surfaces shop-coated with fusion-bonded epoxy.	Light abrasive blast to roughen surface	(6) Aliphatic polyurethane

B. Coating System Schedule, Ferrous Metal – Galvanized: Apply pretreatment coatings, barrier coatings, or washes as recommended by the coating manufacturer.

SCHEDULE NO. AND APPLICATION	SURFACE PREPARATION	SYSTEM NO./ DESCRIPTION
FMG-1: Exposed surfaces indoors and outdoors, except those listed below.	Alkaline cleaning SSPC-SP1	(1) or (4) Aliphatic Polyurethane, or Acrylic
FMG-2: Surfaces in chlorination room, chlorine storage room, and sodium hypochlorite storage room.	Alkaline Cleaning SSPC-SP1	(100) Amine-cured epoxy
FMG-3: Surfaces submerged in water or wastewater, including surfaces lower than 2 feet above high-water level and surfaces inside hydraulic structures and vents	Alkaline cleaning SSPC-SP1 followed by Brush-Off blast cleaning SSPC-SP7/ NACE 4	(100) Amine-cured epoxy
FMG-4: Surface exposed to view, inside and outside of building.	Alkaline Cleaning SSPC-SP1	(1) or (4) Aliphatic polyurethane, or Acrylic

C. Coating System Schedule, Interior Surface of Welded Steel Tanks: Coat interior surfaces, including tank nozzles, manholes, nozzle necks, and flange faces. For steel tank exterior coating systems, see paragraph 3.15.1, Coating System Schedule, Ferrous Metal – Not Galvanized.

PRODUCT STORED	SURFACE PREPARATION	SYSTEM NO. /DESCRIPTION
Zinc Orthophosphate	White metal blast cleaning SSPC-SP5/NACE1	(104) Natural rubber (soft) or neoprene
Liquid Alum	White metal blast cleaning SSPC-SP5/NACE1	(104) Natural rubber (soft) or neoprene

Polymer	White metal blast cleaning SSPC-SP5/NACE1	(104) Natural rubber (soft) or neoprene
Sodium Bisulfite	White metal blast cleaning SSPC-SP5/NACE1	(104) Natural rubber (soft) or neoprene
Ferric Chloride	White metal blast cleaning SSPC-SP5/NACE1	(104) Natural rubber (hard)
Aqueous Ammonia	White metal blast cleaning SSPC-SP5/NACE1	(104) Chlorobutyl rubber
Caustic Soda	Commercial Blast Cleaning SSPC-SP6/NACE 3	No Coating
Sodium Hypochlorite	White metal blast cleaning SSPC-SP5/NACE1	(104) Chlorobutyl Rubber
Sulfuric Acid (max. 45% concentration)	White metal blast cleaning SSPC-SP5/NACE1	(107) Hypalon
Sulfuric Acid (above 40% concentration)	White metal blast cleaning SSPC-SP5/NACE1	(107) Viton
Hydrofluosilicic Acid	White metal blast cleaning SSPC-SP5/NACE1	(107) Chlorobutyl Rubber
Water, Potable Water, Utility Water	White metal blast cleaning SSPC-SP5/NACE1	(100) Amine-Cured Epoxy

3.13 COATING SYSTEM SCHEDULES, NONFERROUS METAL, PLASTIC, FIBERGLASS

- A. Where isolated non-ferrous parts are associated with equipment or piping, use the coating system for the adjacent connected surfaces. Do not coat handrails, gratings, frames, or hatches. Use primers recommended by coating manufacturer.

SCHEDULE NO. AND APPLICATIONS	SURFACE PREPARATION	SYSTEM NO./ DESCRIPTION
NFM-1: Exposed surfaces, indoors and outdoors, except those listed below.	Solvent cleaned SSPC-SP1	(1) Aliphatic Polyurethane
NFM-2: Chlorination room, chlorine storage room, sodium hypochlorite storage room.	Solvent cleaned SSPC-SP1	(100) Amine-Cured Epoxy
NFM-3: Aluminum surfaces in contact with concrete, or with any other metal except galvanized ferrous metal.	Solvent cleaned SSPC-SP1	(8) Aluminum Metal Isolation
NFM-4: polyvinyl chloride plastic, indoors and outdoors, not submerged.	Solvent cleaned SSPC-SP1	(4) Acrylic
NFM-5: Fiberglass surfaces.	Per paragraph 3.09, Plastic, Fiberglass, and Non-Ferrous Metals Surface Preparation	(6) Aliphatic Polyurethane Fiberglass

END OF SECTION

Section 15101

VALVES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Valves, gates and accessories for exposed, submerged and other types of piping for wastewater treatment plant and pump station.

1.02 REFERENCES

- A. ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
- B. AWWA C509 - Resilient Seated Gate Valves.
- C. AWWA C508 - Check Valves.
- D. AWWA C500 - Gate Valves.
- E. ASTM A126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
- F. ASTM A395 - Ductile Iron Castings.
- G. ASTM A48 - Gray Iron Castings.
- H. ASTM A193 - Alloy-Steel and Stainless Steel Bolting Materials for High Temperature Service.
- I. ASTM A194 - Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service.

1.03 QUALITY ASSURANCE

- A. Manufacturer's Qualifications
 - 1. Valves and appurtenances provided under this Section shall be the standard product in regular production by manufacturers whose products have proven reliable in similar service for at least 5 years.
 - 2. Insofar as possible all valves of the same specific type shall be the product of one manufacturer.

1.04 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Sections 01330 - Submittal Procedures and 15050 - Basic Mechanical Materials and Methods.

B. Shop Drawings

1. Submit for review detailed drawings, data and descriptive literature on valves and appurtenances, including:
 - a. Dimensions.
 - b. Size.
 - c. Materials of construction.
 - d. Weight.
 - e. Protective coating.
 - f. Actuator weight, where applicable.
 - g. Calculations for actuator torque, where applicable.
 - h. Wiring diagram, where applicable.
2. Submit manufacturer's valve sizing calculations for verification of sizing for air release valves, air and vacuum valves, and surge relief valves.

C. Manufacturer's Certifications

1. Submit manufacturer's certificates of compliance with ANSI, AWWA and other listed standards.

1.05 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of Section 01730 - Operations and Maintenance Data.
- B. Submit a detailed operation and maintenance manual for valves and appurtenances provided under this Section.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Have products delivered, stored and protected under provisions of Section 01600 - Material and Equipment.
- B. Store valves and appurtenances off the ground in enclosed shelter.

PART 2 PRODUCTS

2.01 BASIC REQUIREMENTS

- A. Mark and identify valves in conformance with standards, these Specifications or to the manufacturer's standard.
- B. Bolts, studs and nuts to be Type 316 stainless steel.
- C. End connections of valves shall be flanged and drilled to ANSI Class 125 unless otherwise specified.
- D. For handwheel operators on valves 4-inches or larger where located more than 5 feet above the operating floor, provide chain and chainwheel or extension operators. Use chainwheels fabricated of malleable cast iron with chain guides. Provide stainless steel chains of a length to extend to within 5 feet of the operating floor.
- E. To exterior surfaces of valves, apply a shop coating in accordance with Section 09900- Painting.

2.02 CHECK VALVES

- A. Swing check valves 4-inches through 14-inches having a system pressure 30 psi or less, shall be air cushioned with side mount lever and weight. The valve shaft shall extend through both sides of the body with minimum shaft diameters equal to APCO Series 6000. The cushion shall be totally enclosed, swivel mounted at the bottom, and equipped with a micrometer air control valve and air breather filters. Valves shall be similar to APCO Series 6000, or approved equal.
- B. Swing check valves 10-inches through 14-inches having a system pressure greater than 30 psi shall be cushioned with side mount lever and weight. Valves shall be similar to APCO Series 6100, or approved equal.
- C. Swing check valves 16-inches and larger regardless of system operating pressure shall be cushioned with side mount lever and weight. Valves shall be similar to APCO Series 6100, or approved equal.
- D. Check valves of special design utilizing controlled closing of the disc, such as APCO Series 6000B (Bottom-Buffer) and Golden Anderson Fig. #25-DXH or approved equal shall be used when specifically indicated on the Drawings. These valves are special valves used to control the surge pressure in the force main upon multiple pump shutdown during a power failure. Other surge control check valves

utilizing ball or cone valve and power cylinder operator may also be used as approved by the City Engineer.

- E. All check valves shall have 300 series stainless steel hinge shafts, stainless steel body seats and stainless steel resilient seat retainer rings.

2.03 GATE VALVES

- A. Gate valves 4 inches through 14 inches: Solid wedge type, with resilient nitrile rubber (Buna- N) tapered seat. Provide valves complying with AWWA C-509. Acceptable manufacturers include Mueller, M&H, AVK, or approved equal.
- B. Gate valves 16 inches and larger: Solid wedge type with bronze to bronze seating surface. Provide valves complying with the AWWA C-500. Acceptable manufacturers include Mueller, M&H, AVK, or approved equal.
- C. Supply gate valves rated as 200 psi water working pressure with 400 psi hydrostatic test for structural soundness for 2 inches through 12 inches and 150 psi water working pressure with 300 psi hydrostatic test for structural soundness for sizes 14 inches through 30 inches.
- D. Stems: OS&Y rising type manganese bronze having a minimum tensile strength of 60,000 psi, a minimum yield strength of 20,000 psi for valve sizes through 24 inches, and a minimum tensile strength of 80,000 psi, a minimum yield strength of 32,000 psi for valve sizes 30 inches and larger.
- E. Valve Bodies: Cast iron conforming to ASTM A126 or ASTM A395. Fabricate internal trim parts of 300 series stainless steel.

2.04 ECCENTRIC PLUG VALVES

- A. Eccentric plug valves shall be the non-lubricated eccentric type with cast iron bodies, resilient-faced plugs or replaceable resilient seats in the bodies.
- B. Operators: All valves for 4-inch and larger service shall have worm gear operators, nickel or stainless steel seats, and ANSI 125 psi flanged ends. Operators shall clearly indicate valve position. Operators on valves in submerged or buried service shall be lubricated and sealed to prevent entry of dirt and water into the operator.
- C. Resilient facing shall be suitable for the intended service.

- D. All shaft bearings shall be of stainless steel, furnished with permanently-lubricated bearing surfaces.
- E. Valves up to and including 20 inches in size shall have an unobstructed port area of no less than 80 percent of the full pipe area, and not less than 70 percent for larger valves.
- F. Eccentric plug valves shall be manufactured by Clow, De Zurik, Keystone, Val-Matic, or as indicated on the latest City of Houston approved products list.

2.05 SEWAGE AIR RELEASE AND SEWAGE AIR AND VACUUM VALVES

- A. Air Release and Air and Vacuum Valves: Provide when shown on Drawings.
- B. Sewage Air Release Valve Design: Single float, single orifice, float operated with a compound lever mechanism to automatically release accumulated air and gases while the system is pressurized and operating.
- C. Sewage Air and Vacuum Valve Design: Two float where the top float shuts off against the seat due to the lifting force of the bottom float as liquid enters the valve body. Once closed and pressurized the air and vacuum valve will not open to release air.
- D. Fabricate valve body, cover and baffles of cast iron. Fabricate internal metal parts of stainless steel. Make valve seat of Buna-N nitrile rubber.
- E. Fit valve with blow off valves, quick disconnect couplings and minimum 6-feet of hose to permit back flushing after installation with dismantling valve.
- F. Provide air release valves equal to Series 400/450 SARV by APCO or Figure 925 by G.A. Industries.
- G. Provide air and vacuum valves equal to Series 400 SARV by APCO. Figure 935 as manufactured by GA Industries, or Val-Matic.

2.06 SURGE RELIEF VALVES

- A. Surge Relief Valves: Provide when shown on Drawings.
- B. Operation: Surge relief valves shall protect piping systems from surges by opening quickly at a set pressure and throttling the flow to maintain line pressure at no more than 5 to 10 percent above the pressure setting indicated. Provide relief pressure adjustment by changing the tension on a spring holding the valve disc on its seat.
- C. Valve Closing Control: By oil dashpots. Oil shall be drawn into the dashpot from a reservoir when the valve opens and return through a flow control valve when the relief valve closes.
- D. Valve Construction: Fabricate valve bodies of cast iron with 300 series stainless steel seat rings. Provide seats that are renewable and resilient. Fabricate hinge shafts of stainless steel and the oil system of bronze. Unless otherwise indicated make the pressure setting 5 percent above normal line pressure.
- E. Provide surge relief valves that are 90-degree elbow body configuration. Acceptable manufacturers include APCO series 3000, GA Industries 625-D, or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install valves and specialties in accordance with manufacturer's written instructions to permit intended performance.
- B. Support and anchor valves and gates in accordance with Section 15140 - Pipe Hangars, Supports and Restraints.
- C. Eccentric plug valves shall be installed according to the following:
 - 1. Position the valves with the stem in the horizontal direction.
 - 2. In horizontal pipelines, position the valves so that the plug swings upward when opening to permit flushing of solids.
 - 3. Orient the valves to prevent the valve bodies from filling up with solids when closed; however, orient the valves such that the pressure differential forces the plug against the seat in cases where the pressure differential across a closed valve will exceed 25 psi.

3.02 PAINTING

- A. Paint valves and specialties in accordance with applicable AWWA standards and with Section 09901 - Protective Coatings.

3.03 TESTING

- A. Test valves using a hydrostatic pressure test in accordance with AWWA C-600.
- B. Test valves and specialties in place. Correct defects in valves, specialties or connections.

END OF SECTION

Section 15101

VALVES AND GATES

PART 1 GENERAL

1.01 SECTION INCLUDES

- C. Valves, gates and accessories for exposed, submerged and other types of piping for wastewater treatment plant and pump station.

1.02 REFERENCES

- D. ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
- E. AWWA C509 - Resilient Seated Gate Valves.
- F. AWWA C508 - Check Valves.
- G. AWWA C500 - Gate Valves.
- H. ASTM A126 - Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
- I. ASTM A395 - Ductile Iron Castings.
- J. ASTM A48 - Gray Iron Castings.
- K. ASTM A193 - Alloy-Steel and Stainless Steel Bolting Materials for High Temperature Service.
- L. ASTM A194 - Carbon and Alloy Steel Nuts for Bolts for High Pressure and High Temperature Service.

1.03 QUALITY ASSURANCE

M. Manufacturer's Qualifications

1. Valves and appurtenances provided under this Section shall be the standard product in regular production by manufacturers whose products have proven reliable in similar service for at least 5 years.
2. Insofar as possible all valves of the same specific type shall be the product of one manufacturer.

1.04 SUBMITTALS

- N. Submit shop drawings and product data under provisions of Sections 01330 - Submittal Procedures and 15050 - Basic Mechanical Materials and Methods.
- O. Shop Drawings
 - 1. Submit for review detailed drawings, data and descriptive literature on valves and appurtenances, including:
 - a. Dimensions.
 - b. Size.
 - c. Materials of construction.
 - d. Weight.
 - e. Protective coating.
 - f. Actuator weight, where applicable.
 - g. Calculations for actuator torque, where applicable.
 - h. Wiring diagram, where applicable.
 - 2. Submit manufacturer's valve sizing calculations for verification of sizing for air release valves, air and vacuum valves, and surge relief valves.
- P. Manufacturer's Certifications
 - 1. Submit manufacturer's certificates of compliance with ANSI, AWWA and other listed standards.

1.05 OPERATION AND MAINTENANCE DATA

- Q. Submit operation and maintenance data under provisions of Section 01730 - Operations and Maintenance Data.
- R. Submit a detailed operation and maintenance manual for valves and appurtenances provided under this Section.

1.06 DELIVERY, STORAGE AND HANDLING

- S. Have products delivered, stored and protected under provisions of Section 01600 - Material and Equipment.
- T. Store valves and appurtenances off the ground in enclosed shelter.

PART 2 PRODUCTS

2.01 BASIC REQUIREMENTS

- F. Mark and identify valves in conformance with standards, these Specifications or to the manufacturer's standard.
- G. Bolts, studs and nuts to be Type 316 stainless steel.
- H. End connections of valves shall be flanged and drilled to ANSI Class 125 unless otherwise specified.
- I. For handwheel operators on valves 4-inches or larger where located more than 5 feet above the operating floor, provide chain and chainwheel or extension operators. Use chainwheels fabricated of malleable cast iron with chain guides. Provide stainless steel chains of a length to extend to within 5 feet of the operating floor.
- J. To exterior surfaces of valves, apply a shop coating in accordance with Section 09900- Painting.

2.02 CHECK VALVES

- K. Swing check valves 4-inches through 14-inches having a system pressure 30 psi or less, shall be air cushioned with side mount lever and weight. The valve shaft shall extend through both sides of the body with minimum shaft diameters equal to APCO Series 6000. The cushion shall be totally enclosed, swivel mounted at the bottom, and equipped with a micrometer air control valve and air breather filters. Valves shall be similar to APCO Series 6000, or approved equal.
- L. Swing check valves 10-inches through 14-inches having a system pressure greater than 30 psi shall be cushioned with side mount lever and weight. Valves shall be similar to APCO Series 6100, or approved equal.
- M. Swing check valves 16-inches and larger regardless of system operating pressure shall be cushioned with side mount lever and weight. Valves shall be similar to APCO Series 6100, or approved equal.
- N. Check valves of special design utilizing controlled closing of the disc, such as APCO Series 6000B (Bottom-Buffer) and Golden Anderson Fig. #25-DXH or approved equal shall be used when specifically indicated on the Drawings. These valves are special valves used to control the surge pressure in the force main upon multiple pump shutdown during a power failure. Other surge control check valves

utilizing ball or cone valve and power cylinder operator may also be used as approved by the City Engineer.

- O. All check valves shall have 300 series stainless steel hinge shafts, stainless steel body seats and stainless steel resilient seat retainer rings.

2.03 GATE VALVES

- P. Gate valves 4 inches through 14 inches: Solid wedge type, with resilient nitrile rubber (Buna- N) tapered seat. Provide valves complying with AWWA C-509. Acceptable manufacturers include Mueller, M&H, AVK, or approved equal.
- Q. Gate valves 16 inches and larger: Solid wedge type with bronze to bronze seating surface. Provide valves complying with the AWWA C-500. Acceptable manufacturers include Mueller, M&H, AVK, or approved equal.
- R. Supply gate valves rated as 200 psi water working pressure with 400 psi hydrostatic test for structural soundness for 2 inches through 12 inches and 150 psi water working pressure with 300 psi hydrostatic test for structural soundness for sizes 14 inches through 30 inches.
- S. Stems: OS&Y rising type manganese bronze having a minimum tensile strength of 60,000 psi, a minimum yield strength of 20,000 psi for valve sizes through 24 inches, and a minimum tensile strength of 80,000 psi, a minimum yield strength of 32,000 psi for valve sizes 30 inches and larger.
- T. Valve Bodies: Cast iron conforming to ASTM A126 or ASTM A395. Fabricate internal trim parts of 300 series stainless steel.

2.04 ECCENTRIC PLUG VALVES

- U. Eccentric plug valves shall be the non-lubricated eccentric type with cast iron bodies, resilient-faced plugs or replaceable resilient seats in the bodies.
- V. Operators: All valves for 4-inch and larger service shall have worm gear operators, nickel or stainless steel seats, and ANSI 125 psi flanged ends. Operators shall clearly indicate valve position. Operators on valves in submerged or buried service shall be lubricated and sealed to prevent entry of dirt and water into the operator.
- W. Resilient facing shall be suitable for the intended service.

- X. All shaft bearings shall be of stainless steel, furnished with permanently-lubricated bearing surfaces.
- Y. Valves up to and including 20 inches in size shall have an unobstructed port area of no less than 80 percent of the full pipe area, and not less than 70 percent for larger valves.
- Z. Eccentric plug valves shall be manufactured by Clow, De Zurik, Keystone, Val-Matic, or as indicated on the latest City of Houston approved products list.

2.05 SEWAGE AIR RELEASE AND SEWAGE AIR AND VACUUM VALVES

- AA. Air Release and Air and Vacuum Valves: Provide when shown on Drawings.
- BB. Sewage Air Release Valve Design: Single float, single orifice, float operated with a compound lever mechanism to automatically release accumulated air and gases while the system is pressurized and operating.
- CC. Sewage Air and Vacuum Valve Design: Two float where the top float shuts off against the seat due to the lifting force of the bottom float as liquid enters the valve body. Once closed and pressurized the air and vacuum valve will not open to release air.
- DD. Fabricate valve body, cover and baffles of cast iron. Fabricate internal metal parts of stainless steel. Make valve seat of Buna-N nitrile rubber.
- EE. Fit valve with blow off valves, quick disconnect couplings and minimum 6-feet of hose to permit back flushing after installation with dismantling valve.
- FF. Provide air release valves equal to Series 400/450 SARV by APCO or Figure 925 by G.A. Industries.
- GG. Provide air and vacuum valves equal to Series 400 SARV by APCO. Figure 935 as manufactured by GA Industries, or Val-Matic.

2.06 SURGE RELIEF VALVES

- HH. Surge Relief Valves: Provide when shown on Drawings.
- II. Operation: Surge relief valves shall protect piping systems from surges by opening quickly at a set pressure and throttling the flow to maintain line pressure at no more than 5 to 10 percent above the pressure setting indicated. Provide relief pressure adjustment by changing the tension on a spring holding the valve disc on its seat.
- JJ. Valve Closing Control: By oil dashpots. Oil shall be drawn into the dashpot from a reservoir when the valve opens and return through a flow control valve when the relief valve closes.
- KK. Valve Construction: Fabricate valve bodies of cast iron with 300 series stainless steel seat rings. Provide seats that are renewable and resilient. Fabricate hinge shafts of stainless steel and the oil system of bronze. Unless otherwise indicated make the pressure setting 5 percent above normal line pressure.
- LL. Provide surge relief valves that are 90-degree elbow body configuration. Acceptable manufacturers include APCO series 3000, GA Industries 625-D, or approved equal.

PART 3 EXECUTION

3.01 INSTALLATION

- C. Install valves and specialties in accordance with manufacturer's written instructions to permit intended performance.
- D. Support and anchor valves and gates in accordance with Section 15140 - Pipe Hangars, Supports and Restraints.
- E. Eccentric plug valves shall be installed according to the following:
 - 1. Position the valves with the stem in the horizontal direction.
 - 2. In horizontal pipelines, position the valves so that the plug swings upward when opening to permit flushing of solids.
 - 3. Orient the valves to prevent the valve bodies from filling up with solids when closed; however, orient the valves such that the pressure differential forces the plug against the seat in cases where the pressure differential across a closed valve will exceed 25 psi.

3.02 PAINTING

- F. Paint valves and specialties in accordance with applicable AWWA standards and with Section 09901 - Protective Coatings.

3.03 TESTING

- G. Test valves using a hydrostatic pressure test in accordance with AWWA C-600.
- H. Test valves and specialties in place. Correct defects in valves, specialties or connections.

END OF SECTION

Section 15140

PIPE HANGERS, SUPPORTS, AND RESTRAINTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Pipe and equipment hangers, supports, and associated anchors.
- B. Equipment bases and supports.
- C. Sleeves and seals.

1.02 REFERENCES

- A. ANSI/ASME B31.1 - Power Piping, Sections 120 and 121 of ASME B31.1.

1.03 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01330 - Submittal Procedures and Section 15050 - Basic Mechanical Materials and Methods.
- B. As a minimum, submit the following items:
 - 1. A layout of the systems including location on fixed and movable joints.
 - 2. Details of design and fabrication of joints.
 - 3. Details of support brackets, cradles, pads, thrust resisting elements, and other supporting elements.
 - 4. Other pertinent elements necessary for a complete installation.
 - 5. Design calculations for submitted items.

PART 2 PRODUCTS

2.01 HANGERS AND SUPPORTS

- A. For uninsulated lines 2 inches and less and for drainage and downspout lines provide hangers which are adjustable swivel ring type fabricated of malleable iron.
- B. For uninsulated lines larger than 2 inches and for insulated lines, except drainage and downspout piping, provide adjustable clevis type hangers. Size hangers to allow insulation to extend unbroken through the hanger.

- C. Fabricate hangers installed in treatment plants as well as valve vaults, wet wells, and other below grade areas of cadmium plated or stainless steel.

2.02 INSERTS

- A. Make inserts for individual hangers of galvanized malleable iron; include removable nuts held in place by V-type teeth on the insert body and nut. Make continuous-slotted channel inserts of galvanized steel with integral anchors at 6-inch centers. Provide factory finished steel snap-on cover plates on channel inserts between support attachments.

2.03 EXPANSION BOLTS

- A. Use expansion bolts for support which are stainless steel wedge type unless otherwise shown on the drawings. Do not use expansion bolt anchors with lead.

2.04 PIPE SADDLES

- A. Fabricate pipe saddles of hot dip galvanized steel. Saddles for supporting pipe from the floor shall be at least 9 inches in length and as wide as the outside diameter of the pipe. Make a bearing support of 120 degrees. Mount saddles on concrete pads at least 2-inches high.

2.05 FRAMING HANGERS

- A. Use factory fabricated metal framing systems with factory applied primer paint as framing for wall type hangers, trapeze hangers, and tunnel stanchions. Attach supports to structures with inserts for new concrete, with surface mounting methods for masonry or existing concrete, and with welding or clamps for structural steel. Make pipe supports fabricated on the site of structural steel members with raw edges ground and dressed. Rest floor supports in areas with uncovered concrete floors on concrete pads not less than 2 inches high.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Hang piping inside structures supported from the floor or racked adjacent to walls.
- B. Provide inserts cast in concrete walls or slabs for hanging and supporting pipe. If materials are not galvanized or cadmium plated, paint them with primer before installation.
- C. Design fabricate, and install support components in general conformance with Sections 120 and 121 of ANSI B31.1, Power Piping, except as modified in this Section.

3.02 PIPE HANGERS AND SUPPORTS

- A. Support, brace, and anchor interior piping to prevent movement in any direction because of pressure, temperature, flow, or water hammer, except at properly located expansion joints and fittings.

- B. Provide two pipe guides on each side of expansion joints at which pipe movement occurs. The first guide shall be not more than 4-pipe diameters from the joint and the second not more than 14 diameters. Provide additional guides as required to maintain pipe alignment, spaced as required for the pipe size, fluid pressure and temperature inside the pipe, and as recommended by the expansion joint manufacturer or as shown.
- C. Maximum support spacing and hanger rod sizes for metal pipe containing liquids are as follows:

<u>Nominal Pipe Size (Inches)</u>	<u>Support Spacing (Feet)</u>	<u>Rod Diameter in Inches</u>	
		<u>One Rod</u>	<u>Two Rods</u>
1 and Smaller	7	3/8	3/8
1-1/4 and 1-1/2	8	3/8	3/8
2	10	3/8	3/8
2-1/2	11	1/2	3/8
3	12	1/2	3/8
4 and 5	14	1/2	3/8
6 and 8	17	1/2	3/8
10	17	5/8	1/2
12	17	3/4	1/2
14	17	3/4	5/8
16	17	7/8	5/8
18 and 20	17	1	3/4
24	17	1-1/8	7/8

- D. For valves 4 inches and larger in unburied horizontal lines support the valve on both sides when located within 18 inches of the valve or meter. Provide additional supports where required so that piping loads do not place damaging stresses on supports, valves, and equipment. Where necessary, block up pipe at supports to permit installation of insulation.
- E. Support unburied horizontal runs of rubber hose and non-metallic pipe for the entire length by means of troughs consisting of structural steel channels or angles supported at not more than 10-foot intervals.
- F. Support piping not included in the foregoing tabulation as indicated or in accordance with the pipe manufacturer's recommendations, if not indicated.
- G. Anchor buried pressure pipe at each fitting causing a change in direction of 10 degrees or more. Concrete thrust blocks or other restraining devices in any satisfactory combination may be used. Submit the details of the method proposed for use, together with design calculations, to the City Engineer before installation.

END OF SECTION

Drawings may be found at:
<https://purchasing.houstontx.gov/bids/C22837/C22837.Drawing2.pdf>

Document 00612

ONE-YEAR MAINTENANCE BOND

THAT WE, _____, as Principal, hereinafter called Contractor, and the other subscriber hereto, _____, as Surety, do hereby acknowledge ourselves to be held and firmly bound to the City of Houston, a municipal corporation, in the sum of \$_____, for the payment of which sum well and truly to be made to the City of Houston and its successors, the said Contractor and Surety do bind themselves, their heirs, executors, administrators, successors, jointly and severally.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT:

WHEREAS, the Contractor has on or about this day executed a Contract in writing with the City of Houston for _____

_____, all of such work to be done as set out in full in said Contract documents therein referred to and adopted by the City Council, all of which are made a part of this instrument as fully and completely as if set out in full herein.

NOW THEREFORE, if the said Contractor shall comply with the provisions of Paragraph 11.5.1 of the General Conditions, and correct work not in accordance with the Contract documents discovered within the established one-year period, then this obligation shall become null and void, and shall be of no further force and effect; otherwise, the same is to remain in full force and effect.

Notices required or permitted hereunder shall be in writing and shall be deemed delivered when actually received or, if earlier, on the third day following deposit in a United States Postal Service post office or receptacle, with proper postage affixed (certified mail, return receipt requested), addressed to the respective other party at the address prescribed in the Contract documents, or at such other address as the receiving party may hereafter prescribe by written notice to the sending party.

IN WITNESS THEREOF, the said Contractor and Surety have signed and sealed this instrument on the respective dates written below their signatures and have attached current Power of Attorney.

ATTEST, SEAL: (if a corporation)

WITNESS: (if not a corporation)

Name of Contractor

By: _____

Name:

Title:

By: _____

Name:

Title:

Date:

ATTEST/SURETY WITNESS:

(SEAL)

Full Name of Surety

Address of Surety for Notice

Telephone Number of Surety

By: _____

Name:

Title:

Date:

By: _____

Name:

Title: Attorney-in-Fact

Date:

This Ordinance or Contract has been reviewed as to form by the undersigned legal assistant and have been found to meet established Legal Department criteria. The Legal Department has not reviewed the content of these documents.

Legal Assistant

Date

END OF DOCUMENT

PERFORMANCE BOND

THAT WE, _____, as Principal, (the "Contractor"), and the other subscriber hereto, _____, as Surety, do hereby acknowledge ourselves to be held and firmly bound to the City of Houston (the "City"), a municipal corporation, in the penal sum of \$_____ for the payment of which sum, well and truly to be made to the City, its successors and assigns, Contractor and Surety do bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT:

WHEREAS, the Contractor has on or about this day executed a Contract in writing with the City for _____,

_____ , all of such work to be done as set out in full in said Contract documents therein referred to and adopted by the City Council, all of which are made a part of this instrument as fully and completely as if set out in full herein.

NOW THEREFORE, if the said Contractor shall faithfully and strictly perform the Contract in all its terms, provisions, and stipulations in accordance with its true meaning and effect, and in accordance with the Contract documents referred to therein and shall comply strictly with each and every provision of the Contract and with this Bond, then this obligation shall become null and void and shall have no further force and effect; otherwise the same is to remain in full force and effect. Should the Contractor fail to faithfully and strictly perform the Contract in all its terms, including but not limited to the indemnifications thereunder, the Surety shall be liable for all damages, losses, expenses and liabilities that the City may suffer in consequence thereof, as more fully set forth herein.

It is further understood and agreed that the Surety does hereby relieve the City or its representatives from the exercise of any diligence whatever in securing compliance on the part of the Contractor with the terms of the Contract, and the Surety agrees that it shall be bound to take notice of and shall be held to have knowledge of all acts or omissions of the Contractor in all matters pertaining to the Contract. The Surety understands and agrees that the provision in the Contract that the City will retain certain amounts due the Contractor until the expiration of 30 days from the acceptance of the Work is intended for the City's benefit, and the City will have the right to pay or withhold such retained amounts or any other amount owing under the Contract without changing or affecting the liability of the Surety hereon in any degree.

It is further expressly agreed by Surety that the City or its representatives are at liberty at any time, without notice to the Surety, to make any change in the Contract documents and in the Work to be done thereunder, as provided in the Contract, and in the terms and conditions thereof, or to make any change in, addition to, or deduction from the Work to be done thereunder; and that such changes, if made, shall not in any way vitiate the obligation in this Bond and undertaking or release the Surety therefrom.

It is further expressly agreed and understood that the Contractor and Surety will fully indemnify and save harmless the City from any liability, loss, cost, expense, or damage arising out of Contractor's performance of the Contract.

If the City gives Surety notice of Contractor's default, Surety shall, within 45 days, take one of the following actions:

1. Arrange for Contractor, with consent of the City, to perform and complete the Contract; or
2. Take over and assume completion of the Contract itself, through its agents or through independent contractors, and become entitled to the payment of the balance of the Contract Price.

If the Surety fails to take either of the actions set out above, it shall be deemed to have waived its right to perform and complete the Contract and receive payment of the balance of the Contract Price and the City shall be entitled to enforce any remedies available at law, including but not limited to completing the Contract itself and recovering any cost in excess of the Original Contract Price from the Surety.

This Bond and all obligations created hereunder shall be performable in Harris County, Texas. This Bond is given in compliance with the provisions of Chapter 2253, Texas Government Code, as amended, which is incorporated herein by this reference.

Notices required or permitted hereunder shall be in writing and shall be deemed delivered when actually received or, if earlier, on the third day following deposit in a United States Postal Service post office or receptacle, with proper postage affixed (certified mail, return receipt requested), addressed to the respective other Party at the address prescribed in the Contract documents, or at such other address as the receiving party may hereafter prescribe by written notice to the sending party.

EXECUTED in multiple originals this _____ day of _____, 20____.

ATTEST/SEAL: (if a corporation)
WITNESS: (if not corporation)

(Name of Principal)

(Address of Principal)

By: _____
Name:
Title:
Date:

By: _____
Name:
Title:
Date:

ATTEST/SEAL
SURETY WITNESS:

(Name of Surety)

(Address of Surety)

By: _____
Name:
Title:
Date:

By: _____
Name:
Title:
Date:

REVIEWED:

This Bond has been reviewed as to form by the undersigned Paralegal and has been found to meet established Legal Department criteria.

Date

Paralegal

STATUTORY PAYMENT BOND

THAT WE, _____, as Principal, hereinafter called Contractor and the other subscriber hereto, _____, as Surety, do hereby acknowledge ourselves to be held and firmly bound unto the City of Houston, a municipal corporation, in the sum of \$_____ for the payment of which sum, well and truly to be made to the City of Houston, and its successors, the said Contractor and Surety do bind themselves, their heirs, executors, administrators, successors, jointly and severally.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH THAT:

WHEREAS, the Contractor has on or about this day executed a contract in writing with the City of Houston for _____, all of such work to be done as set out in full in said Contract documents therein referred to and adopted by the City Council, all of which are made a part of this instrument as fully and completely as if set out in full herein;

NOW, THEREFORE, if the said Contractor shall pay all claimants supplying labor and materials to him or a Subcontractor in the prosecution of the Work provided for in the Contract, then, this obligation shall be void; otherwise the same is to remain in full force and effect;

PROVIDED HOWEVER, that this Bond is executed pursuant to the provisions of Chapter 2253, Texas Government Code, as amended, and all liabilities on this Bond shall be determined in accordance with the provisions of said Article to the same extent as if it were copied at length herein.

IN WITNESS THEREOF, the said Contractor and Surety have signed and sealed this instrument on the respective dates written below their signatures and have attached current Power of Attorney.

Keegans Bayou Wastewater Treatment Plant Skimmer Replacement
Bid No. S30-C22837

ATTEST, SEAL: (if a corporation)
WITNESS: (if not a corporation)

Name of Contractor

By: _____
Name:
Title:

By: _____
Name:
Title:
Date:

ATTEST/SURETY WITNESS:

(SEAL)

Full Name of Surety

Address of Surety for Notice

Telephone Number of Surety

By: _____
Name:
Title:
Date:

By: _____
Name:
Title: Attorney-in-Fact
Date:

This Ordinance or Contract has been reviewed as to form by the undersigned legal assistant and have been found to meet established Legal Department criteria. The Legal Department has not reviewed the content of these documents.

Legal Assistant

Date

END OF DOCUMENT

Keegans Bayou Wastewater Treatment Plant Skimmer Replacement
Bid No. S30-C22837

General Terms and Conditions may be found at:

General Conditions at the following website: (Doc 00700)
[www.publicworks.cityofhouston.gov/documents/
Specifications/Front%20End%20\(Div00\)/Standard/](http://www.publicworks.cityofhouston.gov/documents/Specifications/Front%20End%20(Div00)/Standard/)

Document 00800

SUPPLEMENTARY CONDITIONS

The following Paragraphs amend and supplement the 2005 edition of General Conditions. Unaltered portions of General Conditions remain in effect.

ARTICLE 3 - THE CONTRACTOR

3.5 *LABOR: Insert the following Paragraph 3.5.3.1.1.*

3.5.3.1.1 Contractor shall make good faith efforts to comply with the City ordinances regarding Minority and Women Business Enterprises (MWBE) and Persons with Disabilities Business Enterprises (PDBE) participation goals which are as follows:

- .1 the MWBE goal is 0 percent, and
- .2 the PDBE goal is 0 percent.

3.28 CONTRACTOR DEBT

3.28.1 IF CONTRACTOR, AT ANY TIME DURING THE TERM OF THIS AGREEMENT, INCURS A DEBT, AS THE WORD IS DEFINED IN SECTION 15-122 OF THE HOUSTON CITY CODE OF ORDINANCES, IT SHALL IMMEDIATELY NOTIFY CITY CONTROLLER IN WRITING. IF CITY CONTROLLER BECOMES AWARE THAT CONTRACTOR HAS INCURRED A DEBT, IT SHALL IMMEDIATELY NOTIFY CONTRACTOR IN WRITING. IF CONTRACTOR DOES NOT PAY THE DEBT WITHIN 30 DAYS OF EITHER SUCH NOTIFICATION, CITY CONTROLLER MAY DEDUCT FUNDS IN AN AMOUNT EQUAL TO THE DEBT FROM ANY PAYMENTS OWED TO CONTRACTOR UNDER THIS AGREEMENT, AND CONTRACTOR WAIVES ANY RECOURSE THEREFORE.

ARTICLE 8 - TIME

8.1 *PROGRESS AND COMPLETION: Delete Paragraph 8.1.6. and replace with the following 8.1.6.*

8.1.6.1 Contractor shall credit the City by Change Order for inspection services for overtime work or work performed on Sundays or Legal Holidays. The amount Contractor credits the City will be **\$50.00 per hour** per inspector for inspection services.

ARTICLE 9 - PAYMENTS AND COMPLETION

- 9.1 *UNIT PRICE WORK: Delete Section 9.1 in its entirety and insert the following Section 9.1.*
- 9.1 References to Unit Prices in individual Specification sections are not applicable to the Contract. Include payment for portions of the Work required by these sections in the Stipulated Price for the Contract.
- 9.12 **LIQUIDATED DAMAGES:** *Insert the following Paragraph 9.12.1.1.*
- 9.12.1.1 The amount of liquidated damages provided in General Conditions Paragraph 9.12.1 payable by Contractor or Surety for each and every day of delay beyond Contract Time, are **\$500.00 per day**.

ARTICLE 11 - INSURANCE AND BONDS

- 11.2 *INSURANCE TO BE PROVIDED BY CONTRACTOR: Delete Paragraph 11.2.8. and replace with the following 11.2.8.*
- 11.2.1.4 Contractor shall provide Owners and Contractor's Protective Liability Insurance only if the contractor's bid price is equal to or greater than \$100,000.00.
- 11.2.8 *Endorsement of Primary Insurance:* Each policy except Workers' Compensation Insurance must contain an endorsement that the policy is primary insurance to any other insurance available to additional insured with respect to claims arising under the Contract.

END OF DOCUMENT