



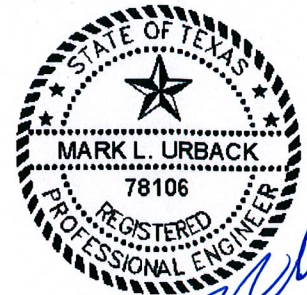
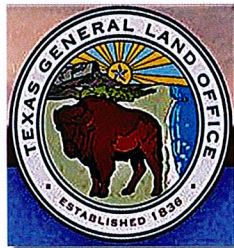
COUNTY OF GALVESTON

SPECIFICATIONS AND CONTRACT DOCUMENTS

BOLIVAR PENINSULA SPECIAL UTILITY DISTRICT
THREE GENERATOR PROJECTS

GLO CONTRACT NO. 13-465-000-7974

PROJECT NO. P21463-1A



Mark L. Urback
6-8-15

 **CobbFendley**
TBPE Firm Registration No. 274 | TBPLS Firm Registration No. 100467

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INVITATION TO BID
GALVESTON COUNTY
BOLIVAR PENINSULA SUD THREE GENERATOR PROJECTS
GALVESTON COUNTY, TEXAS

The County of Galveston solicits bids on the following project funded through the Texas General Land Office, contract number 13-465-000-7974, Hurricane Ike disaster recovery program funds.

Contract to furnish labor, equipment, materials and incidentals as required for:

Bid #B151027, Galveston County Bolivar Peninsula SUD Three Generator Projects

Davis-Bacon rates will apply under this disaster recovery program.

Sealed bids in **sets of seven, (one (1) original and six (6) copies)** will be received in the office of the County Purchasing Agent, until **2:00 PM** on **09/03/2015** and opened immediately in that office in the presence of the County Auditor and the Purchasing Agent. **Bidders are specifically advised that any bid delivered after this time will be returned unopened.**

Submitted bids will be publicly opened on **09/03/2015 at 2:00 PM** in the Purchasing Agent's office located in the Galveston County Courthouse, 722 Moody Avenue (21st St), Fifth (5th) Floor, Galveston, Texas 77550, (409) 770-5372 www.co.galveston.tx.us/Purchasing/BidListing .

All bids must be marked on the outside of the envelope:

Bid #B151027, Galveston County Bolivar Peninsula SUD Three Generator Projects

A non-mandatory pre-bid conference will be held on 08/26/2015 at 10:30 a.m. in the Galveston County Purchasing Department located in the Galveston County Courthouse, 722 Moody Avenue (21st St), Fifth (5th) Floor, Galveston, Texas 77550.

Bidder's name and return address should be on the outside of the envelope.

Plans and specifications may be obtained at www.civcastusa.com without charge. Bids will be completed on the forms and proposal sheets provided.

Each bid must be accompanied by a Cashier's Check or acceptable Bidder's Bond in the amount of 5% of bid as a guarantee that, if awarded the contract, within thirty (30) days from the date of bid opening, the bidder will enter into a contract and execute Performance and Payment Bonds statutorily required for public works projects. The county intends to award a contract within sixty (60) days.

Commissioners' Court reserves the right to waive any informality and to reject any and all bids, and to accept bid or bids which, in its opinion, is most advantageous to the County.

Rufus G. Crowder, CPPO CPPB
Purchasing Agent
Galveston County

SECTION II

General Contract Conditions

Bid Proposal

Contract Award

GENERAL CONTRACT CONDITIONS

1. Contract and Contract Documents

- (a) The project to be constructed pursuant to this contract will be financed with assistance from the CDBG and is subject to all applicable Federal and State laws and regulations.
- (b) The Plans, Specifications and Addenda, hereinafter enumerated in Paragraph 1 of the Supplemental General Conditions shall form part of this contract and the provisions thereof shall be as binding upon the parties hereto as if they were herein fully set forth.

2. Definitions

Whenever used in any of the contract Documents, the following meanings shall be given to the terms here in defined:

- (a) The term "Contract" means the Contract executed between the Galveston County, hereinafter called the Owner and (Name of Construction Co.), hereinafter called Contractor, of which these GENERAL CONDITIONS, form a part.
- (b) The term "Project Area" means the area within which are the specified Contract limits of the Improvements contemplated to be constructed in whole or in part under this contract.
- (c) The term "Engineer" means Cobb, Fendley & Associates, Inc., Engineer in charge, serving the Owner with architectural or engineering services, his successor, or any other person or persons, employed by the Owner for the purpose of directing or having in charge the work embraced in this Contract.
- (d) The term "Contract Documents" means and shall include the following: Executed Contract, Addenda (if any), Invitation for Bids, Instructions to Bidders, Signed Copy of Bid, General Conditions, Special Conditions, Technical Specifications, and Drawings (as listed in the Schedule of Drawings).

3. Supervision By Contractor

- (a) Except where the Contractor is an individual and gives his personal supervision to the work, the Contractor shall provide a competent superintendent, satisfactory to the Local Public Agency and the Engineer, on the work at all times during working hours with full authority to act for him. The Contractor shall also provide an adequate staff for the proper coordination and expediting of his work.
- (b) The Contractor shall lay out his own work and he shall be responsible for all work executed by him under the Contract. He shall verify all figures and elevations before proceeding with the work and will be held responsible for any error resulting from his failure to do so.

4. Subcontracts

- (a) The Contractor shall not execute an agreement with any subcontractor or permit any subcontractor to perform any work included in this contract until he has verified the subcontractor as eligible to participate in federally funded contracts.
- (b) No proposed subcontractor shall be disapproved by the city/county except for cause.
- (c) The Contractor shall be as fully responsible to the city/county for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them.
- (d) The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work and required compliance by each subcontractor with the applicable provisions of the Contract.
- (e) Nothing contained in the Contract shall create any contractual relation between any subcontractor and the Owner.

5. Fitting and Coordination of Work

The Contractor shall be responsible for the proper fitting of all work and for the coordination of the operations of all trades, subcontractors, or material suppliers engaged upon this Contract.

6. Payments to Contractor

a. Partial Payments

- 1) The Contractor shall prepare his requisition for partial payment as of the last day of the month and submit it, with the required number of copies, to the Engineer for his approval. The amount of the payment due the Contractor shall be determined by adding to the total value of work completed to date, the value of materials properly stored on the site and deducting (1) five percent (5%) of the total amount, to be retained until final payment and (2) the amount of all previous payments. The total value of work completed to date shall be based on the estimated quantities of work completed and on the unit prices contained in the agreement. The value of materials properly stored on the site shall be based upon the estimated quantities of such materials and the invoice prices. Copies of all invoices shall be available for inspection of the Engineer.
- 2) Monthly or partial payments made by the Owner to the Contractor are moneys advanced for the purpose of assisting the contractor to expedite the work of construction. The Contractor shall be responsible for the care and protection of all materials and work upon which payments have been made until final acceptance of such work and materials by the Owner. Such payments shall not constitute a waiver of the right of the Owner to require the fulfillment of all terms of the Contract and the delivery of all improvements embraced in this Contract complete and satisfactory to the Owner in all details.

b. Final Payment

- 1) After final inspection and acceptance by the Owner of all work under the Contract, the Contractor shall prepare his requisition for final payment which shall be based upon the careful inspection of each item of work at the applicable unit prices stipulated in the Agreement. The total amount of the final payment due the Contractor under this contract shall be the amount computed as described above less all previous payments.

- 2) The Owner before paying the final estimate, shall require the Contractor to furnish releases or receipts from all subcontractors having performed any work and all persons having supplied materials, equipment (installed on the Project) and services to the Contractor, if the Owner deems it necessary in order to protect its interest. The Owner may, if it deems such action advisable, make payment in part or in full to the Contractor without requiring the furnishing of such releases or receipts and any payments made shall in no way impair the obligations of any surety or sureties furnished under this Contract.
- 3) Any amount due the Owner under Liquidated Damages, shall be deducted from the final payment due the contractor.

c. Payments Subject to Submission of Certificates

Each payment to the Contractor by the Owner shall be made subject to submission by the Contractor of all written certifications required of him and his subcontractors.

d. Withholding Payments

The Owner may withhold from any payment due the Contractor whatever is deemed necessary to protect the Owner, and if so elects, may also withhold any amounts due from the Contractor to any subcontractors or material dealers, for work performed or material furnished by them. The foregoing provisions shall be construed solely for the benefit of the Owner and will not require the Owner to determine or adjust any claims or disputes between the Contractor and his subcontractors or material dealers, or to withhold any moneys for their protection unless the Owner elects to do so. The failure or refusal of the Owner to withhold any moneys from the Contractor shall in no way impair the obligations of any surety or sureties under any bond or bonds furnished under this Contract.

7. Estimated Quantities

This Contract, including the specifications, plans and estimates, is intended to show clearly all the work to be done and material to be furnished hereunder. The estimated quantities of the various classes of work to be done and material to be furnished under this contract are approximate and are to be used as a basis for estimating the probable cost of the work and for comparing the proposals offered for the work. It is understood and agreed that the actual amount of work to be done and material to be furnished under this contract may differ somewhat from these estimates, and that the basis for payment under this contract shall be the plan quantity or actual amount of such work done whichever is specified. It is further understood that the County does not guarantee any minimum amount of work under this Contract.

Contractor agrees that it will make no claim for damages, anticipated profits or otherwise on account of any differences which may be found between the quantities of work actually done, the material actually furnished under this Contract and the estimated quantities contemplated and contained in the proposals.

8. Changes in the Work

- (a) The Owner may make changes in the scope of work required to be performed by the Contractor under the Contract without relieving or releasing the Contractor from any of his obligations under the Contract or any guarantee given by him pursuant to the Contract provisions, and without affecting the validity of the guaranty bonds, and without relieving or releasing the surety or sureties of said bonds. All such work shall be executed under the terms of the original Contract unless it is

expressly provided otherwise. Additionally, all such change orders must be approved by the CDBG staff prior to execution of same.

- (b) Except for the purpose of affording protection against any emergency endangering health, life, limb or property, the Contractor shall make no change in the materials used or in the specified manner of constructing and/or installing the improvements or supply additional labor, services or materials beyond that actually required for the execution of the Contract, unless in pursuance of a written order from the Owner authorizing the Contractor to proceed with the change. No claim for an adjustment of the Contract Price will be valid unless so ordered.
- (c) It is agreed that Contractor shall perform all Extra Work under the direction of the Owner when presented with a Written Work Order signed by the Owner: subject, however, to the right of Contractor to require a written confirmation of such Extra Work Order by the County Commissioners' Court. It is also agreed that the compensation to be paid Contractor for performing said Extra Work shall be determined by one or more of the following methods:

Method (a) - By agreed unit prices; or

Method (b) - By agreed lump sum: or

Method (c) - If Neither Method (a) nor Method (b) can be agreed upon before the Extra Work is commenced, then Contractor shall be paid the "Actual field cost" of the work plus fifteen (15) percent.

In the event said Extra Work be performed and paid for under Method (c), then the provisions of this paragraph shall apply and the "actual field cost" is hereby defined to include the cost of all workmen, such as foremen, timekeepers, merchants, and laborers, and materials, supplies, teams, trucks, rentals on machinery and equipment for time actually employed or used on such Extra Work plus actual transportation charges necessarily incurred, if the kind of equipment or machinery is not already on the job, together with all power, fuel, lubricants, water and similar operating expenses, also all necessary incidental expenses incurred directly on account of such Extra Work including Social Security, Old Age Benefits and other payroll taxes, and a ratable proportion of premiums on Construction and Maintenance Bonds, Public Liability and Property Damage and Workmen's Compensation, and all other insurance as may be required by any law or ordinance, or directed by the Owner or by him agreed. The Owner may direct the form in which accounts of the "actual field cost" shall be kept and may also specify in writing, before the work commences, the method of doing the work and the type and kind of machinery and equipment to be used, otherwise these matters shall be determined by Contractor. Unless otherwise agreed upon, the prices for the use of machinery and equipment shall be determined by using the one hundred (100) percent of the actual hourly or daily rate (for the time used plus time in moving to and from Job) of the latest schedule of Equipment Ownership Expense adopted by the Association General Contractors of America. Where practicable the terms and prices for the use of Machinery and Equipment shall be incorporated in the Written Extra Work Order. The fifteen (15) percent of the "Actual Field Cost" to be paid Contractor shall cover and compensate him for his profit, overhead, general superintendence and field office expense, and all other elements of cost and expense not embraced within the "actual field cost" as herein defined, save that where the Contractor's Camp or Field Office must be maintained primarily on account of such extra work, then the cost to maintain and operate same shall be included in the "actual field cost".

No claim for extra work of any kind will be allowed unless ordered in writing by the Owner. In case any orders or instructions, either oral or written appear to Contractor to involve extra work for which he should receive compensation, it shall make written request to the Program Administrator for written order authorizing Extra Work. Should a difference of opinion arise as to what does or does not constitute extra work, or as to the payment therefor, and the Owner insists upon its performance, Contractor shall proceed with the work after making written order and shall keep an

accurate account of the "actual field cost" thereof, as provided under Method (c) and by this action Contractor will thereby preserve the right to submit the matter of payment to litigation.

(d) Each change order shall include in its final form:

- 1) A detailed description of the change in the work.
- 2) The Contractor's proposal (if any) or a confirmed copy thereof.
- 3) A definite statement as to the resulting change in the contract price and/or time.
- 4) The statement that all work involved in the change shall be performed in accordance with contract requirements except as modified by the change order.
- 5) The procedures as outlined in this Section for a unit price contract also apply in any lump sum contract.

9. Claims for Extra Cost

- (a) If the Contractor claims that any instructions by Drawings or otherwise involve extra cost or extension of time, he shall, within ten days after the receipt of such instructions, and in any event before proceeding to execute the work, submit his protest thereto in writing to the Owner, stating clearly and in detail the basis of his objections. No such claim will be considered unless so made.
- (b) Claims for additional compensation for extra work, due to alleged errors in ground elevations, contour lines, or bench marks, will not be recognized unless accompanied by certified survey data, made prior to the time the original ground was disturbed, clearly showing that errors exist which resulted, or would result, in handling more material, or performing more work, than would be reasonably estimated from the Drawings and maps issued.
- (c) Any discrepancies which may be discovered between actual conditions and those represented by the Drawings and maps shall be reported at once to the Owner and work shall not proceed except at the Contractor's risk, until written instructions have been received by him from the Owner.
- (d) If, on the basis of the available evidence, the Owner determines that an adjustment of the Contract Price and/or time is justifiable, a change order shall be executed.

10. Liquidated Damages

If the work is not completed within the time stipulated in the applicable bid for Lump Sum or Unit Price Contract provided, the Contractor shall pay to the Owner as fixed, agreed, and liquidated damages (it being impossible to determine the actual damages occasioned by the delay) the amount of Enter Sum dollars (\$XXX.XX) or each calendar day of delay, until the work is completed. The Contractor and his sureties shall be liable to the Owner for the amount thereof.

11. Disputes

- (a) All disputes arising under this Contract or its interpretation except those disputes covered by FEDERAL LABOR STANDARDS PROVISIONS whether involving law or fact or both, or extra work, and all claims for alleged breach of contract shall, within ten (10) days of commencement of the dispute, be presented by the Contractor to the Owner for decision. Any claim not presented within the time limit specified in this paragraph shall be deemed to have been waived, except that if the claim is of a continuing character and notice of the claim is not given within ten (10) days of its

commencement, the claim will be considered only for a period commencing ten (10) days prior to the receipt of the Owner.

- (b) The Contractor shall submit in detail his claim and his proof thereof.
- (c) If the Contractor does not agree with any decision of the Owner, he shall in no case allow the dispute to delay the work but shall notify the Owner promptly that he is proceeding with the work under protest.

12. Technical Specifications and Drawings

Anything mentioned in the Technical Specifications and not shown on the Drawings or vice versa, shall be of like effect as if shown on or mentioned in both. In case of difference between Drawings and Technical Specifications, the Technical Specifications shall govern. In case of any discrepancy in Drawings, or Technical Specifications, the matter shall be immediately submitted to the Owner, without whose decision, said discrepancy shall not be adjusted by the Contractor, save only at his own risk and expense.

13. Shop Drawings

- (a) All required shop drawings, machinery details, layout drawings, etc. shall be submitted to the Engineer in 6 copies for approval sufficiently in advance of requirements to afford ample time for checking, including time for correcting, resubmitting and rechecking if necessary. The Contractor may proceed, only at his own risk, with manufacture or installation of any equipment or work covered by said shop drawings, etc. until they are approved and no claim, by the Contractor, for extension of the contract time shall be granted by reason of his failure in this respect.
- (b) Any drawings submitted without the Contractor's stamp of approval will not be considered and will be returned to him for proper resubmission. If any drawings show variations from the requirements of the Contract because of standard shop practice or other reason, the Contractor shall make specific mention of such variation in his letter of transmittal in order that, if acceptable, suitable action may be taken for proper adjustment of contract price and/or time, otherwise the Contractor will not be relieved of the responsibility for executing the work in accordance with the Contract even though the drawings have been approved.
- (c) If a shop drawing is in accordance with the contract or involves only a minor adjustment in the interest of the Owner not involving a change in contract price or time; the engineer may approve the drawing. The approval shall not relieve the Contractor from his responsibility for adherence to the contract or for any error in the drawing.

14. Requests for Supplementary Information

It shall be the responsibility of the Contractor to make timely requests of the Owner for any additional information not already in his possession which should be furnished by the Owner under the terms of this Contract, and which he will require in the planning and execution of the work. Such requests may be submitted from time to time as the need approaches, but each shall be filed in ample time to permit appropriate action to be taken by all parties involved so as to avoid delay. Each request shall be in writing, and list the various items and the latest date by which each will be required by the Contractor. The first list shall be submitted within two weeks after Contract award and shall be as complete as possible at that time. The Contractor shall, if requested, furnish promptly any assistance and information the Engineer may require in responding to these requests of the Contractor. The Contractor shall be fully

responsible for any delay in his work or to others arising from his failure to comply fully with the provision of this section.

15. Materials and Workmanship

- (a) Unless otherwise specifically provided for in the technical specifications, all workmanship, equipment, materials and articles incorporated in the work shall be new and the best grade of the respective kinds for the purpose. Where equipment, materials, articles or workmanship are referred to in the technical specifications as "equal to" any particular standard, the Engineer shall decide the question of equality.
- (b) The Contractor shall furnish to the Owner for approval the manufacturer's detailed specifications for all machinery, mechanical and other special equipment, which he contemplates installing together with full information as to type, performance characteristics, and all other pertinent information as required, and shall likewise submit for approval full information concerning all other materials or articles which he proposes to incorporate.
- (c) Machinery, mechanical and other equipment, materials or articles installed or used without such prior approval shall be at the risk of subsequent rejection.
- (d) Materials specified by reference to the number or symbol of a specific standard, shall comply with requirements in the latest revision thereof and any amendment or supplement thereto in effect on the date of the Invitation for Bids, except as limited to type, class or grade, or modified in the technical specifications shall have full force and effect as though printed therein.
- (e) The Owner may require the Contractor to dismiss from the work such employee or employees as the Owner or the Engineer may deem incompetent, or careless, or insubordinate.

16. Samples, Certificates and Tests

- (a) The Contractor shall submit all material or equipment samples, certificates, affidavits, etc., as called for in the contract documents or required by the Engineer, promptly after award of the contract and acceptance of the Contractor's bond. No such material or equipment shall be manufactured or delivered to the site, except at the Contractor's own risk, until the required samples or certificates have been approved in writing by the Engineer. Any delay in the work caused by late or improper submission of samples or certificates for approval shall not be considered just cause for an extension of the contract time.
- (b) Each sample submitted by the Contractor shall carry a label giving the name of the Contractor, the project for which it is intended, and the name of the producer. The accompanying certificate or letter from the Contractor shall state that the sample complies with contract requirements, shall give the name and brand of the product, its place of origin, the name and address of the producer and all specifications or other detailed information which will assist the Engineer in making a prompt decision regarding the acceptability of the sample. It shall also include the statement that all materials or equipment furnished for use in the project will comply with the samples and/or certified statements.
- (c) Approval of any materials shall be general only and shall not constitute a waiver of the Owner's right to demand full compliance with Contract requirements. After actual deliveries, the Engineer will have such check tests made as he deems necessary in each instance and may reject materials and equipment and accessories for cause, even though such materials and articles have been given general approval. If materials, equipment or accessories which fail to meet check tests have been incorporated in the work, the Engineer will have the right to cause their removal and

replacement by proper materials or to demand and secure such reparation by the Contractor as is equitable.

- (d) Except as otherwise specifically stated in the Contract, the costs of sampling and testing will be divided as follows:
- 1) The Contractor shall furnish without extra cost, including packing and delivery charges, all samples required for testing purposes, except those samples taken on the project by the Engineer;
 - 2) The Contractor shall assume all costs of re-testing materials which fail to meet contract requirements;
 - 3) The Contractor shall assume all costs of testing materials offered in substitution for those found deficient;
 - 4) The Owner will pay all other expenses.

17. Permits and Codes

- (a) The Contractor shall give all notices required by and comply with all applicable laws, ordinances, and codes of the Local Government. All construction work and/or utility installations shall comply with all applicable ordinances, and codes including all written waivers. Before installing any work, the Contractor shall examine the drawings and technical specifications for compliance with applicable ordinances and codes and shall immediately report any discrepancy to the Owner. Where the requirements of the drawings and technical specifications fail to comply with such applicable ordinances or codes, the Owner will adjust the Contract by Change Order to conform to such ordinances or codes (unless waivers in writing covering the difference have been granted by the governing body or department) and make appropriate adjustment in the Contract Price or stipulated unit prices.
- (b) Should the Contractor fail to observe the foregoing provisions and proceed with the construction and/or install any utility at variance with any applicable ordinance or code, including any written waivers (notwithstanding the fact that such installation is in compliance with the drawings and technical specifications), the Contractor shall remove such work without cost to the Owner.
- (c) The Contractor shall at his own expense, secure and pay for all permits for street pavement, sidewalks, shed, removal of abandoned water taps, sealing of house connection drains, pavement cuts, buildings, electrical, plumbing, water, gas and sewer permits required by the local regulatory body or any of its agencies.
- (d) The Contractor shall comply with applicable local laws and ordinances governing the disposal of surplus excavation, materials, debris and rubbish on or off the Project Area and commit no trespass on any public or private property in any operation due to or connected with the Improvements contained in this Contract.
- (e) The Contractor will be required to make arrangements for and pay the water, electrical power, or any other utilities required during construction.
- (f) During construction of this project, the Contractor shall use every means possible to control the amount of dust created by construction. Prior to the close of a day's work, the Contractor, if directed by the Owner, shall moisten the bank and surrounding area to prevent a dusty condition.

18. Care of Work

- (a) The Contractor shall be responsible for all damages to person or property that occur as a result of his fault or negligence in connection with the prosecution of the work and shall be responsible for the proper care and protection of all materials delivered and work performed until completion and final acceptance.
- (b) The Contractor shall provide sufficient competent watchmen, both day and night, including Saturdays, Sundays, and holidays, from the time the work is commenced until final completion and acceptance.
- (c) In an emergency affecting the safety of life, limb or property, including adjoining property, the Contractor, without special instructions or authorization from the Owner is authorized to act at his discretion to prevent such threatened loss or injury, and he shall so act. He shall likewise act if instructed to do so by the Owner.
- (d) The Contractor shall avoid damage as a result of his operations to existing sidewalks, streets, curbs, pavements, utilities (except those which are to be replaced or removed), adjoining property, etc., and he shall at his own expense completely repair any damage thereto caused by his operations.
- (e) The Contractor shall shore up, brace, underpin, secure, and protect as maybe necessary, all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be in any way affected by the excavations or other operations connected with the construction of the improvements included in this Contract. The Contractor shall be responsible for the giving of any and all required notices to any adjoining or adjacent property owner or other party before the commencement of any work. The Contractor shall indemnify and save harmless the Owner from any damages on account of settlements or the loss of lateral support of adjoining property and from all loss or expense and all damages for which the Owner may become liable in consequence of such injury or damage to adjoining and adjacent structures and their premises.

19. Accident Prevention

- (a) No laborer or mechanic employed in the performance of this Contract shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health or safety as determined under construction safety and health standards promulgated by the Secretary of Labor.
- (b) The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages to persons or property, either on or off the site, which occur as a result of his prosecution of the work.
- (c) The Contractor shall maintain an accurate record of all cases of death, occupational disease, or injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment on work under the Contract. The Contractor shall promptly furnish the Owner with reports concerning these matters.
- (d) The Contractor shall indemnify and save harmless the Owner from any claims for damages resulting from property damage, personal injury and/or death suffered or alleged to have been suffered by any person as a result of any work conducted under this contract.
- (e) The Contractor shall provide trench safety for all excavations more than five feet deep prior to excavation. All OSHA Standards for trench safety must be adhered to by the Contractor.

- (f) The contractor shall at all times conduct his work in such a manner as to insure the least possible inconvenience to vehicular and pedestrian traffic. At the close of the work each day, all streets where possible in the opinion of the Owner, shall be opened to the public in order that persons living in the area may have access to their homes or businesses by the use of the streets. Barricades, warning signs, and necessary lighting shall be provided to the satisfaction of the Owner at the expense of the Contractor.

20. Sanitary Facilities

The Contractor shall furnish, install and maintain ample sanitary facilities for the workmen. As the needs arise, a sufficient number of enclosed temporary toilets shall be conveniently placed as required. Drinking water shall be provided from an approved source, so piped or transported as to keep it safe and fresh and served from single service containers or satisfactory types of sanitary drinking stands or fountains. All such facilities and services shall be furnished in strict accordance with existing and governing health regulations.

21. Use of Premises

- (a) The Contractor shall confine his equipment, storage of materials, and construction operations to the contract limits as shown on the drawings and as prescribed by ordinances or permits, or as may be desired by the Owner, and shall not unreasonably encumber the site or public rights of way with his materials and construction equipment.
- (b) The Contractor shall comply with all reasonable instructions of the Owner and all existing state and local regulations regarding signs, advertising, traffic, fires, explosives, danger signals, and barricades.

22. Removal of Debris, Cleaning, Etc.

The Contractor shall, periodically or as directed during the progress of the work, remove and legally dispose of all surplus excavated material and debris, and keep the Project Area and public rights of way reasonably clear. Upon completion of the work, he shall remove all temporary construction facilities, debris and unused materials provided for work, and put the whole site of the work and public rights of way in a neat and clean condition.

23. Inspection

- (a) All materials and workmanship shall be subject to inspection, examination, or test by the Owner and Engineer at any and all times during manufacture or construction and at any and all places where such manufacture or construction occurs. The Owner shall have the right to reject defective material and workmanship or require its correction. Unacceptable workmanship shall be satisfactorily corrected. Rejected material shall be promptly segregated and removed from the Project Area and replaced with material of specified quality without charge. If the Contractor fails to proceed at once with the correction of rejected workmanship or defective material, the Owner may by contract or otherwise have the defects remedied or rejected materials removed from the Project Area and charge the cost of the same against any Monies which may be due the Contractor, without prejudice to any other rights or remedies of the Owner.
- (b) The Contractor shall furnish promptly all materials reasonably necessary for any tests which may be required. All tests by the Owner will be performed in such manner as not to delay the work unnecessarily and will be made in accordance with the provisions of the technical specifications.

- (c) The Contractor shall notify the Owner sufficiently in advance of back filling or concealing any facilities to permit proper inspection. If any facilities are concealed without approval or consent of the Owner, the Contractor shall uncover for inspection and recover such facilities at his own expense, when so requested by the Owner.
- (d) Should it be considered necessary or advisable by the Owner at any time before final acceptance of the entire work to make an examination of work already completed by uncovering the same, the Contractor shall on request promptly furnish all necessary facilities, labor, and material. If such work is found to be defective in any important or essential respect, due to fault of the Contractor or his subcontractors, the Contractor shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the actual cost of labor and material necessarily involved in the examination and replacement, shall be allowed the Contractor and he shall, in addition, if completion of the work of the entire Contract has been delayed thereby, be granted a suitable extension of time on account of the additional work involved.
- (e) Inspection of materials and appurtenances to be incorporated in the improvements included in this Contract may be made at the place of production, manufacture or shipment, whenever the quantity justifies it, and such inspection and acceptance, unless otherwise stated in the technical specifications, shall be final, except as regards (1) latent defects, (2) departures from specific requirements of the Contract, (3) damage or loss in transit, or (4) fraud or such gross mistakes as amount to fraud. Subject to the requirements contained in the preceding sentence, the inspection of materials as a whole or in part will be made at the Project Site.
- (f) Neither inspection, testing, approval nor acceptance of the work in whole or in part, by the Owner or its agents shall relieve the Contractor or his sureties of full responsibility for materials furnished or work performed not in strict accordance with the Contract.

24. Review by Owner

The Owner and its authorized representatives and agents shall have access to and be permitted to observe and review all work, materials, equipment, payrolls, personnel records, employment conditions, material invoices, and other relevant data and records pertaining to this Contract, provided, however that all instructions and approval with respect to the work will be given to the Contractor only by the Owner through its authorized representatives or agents.

25. Final Inspection

When the Improvements included in this Contract are substantially completed, the Contractor shall notify the Owner in writing that the work will be ready for final inspection on a definite date which shall be stated in the notice. The Owner will make the arrangements necessary to have final inspection commenced on the date stated in the notice, or as soon thereafter as is practicable.

26. Deduction for Uncorrected Work

If the Owner deems it not expedient to require the Contractor to correct work not done in accordance with the Contract Documents, an equitable deduction from the Contract Price will be made by agreement between the Contractor and the Owner and subject to settlement, in case of dispute, as herein provided.

27. Warranty of Title

No material, supplies, or equipment to be installed or furnished under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale, lease-purchase or other agreement by which

an interest is retained by the seller or supplier. The Contractor shall warrant good title to all materials, supplies, and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvements and appurtenances constructed or placed by him to the Owner free from any claims, liens, or charges. Neither the Contractor nor any person, firm, or corporation furnishing any material or labor for any work covered by this Contract shall have any right to a lien upon any improvement or appurtenance. Nothing contained in this paragraph, however, shall defeat or impair the right of persons furnishing materials or labor to recover under any law permitting such persons to look to funds due the Contractor in the hands of the Owner. The provisions of this paragraph shall be inserted in all subcontracts and material contracts and notice of its provisions shall be given to all persons furnishing materials for the work when no formal contract is entered into for such materials.

28. Warranty of Workmanship and Materials

Neither the final certificate of payment nor any provision in the Contract nor partial or entire use of the improvements included in this Contract by the Owner or the public shall constitute an acceptance of work

not done in accordance with the Contract or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall promptly remedy any defects in the work and pay for any damage to other work resulting therefrom which shall appear within a period of 12 months from the date of final acceptance of the work.

29. Compliance with Air and Water Acts

(a) In compliance with the Clean Air Act, as amended, 41 U.S.C. Sec. 7401 et. seq., and the regulations of the Environmental Protection Agency with respect thereto, the Contractor agrees that:

- 1) Any facility to be utilized in the performance of this contract or any subcontract shall not be a facility listed on the EPA List of Violating Facilities pursuant to 40 CFR 15.20.
- 2) He will comply with all requirements of Section 114 of the Clean Air Act, as amended.
- 3) Materials utilized in the project shall be free of any hazardous materials, except as may be specifically provided for in the specifications.

(b) If the Contractor encounters existing material on sites owned or controlled by the Owner or in material sources that are suspected by visual observation or smell to contain hazardous materials, the Contractor shall immediately notify the Engineer and the Owner. The Owner will be responsible for testing for and removal or disposition of hazardous materials on sites owned or controlled by the Owner. The Owner may suspend the work, wholly or in part during the testing, removal or disposition of hazardous materials on sites owned or controlled by the Owner.

30. Section 109 of the Housing and Community Development Act of 1974

No person in the United States shall on the ground of race, color, national origin, or sex be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity funded in whole or in part with funds made available under this title.

31. The Provision of Local Training, Employment, and Business Opportunities

(a) To the greatest extent feasible opportunities for training and employment be given lower income residents of the project area and contracts for work in connection with the project be awarded to business concerns which are located in, or owned in substantial part by persons residing in the area of the project.

(b) The Contractor will include this clause in every subcontract for work in connection with the project.

32. Non Segregated Facilities

The Contractor certifies that he does not and will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not and will not permit his employees any segregated facilities at any of his establishments, or permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. As used in this paragraph the term "segregated facilities" means any waiting rooms, work areas, rest rooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise.

33. Job Offices

(a) The Contractor and his subcontractors may maintain such office and storage facilities on the site as are necessary for the proper conduct of the work. These shall be located so as to cause no interference to any work to be performed on the site. The Owner shall be consulted with regard to locations.

(b) Upon completion of the improvements, or as directed by the Owner, the Contractors shall remove all such temporary structures and facilities from the site, and leave the site of the work in the condition required by the Contract.

34. Partial Use of Site Improvements

The Owner may give notice to the Contractor and place in use those sections of the improvements which have been completed, inspected and can be accepted as complying with the technical specifications and if in its opinion, each such section is reasonably safe, fit, and convenient for the use and accommodation for which it was intended, provided:

(a) The use of such sections of the Improvements shall in no way impede the completion of the remainder of the work by the Contractor.

(b) The Contractor shall not be responsible for any damages or maintenance costs due directly to the use of such sections.

(c) The period of guarantee stipulated in the Section 29 hereof shall not begin to run until the date of the final acceptance of all work which the Contractor is required to construct under this Contract.

BID FORM

**BOLIVAR PENINSULA SPECIAL UTILITY DISTRICT
THREE GENERATOR PROJECTS**

COUNTY OF GALVESTON, TEXAS

THE FIRM OF: _____

Address: _____

FEIN (TAX ID): _____

The following shall be returned with your proposal. Failure to do so may be ample cause for rejection of proposal as non responsive. It is the responsibility of the Proposer to ensure that Proposer has received all addenda.

Items:	Confirmed (X):
1. References (if required)	_____
2. Addenda, if any	#1_____ #2_____ #3_____ #4_____
3. One (1) original and six (6) copies of submittal	_____
4. Proposal Form	_____
5. Vendor Qualification packet	_____
6. Debarment Certification	_____
7. Payment Terms:	_____net 30 _____Other
8. Anti-Collusion Affidavit	_____

Person to contact regarding this proposal: _____

Title: _____ Phone: _____ Fax: _____

E-mail address: _____

Name of person authorized to bind the Firm: _____

Signature: _____ Date: _____

Title: _____ Phone: _____ Fax: _____

E-mail address: _____

BIDDER MUST SIGN HERE BELOW:

By signing here, the firm does hereby attest that it has fully read the instructions, conditions and general and special provisions and understands them.

Firm Name: _____

Authorized Signature: _____

Name & Title Printed: _____

Telephone No.: _____ FAX No.: _____

E-Mail Address: _____

Date: _____

EXCEPTIONS (if no exceptions are taken, state NONE):

The remainder of this page intentionally left blank

BID FORM

**BOLIVAR PENINSULA SPECIAL UTILITY DISTRICT
THREE GENERATOR PROJECTS**

GALVESTON COUNTY, TEXAS

Bidder shall use this form to provide the information for notice.

1. Contact information for notice:

Name: _____
Address: _____

Telephone Number: _____ Facsimile number: _____

2. If a copy of notice is requested, please complete below:

Name: _____
Address: _____

Telephone Number: _____ Facsimile number: _____

3. If second or more copies are requested for notice, please supplement this form and clearly mark the supplement as "Supplementary Notice Information."

Bidder to submit reference information. Proposer shall use this form to provide minimum required reference information. If Proposer wishes to provide more than the minimum, Proposer should supplement this form and should clearly mark the supplement as "Supplementary Reference Information."

1. References who can attest to the Bidder's capability to carry out the requirements set forth in this proposal:

Business Name of Organization: _____
Name of Person: _____
Title of Individual within Organization, if applicable _____
Business address: _____

Telephone number: _____ Facsimile number: _____

Business Name of Organization: _____
Name of Person: _____
Title of Individual within Organization, if applicable _____
Business address: _____

Telephone number: _____ Facsimile number: _____

Business Name of Organization: _____
Name of Person: _____
Title of Individual within Organization, if applicable _____
Business address: _____

Telephone number: _____ Facsimile number: _____

BID FORM

BOLIVAR PENINSULA SPECIAL UTILITY DISTRICT
THREE GENERATOR PROJECTS

GALVESTON COUNTY, TEXAS

References of major supplier of Proposer who can speak to the financial capability of the Proposer to carry out the requirements set forth in this proposal:.

1. Business Name of Supplier _____
Name of Person: _____
Title of Individual within business: _____
Business address: _____

Telephone number: _____ Facsimile number: _____

2. Business Name of Supplier _____
Name of Person: _____
Title of Individual within business: _____
Business address: _____

Telephone number: _____ Facsimile number: _____

3. Business Name of Supplier _____
Name of Person: _____
Title of Individual within business: _____
Business address: _____

Telephone number: _____ Facsimile number: _____

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BID PROPOSAL

The bidder hereby proposes to furnish all labor, material, equipment and incidentals for:
Bolivar Peninsula SUD Three Generaator Projects
Enclosed is a Cashier's Check or Bid Bond in the sum of 5% of the greatest amount bid.

Bidder agrees to perform in accordance with the requirements of the contract documents in consideration of payment by the County of the prices in this proposal.

IN CASE OF DISCREPANCY BETWEEN UNIT PRICES AND EXTENDED PRICES, UNIT PRICES WILL GOVERN.

This bid sheet must be completely filled out in ink or typewritten with any necessary supplemental information attached.

The undersigned hereby agrees to all of the foregoing terms and provisions and to all terms and provisions of the contract, if awarded, which includes all provisions of Sections I - VI of this bid package.

BIDDER _____

SIGNATURE _____

PRINT NAME _____

TITLE _____

ADDRESS _____

CITY, STATE _____

ZIP _____

TELEPHONE _____

FAX NO _____

DATE _____

TAX I.D. No. _____

A. BASE BID ITEMS

Item No.	Item Description	Unit	Quantity	Unit Price	Extended Price
SECTION 1 – MOBILIZATION/DEMobilIZATION					
1	Mobilization/Demobilization (Limited to 5% of the total contract amount)	LS	1		
SUBTOTAL SECTION 1					\$
SECTION 2 – BOLIVAR (MAIN) PLANT					
2	Site Preparation and Regrading	LS	1		
3	Hydromulch Seeding	AC	0.25		
4	SWPPP Requirements	LS	1		
5	Aluminum Handrail (Complete in Place as per Construction Plans and Contract Documents)	LS	1		
6	Bolivar Port Plant 20” Concrete Piles (Complete in Place as per Construction Plans and Contract Documents)	EA	6		
7	Bolivar Port Plant Concrete Generator Platform (Complete in Place as per Construction Plans and Contract Documents)	LS	1		
8	Bolivar Port Plant Hot Dipped Galvanized Stair with Fiberglass Treads (Complete in Place as per Construction Plans and Contract Documents)	LS	1		
9	Complete Electrical System, Including but not Limited to, Relocate Existing Equipment, Control Panel, Electrical Controls, Automatic Transfer Switch, Transformer, Grounding, Conduits, and Lighting (Complete in Place and Fully Operational)	LS	1		

Item No.	Item Description	Unit	Quantity	Unit Price	Extended Price
10	Bolivar Port Plant 250 kW Diesel Generator with sub-base fuel tank and enclosure, including all associated appurtenances	LS	1		
SUBTOTAL SECTION 2					\$
SECTION 3 – SINGING SANDS PLANT					
11	Site Preparation and Regrading	LS	1		
12	Hydromulch Seeding	AC	0.25		
13	SWPPP Requirements	LS	1		
14	Aluminum Handrail (Complete in Place as per Construction Plans and Contract Documents)	LS	1		
15	Singing Sands Plant 20” Concrete Piles (Complete in Place as per Construction Plans and Contract Documents)	EA	9		
16	Singing Sands Plant Concrete Generator Platform (Complete in Place as per Construction Plans and Contract Documents)	LS	1		
17	Singing Sands Plant Hot Dipped Galvanized Stair with Fiberglass Treads (Complete in Place as per Construction Plans and Contract Documents)	LS	1		
18	Complete Electrical System, Including but not Limited to, Relocate Existing Equipment, Control Panel, Electrical Controls, Automatic Transfer Switch, Transformer, Grounding, Conduits, and Lighting (Complete in Place and Fully Operational)	LS	1		
19	Singing Sands Plant 500 kW Diesel Generator with sub-base fuel tank and enclosure, including all associated appurtenances	LS	1		

Item No.	Item Description	Unit	Quantity	Unit Price	Extended Price
SUBTOTAL SECTION 3					\$
SECTION 4 – HIGH ISLAND NORTH PLANT					
20	Site Preparation and Regrading	LS	1		
21	Hydromulch Seeding	AC	0.25		
22	SWPPP Requirements	LS	1		
23	Aluminum Handrail (Complete in Place as per Construction Plans and Contract Documents)	LS	1		
24	High Island North Plant 14” Concrete Piles (Complete in Place as per Construction Plans and Contract Documents)	EA	6		
25	High Island North Plant Concrete Generator Platform (Complete in Place as per Construction Plans and Contract Documents)	LS	1		
26	High Island North Plant Hot Dipped Galvanized Stair with Fiberglass Treads (Complete in Place as per Construction Plans and Contract Documents)	LS	1		
27	Complete Electrical System, Including but not Limited to, Relocate Existing Equipment, Control Panel, Electrical Controls, Automatic Transfer Switch, Transformer, Grounding, Conduits, and Lighting (Complete in Place and Fully Operational)	LS	1		
28	High Island North Plant 275 kW Diesel Generator with sub-base fuel tank and enclosure, including all associated appurtenances	LS	1		
SUBTOTAL SECTION 4					\$

Each bid item includes any and all appurtenant work and items necessary for fully functional and operational systems, complete and in place, in accordance with the bidding and contract documents.

C. TOTAL BID PRICE

Subtotal Section 1 – Mobilization/Demobilization \$ _____

Subtotal Section 2 – Bolivar Port Plant \$ _____

Subtotal Section 3 – Singing Sands Plant \$ _____

Subtotal Section 4 – High Island North Plant \$ _____

TOTAL BID PRICE \$ _____

State of Texas Tax Statement of Materials and other charges:

The cost of in-place materials to be
incorporated into the project \$ _____

The cost of labor, profit, materials
not in-place and all other charges \$ _____

TOTAL: (Must agree with bid) \$ _____

CONTRACT AWARD

CONTRACT FOR: PROJECT NAME HERE

THIS CONTRACT IS ENTERED INTO BETWEEN GALVESTON COUNTY AND THE CONTRACTOR NAMED BELOW PURSUANT TO SUBCHAPTER B, CHAPTER 271, TEXAS LOCAL GOVERNMENT CODE, AND THE REFERENCED INVITATION TO BID.

Contract No: _____

Bid No: _____

Contractor: _____

The Specifications and Drawings are enumerated as follows:

Standard Specifications:

Special Provisions:

Special Items:

DRAWINGS: _____
ADDENDA: _____

Contract Award (continued)

Sections I (Invitation to Bid; General Provisions; Instructions to Bidders; Vendor Qualification Packet), II (Bid Proposal; Contract Award), III (Special Terms and Conditions, [including Addenda], Wage Rates & Affidavit and Surety Forms), IV (General Terms and Conditions), V (Specifications) and VI (Plans) attached to this Contract Award are all made a part of this Contract and collectively evidence and constitute the entire contract. Contractor shall furnish all materials, perform all of the work required to be done and do everything else required by these documents.

Time of Completion: The Contractor shall complete the work within 300 Calendar Days of the issuance of the notice to proceed. The time set forth for completion of the work is an essential element of the Contract.

The Contract Sum: The County shall pay the Contractor for performance of the Contract, the sum of _____ Dollars and No/100 (\$_____), payments to be made as described herein.

Performance Bond required: (x) yes () no
Payment Bond required: (x) yes () no

This Contract is issued pursuant to award made by Commissioners' Court on _____, 20__.

EXECUTED this ____ day of _____, 20__.

COUNTY OF GALVESTON, TEXAS

BY: _____
MARK HENRY, County Judge

ATTEST:

DWIGHT SULLIVAN, County Clerk

CONTRACTOR

BY: _____
Signature - Title

Printed Name

Federal Labor Standards Provisions

U.S. Department of Housing
And Urban Development

The Project or Program to which the construction work covered by this contract pertains is being assisted by the United States of America and the following Federal Labor Standards Provisions are included in this Contract pursuant to the provisions applicable to such Federal assistance.

A. 1. (i) Minimum Wages. All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR Part 3), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of 29 CFR 5.5(a)(1)(iv); also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under 29 CFR Part 5.5(a)(1)(ii) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii)(a) Any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage rate and fringe benefits therefore only when the following criteria have been met.

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(b) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and HUD or its designee agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by HUD or its designee to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, D.C. 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB control number 1215-0140).

(c) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and HUD or its designee do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), HUD or its designee shall refer the questions, including the views of all interested parties and the recommendation of HUD or its designee, to the Administrator for determination. The Administrator, or an authorized representative will issue a determination within 30 days of receipt and so advise HUD or its designee or will notify HUD or its designee within the 30-day period that additional time is necessary. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140).

(d) The wage rate (including fringe benefits where appropriate) determined pursuant to subparagraphs (1)(b) or (c) of this paragraph, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of an laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program. Provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. (Approved by the Office of Management and Budget under OMB Control Number 1215-0140).

2. Withholding. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract, in the event of failure to pay any laborer or mechanic, including any apprentice, trainee or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased. HUD or its designee may, after written notice to the contractor, disburse such amounts withheld for and on account of the contractor or subcontractor to the respective employees to whom they are due. The Comptroller General shall make such disbursements in the case of direct Davis-Bacon Act contracts.

3. (i) Payrolls and basic records. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates or contributions or costs anticipated for bona fide fringe benefits or cash equivalents there of the types described in Section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR (a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs. (Approved by the Office of Management and Budget under OMB Control Numbers 1215-0140 and 1215-0017).

(ii)(a) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to HUD or its designee if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to HUD or its designee. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR Part 5.5(a)(3)(i). This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-0014-1), U. S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. (Approved by the Office of Management and Budget under OMB Control Number 1215-0149).

(b) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be maintained under 29 CFR Part 5.5(a)(3)(i) and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR Part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(c) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph A.3.(ii)(b) of this section.

(d) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under Section 1001 of Title 18 and Section 231 of Title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph A.3.(i) of this section available for inspection, copying, or transcription by authorized representatives of HUD or its designee or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, HUD or its designee may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR Part 5.12.

(4) Apprentices and Trainees.

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration. Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. the ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR Part 30.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR Part 3 which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor will insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as HUD or its designee may be appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR Part 5.5.

7. Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act Requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR Parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR Parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and HUD or its designee, the U.S. Department of Labor, or the employees or their representatives.

10. (i) Certification of Eligibility. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government

contracts by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a government contract by virtue of Section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1) or to be awarded HUD contracts or participate in HUD programs pursuant to 24 CFR Part 24.

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001. Additionally, U.S. Criminal Code, Section 1010, Title 18, U.S.C., "Federal Housing Administration transactions", provides in part "Whoever, for the purpose of ... influencing in any way the action of such Administration... makes, utters or publishes any statement, knowing the same to be false... shall be fined not more than \$5,000 or imprisoned not more than two years, or both."

11. Complaints, Proceedings, or Testimony by Employees. No laborer or mechanic to whom the wage, salary, or other labor standards provisions of this Contract are applicable shall be discharged or in any other manner discriminated against by the Contractor or any subcontractor because such employee has filed any complaint or instituted or caused to be instituted any proceeding or has testified or is about to testify in any proceeding under or relating to the labor standards applicable under this Contract to his employer.

B. Contract Work Hours and Safety Standards Act. As used in this paragraph, the terms "laborers" and "mechanics" include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in subparagraph (1) of this paragraph, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in subparagraph (1) of this paragraph, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of eight hours or in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in subparagraph (1) of this paragraph.

(3) Withholding for unpaid wages and liquidated damages. HUD or its designee shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor with the same prime contract, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in subparagraph (2) of this paragraph.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in subparagraph (1) through (4) of this paragraph and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in subparagraphs (1) through (4) of this paragraph.

C. Health and Safety

(1) No laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health and safety as determined under construction safety and health standards promulgated by the Secretary of Labor by regulation.

(2) The Contractor shall comply with all regulations issued by the Secretary of Labor pursuant to Title 29 Part 1926 (formerly part 1518) and failure to comply may result in imposition of sanctions pursuant to the Contract Work Hours and Safety Standards Act (Public Law 91-54, 83 Stat.96).

(3) The Contractor shall include the provisions of this Article in every subcontract so that such provisions will be binding on each subcontractor. The contractor shall take such action with respect to any subcontract as the Secretary of Housing and Urban Development or the Secretary of Labor shall direct as a means of enforcing such provisions.

CONTRACTOR'S LOCAL OPPORTUNITY PLAN

(name of company) agrees to implement the following specific affirmative action steps directed at increasing the utilization of lower income residents and businesses within the (City/County) of _____.

- A. To ascertain from the Grant Recipient's CDBG program official the exact boundaries of the project area and where advantageous, seek the assistance of local officials in preparing and implementing the affirmative action plan.
- B. To attempt to recruit from within the city the necessary number of lower income residents through: local advertising media, signs placed at the proposed site for the project, and community organizations and public or private institutions operating within and servicing the project area such as Service Employment and Redevelopment (SER), Opportunities Industrialization Center (OIC), Urban League, Concentrated Employment Program, Hometown Plan, or the U.S. Employment Service.
- C. To maintain a list of all lower income residents who have applied either on their own or on referral from any source, and to employ such persons, if otherwise eligible and if a vacancy exists.
- D. To insert this plan in all bid documents and to require all bidders on subcontracts to submit an affirmative action plan including utilization goals and the specific steps planned to accomplish these goals.
- E. To insure that subcontracts (greater than \$10,000), which are typically let on a negotiated rather than a bid basis in areas other than the covered project area, are also let on a negotiated basis, whenever feasible, in a covered project area.
- F. To formally contact unions, subcontractors, and trade associations to secure their cooperation in this effort.
- G. To insure that all appropriate project area business concerns are notified of pending sub-contractual opportunities.
- H. To maintain records, including copies of correspondence, memoranda, etc., which document that all of the above affirmative action steps have been taken.
- I. To appoint or recruit an executive official of the company or agency as Equal Opportunity Officer to coordinate the implementation of this plan.
- J. To maintain records concerning the amount and number of contracts, subcontracts, and purchases which contribute to objectives.
- K. To maintain records of all projected work force needs for all phases of the project by occupation, trade, skill level, and number of positions and to update these projections based on the extent to which hiring meets these Local Opportunity objectives.

As officers and representatives of (name of company), we the undersigned have read and fully agree to this Plan, and become a party to the full implementation of the program and its provisions.

Signature

Title

Date

PROPOSED CONTRACTS BREAKDOWN

Type of Contracts	No. of Contracts	Approx. Total Dollar Amount	Estimated No. to local Business	Estimated \$ Amount Local Business

ESTIMATED PROJECT WORKFORCE BREAKDOWN

Work Classifications	Total Estimated Positions	No. of Positions Currently Filled	No. of Positions not Filled	No. of Positions to fill with L/M Residents
Totals				

STATEMENT OF BIDDER'S QUALIFICATIONS

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. If necessary, questions may be answered on separate attached sheets. The Bidder may submit any additional information he desires.

Name of Bidder: _____ Date Organized: _____

Address: _____ Date Incorporated _____

Number of Years in contracting business under present name _____:

CONTRACTS ON HAND:

Contract	Amount \$	Completion Date
_____	_____	_____
_____	_____	_____
_____	_____	_____

Type of work performed by your company: _____

Have you ever failed to complete any work awarded to you? _____

Have you ever defaulted on a contract? _____

List the projects most recently completed by your firm (include project of similar importance):

Project	Amount \$	Mo/Yr Completed
_____	_____	_____
_____	_____	_____
_____	_____	_____

Major equipment available for **this** contract: _____

Attach resume(s) for the principal member(s) of your organization, including the officers as well as the proposed superintendent for the project.

Credit available: \$ _____ Bank reference: _____

The undersigned hereby authorizes and requests any person, firm, or corporation to furnish any information requested by the _____ in verification of the recitals comprising this Statement of Bidder's Qualifications.

Executed this _____ day of _____, 19____.

By:(signature) _____ Title: _____

(print name) _____



Texas General Land Office
Community Development Block Grant (CDBG)
Disaster Recovery Program

SECTION 3
RESIDENT EMPLOYMENT OPPORTUNITY DATA
ELIGIBILITY FOR PREFERENCE

Economic Opportunities for Low and Very Low-Income Persons

Grantee/Subrecipient:	Contract Number:	Date:
<input type="text"/>	<input type="text"/>	<input type="text"/>

ELIGIBILITY FOR PREFERENCE

A Section 3 Resident seeking the preference in training and employment provided by this part shall certify, or submit evidence to the Subrecipient, Grantee, Contractor or Subcontractor, if requested, that the person is a Section 3 Resident, as defined in Section CFR 135.5. (An example of evidence of eligibility for the preference is evidence of receipt of public assistance, or evidence of participation in a public assistance program.)

Section 3 Resident Certification
for Worker Seeking Preference in Training
and Employment

RESIDENT COMPLETES THIS SECTION:

I, _____, am a legal resident of the _____

_____ and meet the income eligibility guidelines for a low- or very-low-income person as published on HUD'S income limits www.huduser.org/portal/datasets/il.html and documented on the reverse side of this form.

My permanent address is: _____

I have attached the following documentation as evidence of my status:

Copy of Lease

Copy of receipt of public assistance

Copy of Evidence of participation in a public assistance program

Other Evidence

Resident Signature _____

Date _____

Print Name _____



Texas General Land Office
Community Development Block Grant (CDBG)
Disaster Recovery Program

CERTIFICATION FOR BUSINESS CONCERNS
Seeking Section 3 Preference in Contracting and
Demonstration of Capability

Economic Opportunities for Low and Very Low-Income Persons

Grantee/Subrecipient:	Contract Number:	Date:
<input type="text"/>	<input type="text"/>	<input type="text"/>

CONTRACTOR INFORMATION

Name of Business

Address of Business

- Type of Business: Corporation Partnership Non-Profit
 Sole Proprietorship Joint Venture Consortium

Attach the following documentation as evidence of Section 3 eligible status:
(Definition of "Section 3 Business Concern" in 24 CFR 135 describes the three alternative qualifications.)

For Business claiming status as a Section 3 resident-owned enterprise:

- | | |
|---|---|
| <input type="checkbox"/> Copy of resident lease | <input type="checkbox"/> Copy of receipt of public assistance |
| <input type="checkbox"/> Copy of evidence of participation in a public assistance program | <input type="checkbox"/> Other evidence |

For business entity as applicable:

- | | |
|---|---|
| <input type="checkbox"/> Copy of Articles of Incorporation | <input type="checkbox"/> Certificate of Good Standing |
| <input type="checkbox"/> Assumed Business Name Certificate | <input type="checkbox"/> Partnership Agreement |
| <input type="checkbox"/> List of owners/stockholders and % ownership of each appointed officers | <input type="checkbox"/> Corporation Annual Report |
| <input type="checkbox"/> Organization chart with names and titles and brief function statement | <input type="checkbox"/> Latest Board minutes |
| | <input type="checkbox"/> Additional documentation |

For business entity claiming Section 3 status by subcontracting 25 percent of the dollar awarded to qualified Section 3 business(es):

- List of subcontracted Section 3 business(es) and subcontract amount

For business claiming Section 3 status, by claiming at least 30 percent of their workforce are currently Section 3 residents or were Section 3 eligible residents within 3 years of date of first employment with the business:

- | | |
|---|---|
| <input type="checkbox"/> List of all current full-time employees | <input type="checkbox"/> List of employees claiming Section 3 status |
| <input type="checkbox"/> PHA/IHA Residential lease less than 3 years from day of employment | <input type="checkbox"/> Other evidence of Section 3 status less than 3 years from date of employment |

Evidence of ability to perform successfully under the terms and conditions of the proposed contract:

- | | |
|---|--|
| <input type="checkbox"/> Current financial statement | <input type="checkbox"/> Statement of ability to comply with public policy |
| <input type="checkbox"/> List of owned equipment | |
| <input type="checkbox"/> List of all contracts for the past two years | |

Authorized Name and Signature _____

Date _____

Attested By: _____

(Corporate Seal)



Texas General Land Office
 Community Development Block Grant (CDBG)
 Disaster Recovery Program

**Contractor Certification of Efforts to Fully Comply
 with Employment and Training Provisions of Section 3**

Economic Opportunities for Low and Very Low-Income Persons

THE BIDDER REPRESENTS AND CERTIFIES AS PART OF ITS BID/OFFER THAT IT:

- Is a Section 3 Business Concern. A Section 3 Business Concern means a business concern:
 1. That is 51% or more owned by Section 3 Resident(s); or
 2. Whose permanent, full-time employees include persons, at least 30% of whom are currently Section 3 Residents, or
 3. That provides evidence of a commitment to subcontract in excess of 25% of the dollar value of all subcontracts to be awarded to Section 3 Business Concerns, that meet the qualifications set forth in paragraphs 1 or 2 herein.
- Is **NOT** a Section 3 Business Concern, but who has and will continue to seek compliance with Section 3 by certifying the following efforts to be undertaken.

EFFORTS TO AWARD SUBCONTRACTOR TO SECTION 3 CONCERNS
 (Check ALL that apply)

- By contacting business assistance agencies, minority contractors associations and community organizations to inform them of the contracting opportunities and requesting their assistance in identifying Section 3 businesses which may solicit bids for a portion of the work.
- By advertising contracting opportunities by posting notices, which provide general information about the work to be contracted and where to obtain additional information, in the common areas of the applicable development(s) owned and managed by the Housing Authority.
- By providing written notice to all known Section 3 Business Concerns of contracting opportunities. This notice should be in sufficient time to allow the Section 3 Business Concerns to respond to bid invitations
- By following up with Section 3 Business Concerns that have expressed interest in the contracting opportunities.
- By coordinating meetings at which Section 3 Business Concerns could be informed of specific elements of the work for which subcontract bids are being sought.
- By conducting workshops on contracting procedures and specific contracting opportunities in a timely manner so that Section 3 Business Concerns can take advantage of contracting opportunities.
- By advising Section 3 Business Concerns as to where to seek assistance to overcome barriers such as inability to obtain bonding, lines of credit, financing, or insurance and aiding Section 3 Businesses in qualifying for such bonding, financing, insurance, etc....
- Where appropriate, by breaking out contract work into economically feasible units to facilitate participation by Section 3 businesses.
- By developing and using a list of eligible Section 3 Business Concerns.
- By actively supporting and undertaking joint ventures with Section 3 Businesses.

EFFORTS TO PROVIDE TRAINING AND EMPLOYMENT TO SECTION 3 RESIDENTS

- By entering into a "first source" hiring agreements with organizations representing Section 3 Residents.
- By establishing training programs, which are consistent with the requirements of the Department of Labor, specifically for Section 3 Residents in the building trades.
- By advertising employment and training positions to dwelling units occupied by Category 1 and 2 residents.
- By contacting resident councils and other resident organizations in the affected housing development to request assistance in notifying residents of the training and employment positions to be filled.
- By arranging interviews and conducting interviews on the job site.
- By undertaking such continued job-training efforts as may be necessary to ensure the continued employment of Section 3 Residents previously hired for employment opportunities.
- By posting job vacancies in Work-In-Texas or with my local Workforce Solutions Center.

Contractor Name/Business Name:

Date:

Authorized Representative Name:

Signature:



Texas General Land Office
Community Development Block Grant (CDBG)
Disaster Recovery Program

Code of Federal Regulations
Title 24- Housing and Urban Development

Volume: 1

Date: 2003-04-01

Original Date: 2003-04-01

Title: Section 135.38- Section 3 Clause

Context: Title 24- Housing and Urban Development. Subtitle B- Relating to Housing and Urban Development . Chapter 1- Office of Assistant Secretary for Equal Opportunity, Department. Part 135 Economic Opportunities for Low-and Very Low-Income Persons. Subpart B- Economic Opportunities for Section 3 Residents and Section 3 Business Concerns.

§ 135.38 Section 3 clause.

All section 3 covered contracts shall include the following clause (referred to as the section 3 clause):

- A. The work to be performed under this contract is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.
- B. The parties to this contract agree to comply with HUD's regulations in 24 CFR part 135, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 135 regulations.
- C. The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.
- D. The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR part 135.

- E. The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR part 135.
- F. Noncompliance with HUD's regulations in 24 CFR part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.
- G. With respect to work performed in connection with section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of section 3 and section 7(b) agree to comply with section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

SECTION 3 INCOME LIMITS

All residents of public housing developments of the Housing Authority of

Qualify as Section 3 Residents.

Alternatively, individuals residing in the

City of _____

or County of _____

Who meet the income limits set forth below, can also qualify for Section 3 status.

A picture identification card and proof that illustrates applicant is a current resident of the subject area.

HUD updates area median income (AMI) annually and income limits vary by county. To find the latest income limits visit HUD's website: www.huduser.org/portal/datasets/il.html

Eligibility Guideline

Number in Household	Very Low Income (50% AMI)	Low Income (80%)
1 Individual		
2 Individuals		
3 Individuals		
4 Individuals		
5 Individuals		
6 Individuals		
7 Individuals		
8 Individuals		

Signature Field

Date

Print Name

CONTRACTOR CERTIFICATIONS

U.S. Department of Housing and Urban Development	
CERTIFICATION OF BIDDER REGARDING CIVIL RIGHTS LAWS AND REGULATIONS	
INSTRUCTIONS	
CERTIFICATION OF BIDDER REGARDING Executive Order 11246 and Federal Laws Requiring Federal Contractor to adopt and abide by equal employment opportunity and affirmative action in their hiring, firing, and promotion practices. This includes practices related to race, color, gender, religion, national origin, disability, and veterans' rights.	
NAME AND ADDRESS OF BIDDER (include ZIP Code)	
CERTIFICATION BY BIDDER	
Bidder has participated in a previous contract or subcontract subject to Civil Rights Laws and Regulations. <input type="checkbox"/> Yes <input type="checkbox"/> No	
The undersigned hereby certifies that: <input type="checkbox"/> The <u>Provision of Local Training, Employment, and Business Opportunities</u> clause (Section 3 provision) is included in the Contract. A written Section 3 plan (Local Opportunity Plan) was prepared and submitted as part of the bid proceedings (if bid equals or exceeds \$100,000). <input type="checkbox"/> The <u>Non Segregated Facilities</u> clause (Section 109 provision) is included in the Contract. No segregated facilities will be maintained as required by Title VI of the Civil Rights Act of 1964. <input type="checkbox"/> The <u>Equal Employment Opportunity</u> clause is included in the Contract (if bid equals or exceeds \$10,000). <input type="checkbox"/> The <u>Affirmative Action for Handicapped Workers</u> clause is included in the contract.	
Have you ever been or are you being considered for sanction due to violation of Executive Order 11246, as amended? <input type="checkbox"/> Yes <input type="checkbox"/> No	
NAME AND TITLE OF SIGNER (Please type)	
SIGNATURE	DATE

SECTION 504 CERTIFICATION

**POLICY OF NONDISCRIMINATION ON THE BASIS
OF DISABILITY**

The _____ does not discriminate on the basis of disability in the admission or access to, or treatment or employment in, its federally assisted programs or activities.

(Name) _____

(Address) _____

City State Zip

Telephone Number () _____ - _____ Voice
() _____ - _____ TDD

has been designated to coordinate compliance with the nondiscrimination requirements contained in the Department of Housing and Urban Development's (HUD) regulations implementing Section 504 (24 CFR Part 8. dated June 2, 1988).

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
COMMUNITY DEVELOPMENT BLOCK GRANT PROGRAM
CONTRACTOR'S CERTIFICATION

CONCERNING LABOR STANDARDS AND PREVAILING WAGE REQUIREMENTS

TO (appropriate recipient)	DATE
	PROJECT NUMBER (if any)
C/O	PROJECT NAME

1. The undersigned, having executed a contract with _____
_____ for the construction of the above-identified project, acknowledges that:

- (a) The Labor Standards provisions are included in the aforesaid contract,
- (b) Correction of any infractions of the aforesaid conditions, including infractions by any of his subcontractors and any lower tier subcontractors, is his responsibility.

2. He certifies that:

- (a) Neither he nor any firm, partnership or association in which he has substantial interest is designated as an ineligible contractor by the Comptroller General of the United States pursuant to Section 5.6(b) of the Regulations of the Secretary of Labor, Part 5 (29 CFR, Part 5) or pursuant to Section 3(a) of the Davis-Bacon Act, as amended.
- (b) No part of the aforementioned contract has been or will be subcontracted to any subcontractor if such subcontractor or any firm, corporation, partnership or association in which such subcontractor has a substantial interest is designated as an ineligible contractor pursuant to any of the aforementioned regulatory or statutory provisions.

3. He agrees to obtain and forward to the aforementioned recipient within ten days after the execution of any subcontract, including those executed by his subcontractors and any lower tier subcontractors, a Subcontractor's Certification Concerning Labor Standards and Prevailing Wage Requirements executed by the subcontractors.

4. He certifies that:

- (a) The legal name and the business address of the undersigned are:

(b) The undersigned is:

(1) A SINGLE PROPRIETORSHIP	(3) A CORPORATION ORGANIZED IN THE STATE OF
(2) A PARTNERSHIP	(4) OTHER ORGANIZATION (Describe)

(c) The name, title and address of the owner, partners or officers of the undersigned are:

NAME	TITLE	ADDRESS

(d) The names and addresses of all other persons having a substantial interest in the undersigned, and the nature of the interest are:

NAME	ADDRESS	NATURE OF INTEREST

(e) The names, addresses and trade classifications of all other building construction contractors in which the undersigned has a substantial interest are:

NAME	ADDRESS	TRADE CLASSIFICATION

Date _____

_____ (Contractor)

By _____



County of Galveston
ACKNOWLEDGMENT AND CERTIFICATION REGARDING DEBARMENT,
SUSPENSION, AND OTHER INELGIBILITY
Executive Orders 12549 & 12689 Certification, Debarment and Suspension

Solicitation Number: B228101-1 Bid 7

Solicitation Title: Bolivar Peninsula SUD Three Generator Projects

Contractor hereby CERTIFIES that:

Contractor, and all of its principals, is not presently debarred, suspended, proposed for debarment, proposed for suspension, or declared ineligible under Executive Order 12549 or Executive Order 12689, Debarment and Suspension, and is not in any other way ineligible for participation in Federal or State assistance programs;

Contractor, and all of its principals, were not and have not been debarred, suspended, proposed for debarment, proposed for suspension, or declared ineligible under Executive Order 12549 or Executive Order 12689, Debarment and Suspension, and were not and have not been in any other way ineligible for participation in Federal or State assistance programs at the time its' proposal was submitted in the procurement identified herein and at any time since submission of its' proposal;

Contractor has included, and shall continue to include, this certification in all contracts between itself and any sub-contractors in connection with services performed under this contract; **and**

Contractor shall notify Galveston County in writing immediately, through written notification to the Galveston County Purchasing Agent, if Contractor is not in compliance with Executive Order 12549 or 12689 during the term of its contract with Galveston County.

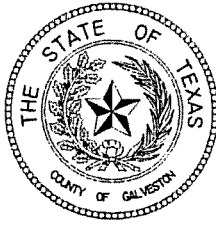
Contractor **Represents** and **Warrants** that the individual executing this Acknowledgment and Certification on its behalf has the full power and authority to do so and can legally bind the Contractor hereto.

Name of Business

Date

By: _____
Signature

Printed Name & Title



County of Galveston Purchasing Department Vendor Qualification Packet

(rev. 1.2, March 29, 2010)

All interested parties seeking consideration for qualified vendor status with the County of Galveston should complete and return only the following attached forms to:

Galveston County Purchasing Department
722 Moody Avenue, (21st Street), 5th Floor
Galveston, Texas 77550
(409) 770-5371 office
(409) 621-7987 fax

Form PEID: Person /Entity Information Data

Form W-9: Request for Taxpayer Identification Number and Certification

(please note that the included form may not be the latest revised form issued by the Internal Revenue Service. Please check the IRS website at <http://www.irs.gov/pub/irs-pdf/fw9.pdf> for the latest revision of this form.)

Form CIQ: Conflict of Interest Questionnaire

(please note that the included form may not be the latest revised form issued by the State of Texas Ethics Commission. Please check the Texas Ethics Commission website at for the latest revision of this form. Please note that Galveston County Purchasing Agent is not responsible for the filing of this form with the Galveston County Clerk per instructions of the State of Texas Ethics Commission).

Certificate(s) of Insurance: If the person or entity seeking qualified vendor status with the County will be performing work at or on any County owned facility and/or property, Certificate(s) of Insurance are required to be submitted prior to performing any work.

Insurance requirements are as follows:

Public Liability and Property Damage Insurance:

Successful vendor agrees to keep in full force and effect, a policy of public liability and property damage insurance issued by a casualty company authorized to do business in the State of Texas, and in standard form approved by the Board of Insurance Commissioners of the State of Texas, with coverage provisions insuring the public from any loss or damage that may arise to any person or property by reason of services rendered by vendor. Vendor shall at its own expense be required to carry the following minimum insurance coverages:

- For damages arising out of bodily injury to or death of one person in any one occurrence – one hundred thousand and no/100 dollars (\$100,000.00);
- For damages arising out of bodily injury to or death of two or more persons in any one occurrence – three hundred thousand and no/100 dollars (\$300,000.00); and
- For injury to or destruction of property in any one occurrence – one hundred thousand and no/100 dollars (\$100,000.00).

This insurance shall be either on an occurrence basis or on a claims made basis. Provided however, that if the coverage is on a claims made basis, then the vendor shall be required to purchase, at the termination of this agreement, tail coverage for the County for the period of the County's relationship with the vendor under this agreement. Such coverage shall be in the amounts set forth in subparagraphs (1), (2), and (3) above.

Worker's Compensation Insurance:

Successful vendor shall also carry in full force Workers' Compensation Insurance policy(ies), if there is more than one employee, for all employees, including but not limited to full time, part time, and emergency employees employed by the vendor. Current insurance certificates certifying that such policies as specified above are in full force and effect shall be furnished by the vendor to the County.

The County of Galveston shall be named as additional insured on policies listed in subparagraphs above and shall be notified of any changes to the policy(ies) during the contractual period.

Insurance is to be placed with insurers having a Best rating of no less than A. The vendor shall furnish the County with certificates of insurance and original endorsements affecting coverage required by these insurance clauses. The certificates and endorsements for each insurance policy are to be signed by a person authorized by the insurer to bind coverage on its behalf. The vendor shall be required to submit annual renewals for the term of any contractual agreement, purchase order or term contract, with Galveston County prior to expiration of any policy.

In addition to the remedies stated herein, the County has the right to pursue other remedies permitted by law or in equity.

The County agrees to provide vendor with reasonable and timely notice of any claim, demand, or cause of action made or brought against the County arising out of or related to utilization of the property. Vendor shall have the right to defend any such claim, demand, or cause of action at its sole cost and expense and within its sole and exclusive discretion. The County agrees not to compromise or settle any claim or cause of action arising out of or related to the utilization of the property without the prior written consent of the vendor.

In no event shall the County be liable for any damage to or destruction of any property belonging to the vendor unless specified in writing and agreed upon by both parties.

Procurement Policy - Special Note:

Understand that it is, according to Texas Local Government Code, Section 262.011, Purchasing Agents, subsections (d), (e), and (f), the sole responsibility of the Purchasing Agent to supervise all procurement transactions.

Therefore, be advised that all procurement transactions require proper authorization in the form of a Galveston County purchase order from the Purchasing Agent's office prior to commitment to deliver supplies, materials, equipment, including contracts for repair, service, and maintenance agreements. Any commitments made without proper authorization from the Purchasing Agent's office, pending Commissioners' Court approval, may become the sole responsibility of the individual making the commitment including the obligation of payment.

Code of Ethics - Statement of Purchasing Policy:

Public employment is a public trust. It is the policy of Galveston County to promote and balance the objective of protecting the County's integrity and the objective of facilitating the recruitment and

retention of personnel needed by Galveston County. Such policy is implemented by prescribing essential standards of ethical conduct without creating unnecessary obstacles to entering public office.

Public employees must discharge their duties impartially so as to assure fair competitive access to governmental procurement by responsible contractors. Moreover, they should conduct themselves in such a manner as to foster public confidence in the integrity of the Galveston County procurement organization.

To achieve the purpose of these instructions, it is essential that those doing business with Galveston County also observe the ethical standards prescribed here.

General Ethical Standards: It shall be a breach of ethics to attempt to realize personal gain through public employment with Galveston County by any conduct inconsistent with the proper discharge of the employee's duties.

It shall be a breach of ethics to attempt to influence any public employee of Galveston County to breach the standards of ethical conduct set forth in this code.

It shall be a breach of ethics for any employee of Galveston County to participate directly or indirectly in procurement when the employee knows that:

- The employee or any member of the employee's immediate family has a financial interest pertaining to the procurement.
- A business or organization in which the employee, or any member of the employee's immediate family, has a financial interest pertaining to the procurement.
- Any other person, business or organization with which the employee or any member of the employee's immediate family is negotiating or has an arrangement concerning prospective employment is involved in the procurement.

Gratuities: It shall be a breach of ethics to offer, give or agree to give any employee of Galveston County, or for any employee or former employee of Galveston County to solicit, demand, accept or agree to accept from another person, a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, preparation of any part of a program requirement or purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any program requirement or a contract or subcontract, or to any solicitation or proposal therefore pending before this government.

Kickbacks: It shall be a breach of ethics for any payment, gratuity or offer of employment to be made by or on behalf of a subcontractor under a contract to the prime contractor or higher tier subcontractor for any contract for Galveston County, or any person associated therewith, as an inducement for the award of a subcontract or order.

Contract Clause: The prohibition against gratuities and kickbacks prescribed above shall be conspicuously set forth in every contract and solicitation by Galveston County.

Confidential Information: It shall be a breach of ethics for any employee or former employee of Galveston County to knowingly use confidential information for actual or anticipated personal gain, or for the actual or anticipated gain of any person.

Questions/Concerns:

If you have any questions or concerns regarding the information or instructions contained within this packet, please contact any member of the Purchasing Department staff at (409) 770-5371.

CONFLICT OF INTEREST DISCLOSURE REPORTING

Proposer may be required under Chapter 176 of the Texas Local Government Code to complete and file a conflict of interest questionnaire (CIQ Form). If so, the completed CIQ Form must be filed with the County Clerk of Galveston County, Texas.

If Proposer has an employment or other business relationship with an officer of Galveston County or with a family member of an officer of Galveston County that results in the officer or family member of the officer receiving taxable income that exceeds \$2,500.00 during the preceding 12-month period, then Proposer **MUST** complete a CIQ Form and file the original of the CIQ Form with the County Clerk of Galveston County.

If Proposer has given an officer of Galveston County or a family member of an officer of Galveston County one or more gifts with an aggregate value of more than \$250.00 during the preceding 12-months, then Proposer **MUST** complete a CIQ Form and file the original of the CIQ Form with the County Clerk of Galveston County.

The Galveston County Clerk has offices at the following locations:

Galveston County Clerk
Galveston County Justice Center, Suite 2001
600 59th Street
Galveston, Texas 77551

Galveston County Clerk
North County Annex, 1st Floor
174 Calder Road
League City, Texas 77573

Again, if Proposer is required to file a CIQ Form, the original completed form is filed with the Galveston County Clerk (not the Purchasing Agent).

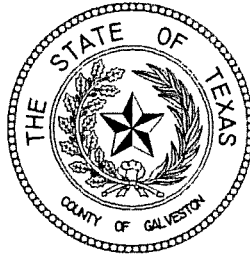
For Proposer's convenience, a blank CIQ Form is enclosed with this proposal. Blank CIQ Forms may also be obtained by visiting the Galveston County Clerk's website and/or the Purchasing Agent's website – both of these web sites are linked to the Galveston County homepage, at <http://www.co.galveston.tx.us>.

As well, blank CIQ Forms may be obtained by visiting the Texas Ethics Commission website, specifically at http://www.ethics.state.tx.us/whatsnew/conflict_forms.htm.

Chapter 176 specifies deadlines for the filing of CIQ Forms (both initial filings and updated filings).

It is Proposer's sole responsibility to file a true and complete CIQ Form with the Galveston County Clerk if Proposer is required to file by the requirements of Chapter 176. Proposer is advised that it is an offense to fail to comply with the disclosure reporting requirements dictated under Chapter 176 of the Texas Local Government Code.

If you have questions about compliance with Chapter 176, please consult your own legal counsel. Compliance is the individual responsibility of each person, business, and agent who is subject to Chapter 176 of the Texas Local Government Code.



COUNTY of GALVESTON
Purchasing Department

rev. 1.3, March 29, 2010

FORM PEID:	Request for Person-Entity Identification Data
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Instructions: Please type or print clearly when completing sections 1 thru 4 and return completed form to:

Galveston County Purchasing Agent
 722 Moody Avenue (21st. Street), 5th Floor
 Galveston, Texas 77550
 (409) 770-5371 office
 (409) 621-7987 fax

1.

Business Name:			
Attention Line:			

2.

Physical Address:			
City:	State:	Zip+4:	

3.

Billing / Remit Address:			
City:	State:	Zip+4	

4.

Main Contact Person:			
Main Phone Number:			
Fax Number:			
E-mail Address:			

Areas below are for County use only.

Requested By:	Phone / Ext. #
Department:	Date:

Action Requested - Check One:	IFAS PEID Vendor Number:	
<input type="checkbox"/> Add New	<input type="checkbox"/> Change Data	<input type="checkbox"/> Re-activate
<input type="checkbox"/> Inactivate	<input type="checkbox"/> Employee	<input type="checkbox"/> Attorney
<input type="checkbox"/> Landlord	<input type="checkbox"/> Foster Parent	<input type="checkbox"/> Refund
<input type="checkbox"/> One Time	<input type="checkbox"/> Foster Child	



Form **W-9**
(Rev. October 2007)
Department of the Treasury
Internal Revenue Service

Request for Taxpayer Identification Number and Certification

Give form to the
requester. Do not
send to the IRS.

Print or type
See Specific Instructions on page 2.

Name (as shown on your income tax return)

Business name, if different from above

Check appropriate box: Individual/Sole proprietor Corporation Partnership
 Limited liability company. Enter the tax classification (D=disregarded entity, C=corporation, P=partnership) ▶ Exempt payee
 Other (see instructions) ▶

Address (number, street, and apt. or suite no.) Requester's name and address (optional)

City, state, and ZIP code

List account number(s) here (optional)

Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on Line 1 to avoid backup withholding. For individuals, this is your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I Instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

Social security number

OR

Employer identification number

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter.

Part II Certification

Under penalties of perjury, I certify that:

- The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and
- I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and
- I am a U.S. citizen or other U.S. person (defined below).

Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the Certification, but you must provide your correct TIN. See the instructions on page 4.

Sign Here Signature of U.S. person ▶ Date ▶

General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Purpose of Form

A person who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) to report, for example, income paid to you, real estate transactions, mortgage interest you paid, acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA.

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN to the person requesting it (the requester) and, when applicable, to:

- Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
- Certify that you are not subject to backup withholding, or
- Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income.

Note. If a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

Definition of a U.S. person. For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien,
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States,
- An estate (other than a foreign estate), or
- A domestic trust (as defined in Regulations section 301.7701-7).

Special rules for partnerships. Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax on any foreign partners' share of income from such business. Further, in certain cases where a Form W-9 has not been received, a partnership is required to presume that a partner is a foreign person, and pay the withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid withholding on your share of partnership income.

The person who gives Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States is in the following cases:

- The U.S. owner of a disregarded entity and not the entity,

- The U.S. grantor or other owner of a grantor trust and not the trust, and
- The U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

Foreign person. If you are a foreign person, do not use Form W-9. Instead, use the appropriate Form W-8 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

Nonresident alien who becomes a resident alien. Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.
2. The treaty article addressing the income.
3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.
4. The type and amount of income that qualifies for the exemption from tax.
5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

Example. Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity not subject to backup withholding, give the requester the appropriate completed Form W-8.

What is backup withholding? Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

Payments you receive will be subject to backup withholding if:

1. You do not furnish your TIN to the requester,
2. You do not certify your TIN when required (see the Part II instructions on page 3 for details),
3. The IRS tells the requester that you furnished an incorrect TIN,

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See the instructions below and the separate Instructions for the Requester of Form W-9.

Also see *Special rules for partnerships* on page 1.

Penalties

Failure to furnish TIN. If you fail to furnish your correct TIN to a requester, you are subject to a penalty of \$50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

Civil penalty for false information with respect to withholding. If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a \$500 penalty.

Criminal penalty for falsifying information. Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

Misuse of TINs. If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

Specific Instructions

Name

If you are an individual, you must generally enter the name shown on your income tax return. However, if you have changed your last name, for instance, due to marriage without informing the Social Security Administration of the name change, enter your first name, the last name shown on your social security card, and your new last name.

If the account is in joint names, list first, and then circle, the name of the person or entity whose number you entered in Part I of the form.

Sole proprietor. Enter your individual name as shown on your income tax return on the "Name" line. You may enter your business, trade, or "doing business as (DBA)" name on the "Business name" line.

Limited liability company (LLC). Check the "Limited liability company" box only and enter the appropriate code for the tax classification ("D" for disregarded entity, "C" for corporation, "P" for partnership) in the space provided.

For a single-member LLC (including a foreign LLC with a domestic owner) that is disregarded as an entity separate from its owner under Regulations section 301.7701-3, enter the owner's name on the "Name" line. Enter the LLC's name on the "Business name" line.

For an LLC classified as a partnership or a corporation, enter the LLC's name on the "Name" line and any business, trade, or DBA name on the "Business name" line.

Other entities. Enter your business name as shown on required federal tax documents on the "Name" line. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on the "Business name" line.

Note. You are requested to check the appropriate box for your status (individual/sole proprietor, corporation, etc.).

Exempt Payee

If you are exempt from backup withholding, enter your name as described above and check the appropriate box for your status, then check the "Exempt payee" box in the line following the business name, sign and date the form.

Generally, individuals (including sole proprietors) are not exempt from backup withholding. Corporations are exempt from backup withholding for certain payments, such as interest and dividends.

Note. If you are exempt from backup withholding, you should still complete this form to avoid possible erroneous backup withholding.

The following payees are exempt from backup withholding:

1. An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2),
 2. The United States or any of its agencies or instrumentalities,
 3. A state, the District of Columbia, a possession of the United States, or any of their political subdivisions or instrumentalities,
 4. A foreign government or any of its political subdivisions, agencies, or instrumentalities, or
 5. An international organization or any of its agencies or instrumentalities.
- Other payees that may be exempt from backup withholding include:
6. A corporation,
 7. A foreign central bank of issue,
 8. A dealer in securities or commodities required to register in the United States, the District of Columbia, or a possession of the United States,
 9. A futures commission merchant registered with the Commodity Futures Trading Commission,
 10. A real estate investment trust,
 11. An entity registered at all times during the tax year under the Investment Company Act of 1940,
 12. A common trust fund operated by a bank under section 584(a),
 13. A financial institution,
 14. A middleman known in the investment community as a nominee or custodian, or
 15. A trust exempt from tax under section 664 or described in section 4947.

The chart below shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 15.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 9
Broker transactions	Exempt payees 1 through 13. Also, a person registered under the Investment Advisers Act of 1940 who regularly acts as a broker
Barter exchange transactions and patronage dividends	Exempt payees 1 through 5
Payments over \$600 required to be reported and direct sales over \$5,000 ¹	Generally, exempt payees 1 through 7 ²

¹See Form 1099-MISC, Miscellaneous Income, and its instructions.

²However, the following payments made to a corporation (including gross proceeds paid to an attorney under section 6045(f), even if the attorney is a corporation) and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, and payments for services paid by a federal executive agency.

Part I. Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see *Limited liability company (LLC)* on page 2), enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

Note. See the chart on page 4 for further clarification of name and TIN combinations.

How to get a TIN. If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local Social Security Administration office or get this form online at www.ssa.gov. You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at www.irs.gov/businesses and clicking on Employer Identification Number (EIN) under Starting a Business. You can get Forms W-7 and SS-4 from the IRS by visiting www.irs.gov or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

Note. Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

Caution: A disregarded domestic entity that has a foreign owner must use the appropriate Form W-8.

Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, and 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). Exempt payees, see *Exempt Payee* on page 2.

Signature requirements. Complete the certification as indicated in 1 through 5 below.

1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983. You must give your correct TIN, but you do not have to sign the certification.

2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983. You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

3. Real estate transactions. You must sign the certification. You may cross out item 2 of the certification.

4. Other payments. You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions. You must give your correct TIN, but you do not have to sign the certification.

Secure Your Tax Records from Identity Theft

Identity theft occurs when someone uses your personal information such as your name, social security number (SSN), or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

Call the IRS at 1-800-829-1040 if you think your identity has been used inappropriately for tax purposes.

Victims of identity theft who are experiencing economic harm or a system problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

Protect yourself from suspicious emails or phishing schemes.

Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to phishing@irs.gov. You may also report misuse of the IRS name, logo, or other IRS personal property to the Treasury Inspector General for Tax Administration at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at: spam@uce.gov or contact them at www.consumer.gov/idtheft or 1-877-IDTHEFT(438-4338).

Visit the IRS website at www.irs.gov to learn more about identity theft and how to reduce your risk.

What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account)	The actual owner of the account or, if combined funds, the first individual on the account ¹
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor ²
4. a. The usual revocable savings trust (grantor is also trustee)	The grantor-trustee ³
b. So-called trust account that is not a legal or valid trust under state law	The actual owner ¹
5. Sole proprietorship or disregarded entity owned by an individual	The owner ³
For this type of account:	Give name and EIN of:
6. Disregarded entity not owned by an individual	The owner
7. A valid trust, estate, or pension trust	Legal entity ⁴
8. Corporate or LLC electing corporate status on Form 8832	The corporation
9. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
10. Partnership or multi-member LLC	The partnership
11. A broker or registered nominee	The broker or nominee
12. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity

¹ List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

² Circle the minor's name and furnish the minor's SSN.

³ You must show your individual name and you may also enter your business or "DBA" name on the second name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

⁴ List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships* on page 1.

Note. If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons who must file information returns with the IRS to report interest, dividends, and certain other income paid to you, mortgage interest you paid, the acquisition or abandonment of secured property, cancellation of debt, or contributions you made to an IRA, or Archer MSA or HSA. The IRS uses the numbers for identification purposes and to help verify the accuracy of your tax return. The IRS may also provide this information to the Department of Justice for civil and criminal litigation, and to cities, states, the District of Columbia, and U.S. possessions to carry out their tax laws. We may also disclose this information to other countries under a tax treaty, to federal and state agencies to enforce federal nontax criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism.

You must provide your TIN whether or not you are required to file a tax return. Payers must generally withhold 28% of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to a payer. Certain penalties may also apply.



CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor or other person doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 1491, 80th Leg., Regular Session.
This questionnaire is being filed in accordance with Chapter 176, Local Government Code by a person who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the person meets requirements under Section 176.006(a).
By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the person becomes aware of facts that require the statement to be filed. See Section 176.006, Local Government Code.
A person commits an offense if the person knowingly violates Section 176.006, Local Government Code. An offense under this section is a Class C misdemeanor.

OFFICE USE ONLY

Date Received

1 Name of person who has a business relationship with local governmental entity.

2 Check this box if you are filing an update to a previously filed questionnaire.

(The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date the originally filed questionnaire becomes incomplete or inaccurate.)

3 Name of local government officer with whom filer has employment or business relationship.

Name of Officer

This section (item 3 including subparts A, B, C & D) must be completed for each officer with whom the filer has an employment or other business relationship as defined by Section 176.001(1-a), Local Government Code. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer named in this section receiving or likely to receive taxable income, other than investment income, from the filer of the questionnaire?

Yes No

B. Is the filer of the questionnaire receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer named in this section AND the taxable income is not received from the local governmental entity?

Yes No

C. Is the filer of this questionnaire employed by a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership of 10 percent or more?

Yes No

D. Describe each employment or business relationship with the local government officer named in this section.

4

Signature of person doing business with the governmental entity

Date

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, _____ as PRINCIPAL, and _____, as SURETY are held and firmly bound unto _____ hereinafter called the "Owner", in the penal sum of _____ Dollars, (\$ _____), lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted the Accompanying Bid, dated _____, for _____

NOW, THEREFOR, if the Principal shall not withdraw said Bid within the period specified therein after the opening of the same, or, if no period be specified, within thirty (30) days after the said opening, and shall within the period specified therefor, or if no period be specified, within ten (10) days after the prescribed forms are presented to him for signature, enter into a written contract with the Owner in accordance with the Bid as accepted, and give bond with good and sufficient surety or sureties, as may be required, for the faithful performance and proper fulfillment of such contract; or in the event of the withdrawal of said Bid within the period specified, or the failure to enter into such Contract and give such bond within the time specified, if the Principal shall pay the Owner the difference between the amount specified in said Bid and the amount for which the local Public Agency may procure the required work or supplies or both, if the latter be in excess of the former, then the above obligation shall be void and of no effect, otherwise to remain in full force and virtue.

IN WITNESS THEREOF, the above-bounded parties have executed this instrument under their several seals this _____ day of _____, the name and corporate seal of each corporate party being hereto affixed and these present signed by its undersigned representative, pursuant to authority of its governing body.

(SEAL)

(SEAL)

Attest:

By: _____
Affix
Corporate
Seal

Attest:

By: _____
Affix
Corporate
Seal

Attest:

By: _____

Countersigned

By _____

* Attorney-in-Fact, State of _____

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the _____, Secretary of the Corporation named as Principal in the within bond; that _____, who signed the said bond on behalf of the Principal was then _____ of said corporation; that I know his signature, and his signature thereto is genuine; and that said bond was duly signed, sealed, and attested to, for and in behalf of said corporation by authority of this governing body.

Corporate
Seal

Title: _____

* Power-of-attorney for person signing for surety company must be attached to bond.

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor or Company)

(Address)

a _____, hereinafter called Principal,
(Corporation / Partnership)

and _____
(Name of Surety Company)

(Address)

hereinafter called Surety, are held and firmly bound unto

(Name of Recipient)

(Recipient's Address)

hereinafter called OWNER, in the penal sum of \$ _____

Dollars, \$ _____ in lawful money of the United States, for this payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONFIDENTIALITY OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____, a copy of which is hereto attached and made a part hereof for the construction of:

(Project Name)

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, SUB-CONTRACTORS, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and all insurance premiums on said WORK, and for all labor, performed in such WORK whether by SUB-CONTRACTOR or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in _____ counter-parts, each on of (Number) which shall be deemed an original, this the _____ day of _____.

ATTEST: _____
(Principal)

_____ By _____ (s)
(Principal Secretary)

(SEAL)

(Witness as to Principal) (Address)

(Address)

ATTEST: _____
(Surety)

_____ By _____
(Witness as to Surety) (Attorney in Fact)

(Address) (Address)

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

_____ (Name of Contractor or Company)

_____ (Address)

a _____ hereinafter called Principal, and

_____ (Name of Surety Company)

_____ (Address)

hereinafter called Surety, are held and firmly bound unto

_____ (Name of Recipient)

_____ (Recipient's Address)

hereinafter called OWNER, in the penal sum of \$ _____ Dollars (\$ ____) in lawful money of the United States, for the payment of which sum well and truly to be made we bind ourselves, successors, and assigns, jointly and severally, firmly in these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the OWNER dated the _____ day of _____, a copy of which is hereto attached and made a part hereof for the construction of:

NOW THEREFORE, if the Principal shall well, truly and faithfully perform its duties in all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void, otherwise to remain in full force and effect.

PROVIDED FURTHER, that the said Surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to WORK to be performed thereunder or the SPECIFICATIONS accompanying the same shall in any way affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in _____ day of _____ counterparts, each one of which shall be deemed an original, this the _____ day of _____.

ATTEST: _____
(Principal)
By _____ (s)
(Principal Secretary)

(SEAL)

(Witness as to Principal) (Address)

(Address)

ATTEST: _____
(Surety)
By _____
(Witness as to Surety) (Attorney in Fact)

(Address) (Address)

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

ATTORNEY'S REVIEW CERTIFICATION

I, the undersigned, _____, the duly authorized and acting legal representative of the _____, do hereby certify as follows:

I have examined the attached contract(s) and surety bonds and am of the opinion that each of the agreements may be duly executed by the proper parties, acting through their duly authorized representatives; that said representatives have full power and authority to execute said agreements on behalf of the respective parties; and that the agreements shall constitute valid and legally binding obligations upon the parties executing the same in accordance with terms, conditions and provisions thereof.

Attorney's signature: _____ Date: _____

Print Attorney's Name: _____

SECTION III
General Provisions

1. BID PACKAGE:

The Invitation to Bid, general and special provisions, drawings, specifications/line item details, contract documents and the Bid sheet are all part of the Bid package. BIDs must be submitted in sets of seven (7), one (1) original and six (6) copies on the forms provided by the County if provided, including the Bid sheets completed in their entirety and signed by an authorized representative by original signature. Failure to complete and sign the Bid sheets/contract page(s) may disqualify the Bid from being considered by the Commissioners' Court. Any individual signing on behalf of the Bidder expressly affirms that he or she is duly authorized to tender this Bid and to sign the Bid sheet/contract under the terms and conditions in this bid. Bidder further understands that the signing of the contract shall be of no effect unless subsequently awarded and the contract properly executed by the Commissioners' Court. All figures must be written in ink or typed. Figures written in pencil or with erasures are not acceptable. However, mistakes may be crossed out, corrections inserted, and initialed in ink by the individual signing the bid. If there are discrepancies between unit prices quoted and extensions, the unit price shall prevail. Each Bidder is required to thoroughly review this entire Bid package to familiarize themselves with the Bid procedures, the plans and specifications for the requested work, as well as the terms, and conditions of the contract the successful Bidder will execute with the County.

2. BIDDER'S RESPONSIBILITY

The Bidder must affirmatively demonstrate its responsibility. The Bidder must also meet the following minimum requirements:

- A. have adequate financial resources or the ability to obtain such resources as required;
- B. be able to comply with all federal, state, and local laws, rules, regulations, ordinances and orders regarding this Request for Bid;
- C. have a satisfactory record of performance;
- D. have a satisfactory record of integrity and ethics;
- E. and be otherwise qualified and eligible to receive an award.

The criteria utilized for determining responsibility of Bidder(s) includes, but is not limited to, the Bidder's experience, skill, ability, business judgment, financial capacity, integrity, honesty, possession of the necessary facilities or equipment, previous performance, reputation, promptness, and any other factor deemed relevant by the County. The

Bidders shall furnish any information requested by the County in order for the County to determine whether a Bidder is responsible.

3. TIME FOR RECEIVING BIDS:

Bids received prior to the submission deadline will be maintained unopened until the specified time for opening. If the Bidder fails to identify the Bid Number on the outside of the envelope as required, the Purchasing Agent will open the envelope for the sole purpose of identifying the Bid number for which the submission was made. The envelope will then be resealed. No liability will attach to a County office or employee for the premature opening of a bid. If you do not submit a bid, return this Invitation to Bid and state reason, otherwise your name may be removed from the Purchasing Agent's mailing list.

4. BID OPENING:

The names of the bidders and the pricing will be read aloud at the bid opening. Sealed bids will be received in the office of the County Purchasing Agent and opened immediately in that office in the presence of the County Auditor and the Purchasing Agent. No Bid may be withdrawn for a period of sixty (60) calendar days of the Bid opening date.

5. COMMISSIONERS' COURT:

No contract is binding on the County until it is properly placed on the Commissioners' Court agenda, approved in open Court, authorized to be executed by the County Judge, and fully executed by both parties.

Department heads and elected officials are not authorized to enter into any type of agreement or contract on behalf of the County. Only the Commissioners' Court acting as a body may enter into a contract on behalf of and contractually

bind the County. Additionally, department heads and elected officials are not authorized to agree to any type of supplemental agreements or contracts for goods or services. Supplemental agreements are subject to review by the County Legal Department prior to being accepted and signed by the County's authorized representative.

6. REJECTION OF BIDS/DISQUALIFICATION:

Galveston County, acting through its Commissioners' Court, reserves the right to :

- reject any and all Bids in whole or in part received by reason of this request for bid;
- to waive any informality in the Bids received;
- to disregard the Bid of any Bidder determined to be not responsible and/or;
- to discontinue its efforts for any reason under this Bid package at any time prior to actual execution of contract by the County.

Bidders may be disqualified and rejection of Bids may be recommended to the Commissioners' Court for any of (but not limited to) the following causes:

- A. Lack of signature by an authorized representative on the Bid form(s);
- B. Failure to properly complete the Bid;
- C. Bids that do not meet the mandatory requirements; and/or;
- D. Evidence of collusion among Bidders.
- E. Failure to use the Bid form(s) furnished by the County.

7. RESTRICTIVE OR AMBIGUOUS SPECIFICATIONS:

It is the responsibility of the prospective Bidder to review the entire Invitation to Bid packet and to notify the Purchasing Department if the specifications are formulated in a manner that would restrict competition or appear ambiguous. Any protest or question(s) regarding the specifications or Bid procedures must be received in the Purchasing Department not less than seventy-two (72) hours prior to the time set for Bid opening. Vendors are to submit Bid as specified herein or propose an approved equal.

8. SUBSTITUTES/DESCRIPTION OF MATERIALS AND EQUIPMENT:

Any brand name or manufacturer reference used herein is intended to be descriptive and not restrictive, unless otherwise noted, and is used to indicate the type and quality of material. The term "or equal" if used, identifies commercially produced items that have the essential performance and salient characteristics of the brand name stated in the item description. All supplies, material, or equipment shall be new and of the most suitable grade for the purpose intended. It is not the County's intent to discriminate against any materials or equipment of equal merit to those specified. However, if Bidder desires to use any substitutions, prior written approval must be obtained from the County Purchasing Agent and sufficiently in advance such that an addendum may be issued. All material supplied must be one hundred percent (100%) asbestos free. Bidder, by submission of its bid, certifies that if awarded any portion of this procurement, the bidder will supply only material and equipment that is 100% asbestos free.

9. EXCEPTIONS TO BID:

The Bidder will list on a separate sheet of paper any exceptions to the conditions of the bid. This sheet will be labeled, "Exceptions to Bid Conditions", and will be attached to the bid. If no exceptions are stated, it will be understood that all general and specific conditions will be complied with, without exception.

The Bidder must specify in its Bid any alternatives it wishes to propose for consideration by the County. Each alternative should be sufficiently described and labeled within the Bid and should indicate its possible or actual advantage to the program being offered.

The County reserves the right to offer these alternatives to other Bidders.

10. PRICING:

Bids will be either lump sum or unit prices as shown on the Bid sheet. The net priced items will be delivered to Galveston County, including all freight or shipping charges. Cash discount must be shown on bid, otherwise prices

will be considered net. Unless prices and all information requested are complete, Bid may be disregarded and given no consideration. In case of default by the contractor, the County of Galveston may procure the articles or services from other sources and may deduct from any monies due, or that may thereafter become due to the contractor, the difference between the price named in the contract of purchase order and the actual cost thereof to the County of Galveston. Prices paid by the County of Galveston shall be considered the prevailing market price at the time such purchase is made. Periods of performance may be extended if the facts as to the cause of delay justify such extension in the opinion of the Purchasing Agent and the Commissioners' Court.

11. PROCUREMENT CARD PROGRAM:

The County of Galveston participates in a Procurement Card (P-Card) program that allows payments made to a vendor by credit card. This method normally results in substantially faster bill payments, sometimes within three (3) to five (5) days of the actual transaction date. All transaction fees from the card provider are to be paid by the successful contractor. If your company will accept payment via credit card (Visa, MasterCard), please notate this in your Bid submittal.

12. PASS THROUGH COST ADJUSTMENTS:

Except in instances of extreme extenuating circumstances Contractor prices shall remain firm throughout the Contract period and any renewals. Examples of extreme extenuating circumstances include such situations as a nationwide rail strike, oil shortage or oil embargo.

In extreme extenuating circumstances, Contractors may be allowed to temporarily "pass through" additional costs they are forced to incur through no fault of their own. A request for a pass through cost increase will not be considered unless a Contractor's cost for his product exceeds 10% over the original cost for the product. Also, the increase in cost must be nationwide and consistent for a minimum period of sixty (60) days. Costs that historically are anticipated to rise over a period of time (for example only, such as wages or insurance costs) do not qualify for pass through. If a Contractor thinks he will be asking for a pass through cost adjustment during the term of the contract, then the original cost of the product to Contractor must be stated in Contractor's original bid.

A request for a pass through cost does not guarantee that one will be granted. Contractors must submit such information on each request as is required by the County Purchasing Agent. The County Purchasing Agent will review each request on a case-by-case basis and determine the appropriateness of each request as well as amount and duration of increase. Contractors will not be permitted any additional compensation for mark-ups or profits based on the increase in price. Rather, such additional compensation will be limited to the actual increase in original cost to the Contractor as such increase is reflected by the original cost stated in the bid. But in no event will the amount of additional compensation exceed 25% increase in Contractor's original cost for his product as such cost is reflected in Contractor's original Bid or the duration exceed a period of sixty (60) days. In addition, should, during the period of the pass through, cost return to normal or decrease to below pre pass through prices, appropriate downward adjustments will be made. No more than one pass through adjustment will be permitted per year.

13. MODIFICATION OF BIDS:

A Bidder may modify a bid by letter at any time prior to the submission deadline for receipt of Bids. Modification requests must be received prior to the submission deadline. Modifications made before opening time must be initialed by Bidder guaranteeing authenticity. Bids may not be amended or altered after the official opening with the single exception that any product literature and/or supporting data required by the actual specifications, if any, will be accepted at any time prior to the Commissioners' Court considering of same.

14. SIGNATURE OF BIDS:

Each Bid shall give the complete mailing address of the Bidder and be signed by an authorized representative by original signature with the authorized representative's name and legal title typed below the signature line. Each bid shall include the Bidder's Federal Employer Identification Number (FEIN). Failure to sign the Contract page(s) and bid response sheets may disqualify the bid from being considered by the County. The person signing on behalf of the Bidder expressly affirms that the person is duly authorized to tender the bid and to sign the bid sheets and contract under the terms and conditions of this Invitation to Bid and to bind the Bidder thereto and further

understands that the signing of the contract shall be of no effect until it is properly placed on the Commissioners' Court agenda, approved in open Court, authorized to be executed by the County Judge, and fully executed by both parties.

15. AWARD OF BIDS:

The award will be made to the responsive, responsible Bidder whose bid is determined to be the best evaluated, lowest cost offer demonstrating the best ability to fulfill the requirements set forth in this Invitation to Bid. **The proposed cost to the County will be considered firm and cannot be altered after the submission deadline, unless the County invokes its right to request a best and final offer.**

Each Bidder, by submitting a bid, agrees that if their bid is accepted by the Commissioners' Court, such Bidder will furnish all items and services upon which prices have been tendered and upon the terms and conditions in this bid and contract.

The contractor shall commence work only after the transmittal of a fully executed contract and after receiving written notification to proceed from the County Purchasing Agent. The contractor will perform all services indicated in the bid in compliance with this contract.

Neither department heads nor elected officials are authorized to sign any binding contracts or agreements prior to being properly placed on the Commissioners' Court agenda and approved in open court. Department heads and other elected officials are not authorized to enter into any type of agreement or contract on behalf of Galveston County. Only the Commissioners' Court, acting as a body, may enter into a contract on behalf of the County. Additionally, department heads and other elected officials are not authorized to agree to any type of supplemental agreements or contracts for goods or services. Supplemental agreements are subject to review by the County Legal Department prior to being signed by the County's authorized representatives.

The County of Galveston reserves the right to accept bids on individual items listed, or group items, or on the bid as a whole; to reject any and all bids; to waive any informality in the bids; and to accept the bid that appears to be in the best interest of the County. The selection process may, however, include a request for additional information or an oral presentation to support the written bid.

The County reserves the right to reject any or all Bids in whole or in part received by reason of this Invitation to Bid and may discontinue its efforts under this Invitation to Bid for any reason or no reason or solely for the County's convenience at any time prior to actual execution of the contract by the County.

A Bidder whose bid does not meet the mandatory requirements set forth in this Invitation to Bid will be considered non-compliant.

The invitation to submit a bid which appears in the newspaper, or other authorized advertising mediums, these general provisions, the specifications which follow, the Bid sheets, and any addenda issued are all considered part of the Bid.

Each Bidder, by submitting a bid, agrees that if its bid is accepted by the Commissioners' Court, such Bidder will furnish all items and services upon the terms and conditions in this Invitation to Bid and the resultant contract.

Notice of contract award will be made within ninety (90) days of opening of Bids to the lowest responsive and responsible contractor, whose bid complies with all the requirements in the Invitation to Bid.

Contractor shall submit to the County, for approval, within ten (10) days from notice of contract award, all Certificates of Insurance evidencing the required coverage as described under Insurance in the schedule of the Invitation to Bid.

The contractor shall not commence work under these terms and conditions of the contract until all required and applicable Certificates of Insurance, Performance and Payment Bonds, and Irrevocable Letters of Credit have been

approved by the County of Galveston and the Contractor has received notice to proceed in writing and an executed copy of the contract from the County Purchasing Agent.

16. DISPUTE AFTER AWARD/PROTEST:

Any actual or prospective Bidder who is allegedly aggrieved in connection with the solicitation of this Invitation to Bid or award of a contract resulting therefrom may protest. The protest shall be submitted in writing to the Purchasing Agent within seven (7) calendar days after such aggrieved person knows of or should have known of the facts giving rise thereto. If the protest is not resolved by mutual agreement, the Purchasing Agent will promptly issue a decision in writing to the protestant. If the protestant wishes to appeal the decision rendered by the Purchasing Agent, such appeal must be made to the Commissioners' Court through the Purchasing Agent. The decision of the Commissioners' Court will be final. The Commissioners' Court need not consider protests unless this procedure is followed.

17. PUBLIC INFORMATION ACT:

The parties agree that the County is a governmental body for purposes of the Public Information Act, codified as Chapter 552 of the Texas Government Code and as such is required to release information in accordance with the Public Information Act. Bidder agrees that it has **clearly and conspicuously** marked any information that it considers to be confidential, proprietary, and/or trade secret in its Bid. County agrees to provide notice to Bidder in accordance with the Public Information Act in the event the County receives a request for information under the Public Information Act for information that the Bidder has marked as confidential, proprietary, and/or trade secret.

18. BIDDER'S EMAIL ADDRESSES:

Notwithstanding the foregoing Section 17, Bidder acknowledges and agrees that the confidentiality of any and all email addresses it uses or discloses in communicating with the County are open to the public in accordance with Section 552.137 of the Government Code and consents to the release of its email addresses.

19. RESULTANT CONTRACT:

Bidder shall correctly and fully execute the resultant contract first. Afterwards, the contract shall be set for consideration by the Commissioners' Court. If the Commissioners' Court authorizes the execution of the contract, the resultant contract shall become effective upon the Commissioners' Court execution of same. Contract documents shall consist of the contract, the general and special provisions, the drawings, bid package (including best and final offer(s) if such is utilized), any addenda issued, and any change orders issued during the work.

If applicable to the attached, Bidder must sign three (3) original contracts and return with their bid submittal.

Bidder should submit a proposed contract with its Bid or its sample material terms and conditions.

20. CONTRACT TERM:

The term of the resultant contract will begin on the date of execution by the Commissioners' Court and will terminate on the date specified in the resultant contract unless terminated earlier as herein set forth.

21. TERMINATION FOR DEFAULT:

Failure of either party in the performance of any of the provisions of this contract shall constitute a breach of contract, in which case either party may require corrective action within ten (10) days from date of receipt of written notice citing the exact nature of such breach. Failure of the party being notified to take corrective action within the prescribed ten (10) days, or failure to provide written reply of why no breach has occurred, shall constitute a Default of Contract.

All notices relating to default by Bidder of the provisions of the contract shall be issued by County by its Legal Department, and all replies shall be made in writing to the County Legal Department. Notices issued by or issued to anyone other than the County Legal Department shall be null and void and shall be considered as not having been issued or received.

Galveston County reserves the right to enforce the performance of this contract in any manner prescribed by law in the event of breach or default of this contract, and may contract with another party, with or without solicitation of

bids or further negotiations. At a minimum, Bidder shall be required to pay any difference in service or materials, should it become necessary to contract with another source, plus reasonable administrative costs and attorney fees.

In the event of Termination for Default, Galveston County, its agents or representatives shall not be liable for loss of any profits anticipated to be made by Bidder.

In addition to the remedies stated herein, the County has the right to pursue other remedies permitted by law or in equity.

No waiver by either party of any event of default under this agreement shall operate as a waiver of any subsequent default under the terms of this agreement.

County reserves the right to terminate this contract immediately in the event Bidder:

- A. Fails to meet delivery or completion schedules; and/or
- B. Fails to otherwise perform in accordance with the accepted Bid and the contract.

22. TERMINATION FOR CONVENIENCE:

County may terminate this contract upon at least thirty (30) calendar days prior written notice for its convenience or for any reason deemed by the County to serve the public interest. County may terminate this contract upon thirty (30) calendar days prior written notice for any reason resulting from any governmental law, order, ordinance, regulations, or court order. In no event shall County be liable for loss of any profits anticipated to be made hereunder by Bidder should this contract be terminated early.

23. FORCE MAJEURE:

If by reason of Force Majeure either Party shall be rendered unable, wholly or in part, to carry out its responsibilities under this contract by any occurrence by reason of Force Majeure, then the Party unable to carry out its responsibility shall give the other Party notice and full particulars of such Force Majeure in writing within a reasonable time after the occurrence of the event, and such notice shall suspend the Party's responsibility for the continuance of the Force Majeure claimed, but for no longer period.

Force Majeure means acts of God, floods, hurricanes, tropical storms, tornadoes, earthquakes, or other natural disasters, acts of a public enemy, acts of terrorism, sovereign conduct, riots, civil commotion, strikes or lockouts, and other causes that are not occasioned by either Party's conduct which by the exercise of due diligence the Party is unable to overcome and which substantially interferes with operations.

24. ESTIMATED QUANTITIES:

Any reference to quantities shown in the Invitation to Bid is an estimate only. Since the exact quantities cannot be predetermined, the County reserves the right to adjust quantities as deemed necessary to meet its requirements.

25. CONTRACTOR INVESTIGATION:

Before submitting a bid, each Bidder shall make all investigations and examinations necessary to ascertain all site conditions and requirements affecting the full performance of the contract and to verify any representations made by the County upon which the contractor will rely. If the contractor receives an award as a result of its bid submission, failure to have made such investigations and examinations will in no way relieve the contractor from its obligation to comply in every detail with all provisions and requirements of the contract, nor will a plea of ignorance of such conditions and requirements be accepted as a basis for any claim whatsoever by the contractor for additional compensation.

26. NO COMMITMENT BY COUNTY OF GALVESTON:

This Invitation to Bid does not commit the County of Galveston to award any costs or pay any costs, or to award any contract, or to pay any costs associated with or incurred in the preparation of a bid in response to this Invitation to Bid and does not commit the County of Galveston to procure or contract for services or supplies.

27. BID COSTS BORNE BY BIDDER:

Galveston County shall not be liable for any costs incurred by Bidder in preparation, production, or submission of a bid and shall not be liable for any work performed by Bidder prior to issuance of fully executed contract and properly issued notice to proceed. Galveston County shall not be liable for any costs incurred by Bidder by reason of attending a pre-Bid conference. Galveston County shall not be liable for any costs incurred by Bidder by reason of the County invoking use of best and final offers.

28. SINGLE BID RESPONSE:

If only one bid is received in response to the Invitation to Bid, a detailed cost bid may be requested of the single contractor. A cost/price analysis and evaluation and/or audit may be performed of the cost bid in order to determine if the price is fair and reasonable.

29. CHANGES IN SPECIFICATIONS:

If it becomes necessary to revise any part of this bid, a written notice of such revision will be provided to all Bidders in the form of addenda. The County is not bound by any oral representations, clarifications, or changes made in the written specifications by the County's employees, unless such clarification or change is provided to Bidders in a written addendum from the Purchasing Agent.

The County of Galveston reserves the right to revise or amend the specifications up to the time set for opening of bids. Such revisions and amendments, if any, shall be announced by amendments to the solicitation. Copies of such amendments shall be furnished to all prospective contractors in the form of an addendum. Prospective contractors are defined as those contractors listed on the County's Invitation to Bid list for this material/service or those who have obtained documents subsequent to the advertisement. If revisions and amendments require changes in quantities or prices proposed, or both, the date set for opening of bids may be postponed by such number of days as in the opinion of the County shall enable contractors to revise their bids. In any case, the bid opening shall be at least five working days after the last amendment, and the amendment shall include an announcement of the new date if applicable, for the opening of bids.

30. BID IDEAS AND CONCEPTS:

The County reserves to itself the right to adopt or use for its benefit, any concept, plan, or idea contained in any bid.

31. BID DISCLOSURES:

The names of those who submitted bids will not be made public information unless in conformity with the County Purchasing Act. No pricing or staffing information will be released. Bidders are requested to withhold all inquiries regarding their bid or other submissions until after an award is made. No communication is to be had with any County employee or official, other than the County Purchasing Agent, regarding whether a bid was received. Violations of this provision may result in the rejection of a bid.

32. WITHDRAWAL OF BID:

Bidders may request withdrawal of a sealed bid prior to the scheduled bid opening time provided the request for withdrawal is submitted to the Purchasing Agent in writing. No bids may be withdrawn for a period of sixty (60) calendar days after opening of the bids.

33. INDEMNIFICATION:

The contractor shall agree to assume all risks and responsibility for, and agrees to indemnify, defend, and save harmless, the County of Galveston, its elected and appointed officials and department heads, and its agents and employees from and against all claims, demands, suits, actions, recoveries, judgments, and costs and expenses including reasonable attorney's fees for the defense thereof in connection therewith on account of the loss of life, property or injury or damage to the person which shall arise from contractor's operations under this contract, its use of County facilities and/or equipment or from any other breach on the part of the contractor, its employees, agents or any person(s), in or about the County's facilities with the expressed or implied consent of the County. Contractor shall pay any judgment with cost which may be obtained against Galveston County resulting from contractor's operations under this contract.

Contractor agrees to indemnify and hold the County harmless from all claims of subcontractors, laborers incurred in the performance of this contract. Contractor shall furnish satisfactory evidence that all obligations of this nature herein above designated have been paid, discharged or waived. If Contractor fails to do so, then the County reserves the right to pay unpaid bills of which County has written notice direct and withhold from Contractor's unpaid compensation a sum of money reasonably sufficient to liquidate any and all such lawful claims.

34. REQUIREMENT OF AND PROOF OF INSURANCE:

The successful Bidder shall furnish evidence of insurance to the County Purchasing Agent and shall maintain such insurance as required hereunder or as may be required in the Special Provisions or resultant contract, if different. Contractor shall obtain and thereafter continuously maintain in full force and effect, commercial general liability insurance, including but not limited to bodily injury, property damage, and contractual liability, with combined single limits as listed below or as may be required by State or Federal law, whichever is greater.

- A. For damages arising out of bodily injury to or death of one person in any one accident :
ONE HUNDRED THOUSAND AND NO/100 (\$100,000.00) DOLLARS.
- B. For damages arising out of bodily injury to or death of two or more persons in any one accident:
THREE HUNDRED THOUSAND AND NO/100 (\$300,000.00) DOLLARS.
- C. For any injury to or destruction of property in any one accident :
ONE HUNDRED THOUSAND AND NO/100 (\$100,000.00) DOLLARS.

Insurance shall be placed with insurers having an A.M. Best's rating of no less than A. Such insurance must be issued by a casualty company authorized to do business in the State of Texas, and in standard form approved by the Board of Insurance Commissioners of the State of Texas, with coverage provisions insuring the public from loss or damage that may arise to any person or property by reason of services rendered by Contractor.

Galveston County shall be listed as the additional insured on policy certificates and shall be provided with no less than thirty (30) calendar days prior notice of any changes to the policy during the contractual period.

Certificates of Insurance, fully executed by a licensed representative of the insurance company written or countersigned by an authorized Texas state agency, shall be filed with the County Purchasing Agent within ten (10) business days of issuance of notification from the County Purchasing Agent to Bidder that the contract is being activated as written proof of such insurance and further provided that Bidder shall not commence work under this contract until it has obtained all insurance required herein, provided written proof as required herein, and received written notice to proceed issued from the County Purchasing Agent.

Proof of renewal/replacement coverage shall be provided upon expiration, termination, or cancellation of any policy. Said insurance shall not be cancelled, permitted to expire, or changed without thirty (30) days prior written notice to the County.

Insurance required herein shall be maintained in full force and effect during the life of this contract and shall be issued on an occurrence basis. Contractor shall require that any and all subcontractors that are not protected under the Contractor's own insurance policies take and maintain insurance of the same nature and in the same amounts as required of Contractor and provide written proof of such insurance to Contractor. Proof of renewed/replacement coverage shall be provided upon expiration, termination, or cancellation of any policy. Contractor shall not allow any subcontractor to commence work on the subcontract until such insurance required for the subcontractor has been obtained and approved.

Workers' Compensation Insurance: Successful Bidder shall carry in full force Workers' Compensation Insurance Policy(ies), if there is more than one employee, for all employees, including but not limited to full time, part time, and emergency employees employed by the successful Bidder. Current insurance certificates certifying that such policies as specified above are in full force and effect shall be furnished by successful Bidder to the County.

Insurance is to be placed with insurers having a Best rating of no less than A. The Bidder shall furnish the County with certificates of insurance and original endorsements affecting coverage required by these insurance clauses within ten (10) business days of receiving notification from the County Purchasing Agent that the contract is being activated. The certificates and endorsements for each insurance policy are to be signed by a person authorized by the insurer to bind coverage on its behalf. The Bidder shall be required to submit annual renewals for the term of this contract prior to expiration of any policy.

Builders Risk Insurance: The contractor shall furnish one copy of each Certificate of Insurance herein required with each signed copy of the Agreement and prior to commencement of the work. The contractor shall furnish to the Owner copies of any endorsements that are subsequently issued amending coverage or limits. Receipt of all required notices shall be evidenced by return receipt of registered or Certified letter. The policies shall contain provision that coverages will not be cancelled until at least thirty days' prior written notice has been given to the County. In the event of such notice of cancellation being given the contractor will provide substitute policies with the same provisions to county prior to the effective date of such cancellation.

The above requirements do not establish limits of Contractor's liability.

Contractor shall at all times during the term of this contract and any extensions thereof maintain such insurance coverage.

Such insurance is to be provided at the sole cost of Contractor.

All policies of insurance shall waive all rights of subrogation against County, its officers, employees and agents.

The County shall be named as "additional insured" on such policies as are specified above.

The County reserves the right to require additional insurance should it be deemed necessary.

In addition to the remedies stated herein, the County has the right to pursue other remedies permitted by law or in equity.

The County agrees to provide Bidder with reasonable and timely notice of any claim, demand, or cause of action made or brought against the County arising out of or related to utilization of the property. Bidder shall have the right to defend any such claim, demand, or cause of action at its sole cost and expense and within its sole and exclusive discretion. The County agrees not to compromise or settle any claim or cause of action arising out of or related to the utilization of the property without the prior written consent of the Bidder.

In no event shall the County be liable for any damage to or destruction of any property belonging to the Bidder.

35. BID GUARANTEE:

Unless specified differently within the Special Provisions of this procurement, each Bidder shall be required to submit a bid guarantee with its proposal as required within this Section Evidencing its firm commitment to engage in contract if Bidder is selected for award of contract, each Bidder is required to furnish with their bid a Cashier's Check or an acceptable Bidder's Bond in the amount of five percent (5%) of the total contract price. If Bidder is using a bond,

then the bidder's bond must be executed with a surety company authorized to do business in the State of Texas. Failure to furnish the bid guarantee in the proper form and amount, by the time set for opening of bids may be cause for rejection of the bid.

The Cashier's Check or Bidder Bond (as applicable) will be returned to each respective unsuccessful Bidder(s) subsequent to the Commissioners' Court award of contract, and shall be returned to the successful Bidder upon the completion and submission of all contract documents. Provided, however, that the Cashier's Check or Bidder Bond

will be forfeited to the County as liquidated damages should successful Bidder fail to execute the contract within thirty (30) days after receiving notice of the acceptance of its bid.

36. PERFORMANCE AND PAYMENT BONDS:

Successful Bidder, before beginning work, shall execute a performance bond and a payment bond, each of which must be in the amount of the contract. The required payment and performance bonds must each be executed by a corporate surety in accordance with Section 1, Chapter 87, Acts of the 56th Legislature, Regular Session, 1959 (Article 7.19-1, Vernon's Texas Insurance Code).

The performance and payment bonds must clearly and prominently display on the bond or on an attachment to the bond:

- A. The name, mailing address, physical address, and telephone number, including the area code, of the surety company to which any notice of claim should be sent; or
- B. The toll-free telephone number maintained by the Texas Department of Insurance under Subchapter B, Chapter 521, Insurance Code, and a statement that the address of the surety company to which any notice of claim should be sent may be obtained from the Texas Department of Insurance by calling the toll free-telephone number.

The performance bond shall be solely for the protection of Galveston County, in the full amount of the contract, and conditioned on the faithful performance of the work in accordance with the plans, specifications, and contract documents. The payment bond is solely for the protection and use of payment bond beneficiaries who have a direct contractual relationship with the prime contractor or a subcontractor to supply public work labor or material, and in the amount of the contract.

The payment and performance bonds required to be furnished herein must be furnished before the contractor begins work and are a requirement for issuance of a Notice to Proceed. Such bonds must be furnished to the Galveston County Purchasing Agent within ten (10) days after the date of signing of the contract or receiving notice from the Purchasing Agent that the contract has been fully executed. Failure to provide the required payment and performance bonds within the required business days shall constitute an event of default under this contract. Contractor shall not commence work until all applicable certificates of insurance, performance, and payment bonds have been received and approved by the County Purchasing Agent and the Contractor receives notice to proceed in writing that has been issued by the County Purchasing Agent.

Additionally, if this Invitation To Bid is for the award of a public works contract, then compliance with Chapter 2253 of the Texas Government Code, which is known as the McGregor Act, is mandatory. Performance and payment

bonds are required to be furnished in accordance with Chapter 2253 of the Texas Government Code. Bidder should familiarize itself with the entire provisions of Chapter 2253 of the Texas Government Code.

37. PATENT AND COPYRIGHT PROTECTION:

The Bidder agrees at its sole expense to protect the County from claims involving infringement of patents or copyrights. **Bidder shall indemnify and save harmless the County of Galveston, its officers, employees, and**

agents, from liability of any nature and kind whatsoever, including without limitation cost and expenses, for or on account of any copyrighted, patented or un-patented invention, process, or article manufactured or used in the performance of the contract, including its use by the County. Bidder also agrees that if Bidder is awarded this contract, that no work performed hereunder shall be subject to patent, copyright, or other intellectual property by Bidder.

38. CONFLICT OF INTEREST DISCLOSURE REPORTING:

Bidder may be required under Chapter 176 of the Texas Local Government Code to complete and file a conflict of interest questionnaire (CIQ Form). If so, the completed CIQ Form must be filed with the County Clerk of Galveston County, Texas.

If Bidder has an employment or other business relationship with an officer of Galveston County or with a family member of an officer of Galveston County that results in the officer or family member of the officer receiving taxable

income that exceeds \$2,500.00 during the preceding 12-month period, then Bidder **MUST** complete a CIQ Form and file the original of the CIQ Form with the County Clerk of Galveston County.

If Bidder has given an officer of Galveston County or a family member of an officer of Galveston County one or more gifts with an aggregate value of more than \$250.00 during the preceding 12-months, then Bidder **MUST** complete a CIQ Form and file the original of the CIQ Form with the County Clerk of Galveston County.

The Galveston County Clerk has offices at the following locations:

Galveston County Clerk
Galveston County Justice Center, Suite 2001
600 59th Street
Galveston, Texas 77551

Galveston County Clerk
North County Annex, 1st Floor
174 Calder Road
League City, Texas 77573

Again, if Bidder is required to file a CIQ Form, the original completed form is filed with the Galveston County Clerk (not the Purchasing Agent).

For Bidder's convenience, a blank CIQ Form is enclosed with this bid package. Blank CIQ Forms may also be obtained by visiting the Galveston County Clerk's website and/or the Purchasing Agent's website – both of these websites are linked from the Galveston County homepage, at <http://www.co.galveston.tx.us>.

As well, blank CIQ Forms may be obtained by visiting the Texas Ethics Commission website, specifically at http://www.ethics.state.tx.us/whatsnew/conflict_forms.htm.

Chapter 176 specifies deadlines for the filing of CIQ Forms (both initial filings and updated filings).

It is Bidder's sole responsibility to file a true and complete CIQ Form with the Galveston County Clerk if Bidder is required to file by the requirements of Chapter 176 of the Local Government Code. Bidder is advised that it is an offense to fail to comply with the disclosure reporting requirements dictated under Chapter 176 of the Texas Local Government Code.

If you have questions about compliance with Chapter 176, please consult your own legal counsel. Compliance is the individual responsibility of each person, business, and agent who is subject to Chapter 176 of the Texas Local Government Code.

39. COMPETITIVENESS AND INTEGRITY:

To prevent biased evaluations and to preserve the competitiveness and integrity of such acquisition efforts, **Bidders are to direct all communications regarding this Bid to the Galveston County Purchasing Agent**, unless otherwise specifically noted.

Do not contact the requesting department. Attempts by offering firms to circumvent this requirement will be viewed negatively and may result in rejection of the offer of the firm found to be in non-compliance.

All questions regarding this Request for Bid must be submitted in writing to:

Rufus Crowder, CPPO CPPB
Galveston County Purchasing Agent
722 Moody, (21st Street)
Fifth (5th) Floor, Purchasing
Galveston, Texas 77550 Fax: (409) 621-7997
E-mail: rufus.crowder@co.galveston.tx.us

An authorized person from the submitting firm must sign all bids. This signature acknowledges that the Bidder has read the bid documents thoroughly before submitting a bid and will fulfill the obligations in accordance to the terms, conditions, and specifications.

Please carefully review this Invitation to Bid. It provides specific information necessary to aid participating firms in formulating a thorough response.

40. ENTIRETY OF AGREEMENT AND MODIFICATION:

This contract contains the entire agreement between the parties. Any prior agreement, promise, negotiation or representation not expressly set forth in this contract has no force or effect. Any subsequent modification to this contract must be in writing, signed by both parties. An official representative, employee, or agent of the County does not have the authority to modify or amend this contract except pursuant to specific authority to do so granted by the Galveston County Commissioners' Court.

41. NON-COLLUSION AFFIDAVIT: N/A

~~Bidder certifies, by signing and submitting a bid, that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the contractor has not directly or indirectly induced or solicited another contractor to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any contractor or anyone else to put in a sham Bid or that anyone shall refrain from bidding; that the contractor has not in any manner, directly or indirectly, sought by agreement, communications, or conference with anyone to fix the bid price of the contractor or any other bidder, or to fix any overhead, profit or cost element of the bid price, or that of any other contractor, or to secure any advantage against the public body awarding the contract or anyone interested in the proposed contract; that all statements contained in the bid are true; and further, that the contractor has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any cooperation, partnership, company, association, organization, Bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.~~

~~A blank Non-Collusion Affidavit is included with this Bid packet. Bidder must enclose a truthful and fully executed original Non-Collusion Affidavit with the submission of its bid. This is a mandatory requirement of this Invitation to Bid. Failure to include the truthfully and fully executed Non-Collusion Affidavit in the submission of its Bid shall be considered non-compliance with the requirements of this Invitation to Bid by the Bidder and grounds for the rejection of Bidder's submission.~~

~~No negotiations, decisions, or actions shall be initiated by any company as a result of any verbal discussion with any County employee prior to the opening of responses to this Invitation to Bid.~~

~~No officer or employee of the County of Galveston, and no other public or elected official, or employee, who may exercise any function or responsibilities in the review or approval of this undertaking shall have any personal or~~

~~financial interest, direct or indirect, in any contract or negotiation process thereof. The above compliance request will be part of all County of Galveston contracts for this service.~~

42. SOVEREIGN IMMUNITY:

The County specifically reserves any claim it may have to sovereign, qualified, or official immunity as a defense to any action arising in conjunction with this contract.

43. CONTROLLING LAW AND VENUE:

Bidder acknowledges and agrees that the contract is and shall be governed and construed by the laws of the State of Texas and that venue shall lie exclusively in Galveston County, Texas.

44. MERGERS, ACQUISITIONS:

The Bidder shall be required to notify the County of any potential for merger or acquisition of which there is knowledge at the time that a bid is submitted.

If subsequent to the award of any contract resulting from this Invitation to Bid the Bidder shall merge or be acquired by another firm, the following documents must be submitted to the County:

- A. Corporate resolutions prepared by the awarded Bidder and the new entity ratifying acceptance of the original contract, terms, conditions and prices;
- B. New Bidder's Federal Identification Number (FEIN) and;
- C. New Bidder's proposed operating plans.

Moreover, Bidder is required to provide the County with notice of any anticipated merger or acquisition as soon as Bidder has actual knowledge of the anticipated merger or acquisition. The New Bidder's proposed plan of operation must be submitted prior to merger to allow time for submission of such plan to the Commissioners' Court for its approval.

45. DELAYS:

The County reserves the right to delay the scheduled commencement date of the contract if it is to the advantage of the County. There shall be no additional costs attributed to these delays should any occur. Bidder agrees it will make no claims for damages, for damages for lost revenues, for damages caused by breach of contract with third parties, or any other claim by Bidder attributed to these delays, should any occur. In addition, Bidder agrees that any contract it enters into with any third party in anticipation of the commencement of the contract will contain a statement that the third party will similarly make no claim for damages based on delay of the scheduled commencement date of the contract.

46. ACCURACY OF DATA:

Information and data provided through this Invitation to Bid are believed to be reasonably accurate.

47. SUBCONTRACTING/ASSIGNMENT:

Bidder shall not assign, sell, or otherwise transfer its contract in whole or in part without prior written permission of Commissioners' Court. Such consent, if granted, shall not relieve the Bidder of any of its responsibilities under this contract.

48. INDEPENDENT CONTRACTOR:

Bidder expressly acknowledges that it is an independent contractor. Nothing in this agreement is intended nor shall be construed to create an agency relationship, an employer/employee relationship, a joint venture relationship, or any other relationship allowing County to exercise control or direction over the manner or method by which Bidder or its subcontractors perform in providing the requirements stated in the Invitation to Bid.

49. MONITORING PERFORMANCE:

The County shall have the unfettered right to monitor and audit the Bidder's work in every respect. In this regard, the Bidder shall provide its full cooperation and insure the cooperation of its employees, agents, assigns, and subcontractors. Further, the Bidder shall make available for inspection and/or copying when requested, original

data, records, and accounts relating to the Bidder's work and performance under this contract. In the event any such material is not held by the Bidder in its original form, a true copy shall be provided.

50. PROCUREMENT ETHICS:

Galveston County is committed to the highest ethical standards. Therefore, it is a serious breach of the public trust to subvert the public purchasing process by directing purchases to certain favored vendors, or to tamper with the competitive bidding process, whether it's done for kickbacks, friendship or any other reason. Since misuse of the purchasing power of a local government carries criminal penalties, and many such misuses are from a lack of clear guidelines about what constitutes an abuse of office, the Code of Ethics outlined below must be strictly followed.

Galveston County also requires ethical conduct from those who do business with the County.

CODE OF ETHICS – Statement of Purchasing Policy:

“Public employment is a public trust. It is the policy of Galveston County to promote and balance the objective of protecting the County's integrity and the objective of facilitating the recruitment and retention of personnel needed by Galveston County. Such policy is implemented by prescribing essential standards of ethical conduct without creating unnecessary obstacles to entering public office.

Public employees must discharge their duties impartially so as to assure fair competitive access to governmental procurement by responsible contractors. Moreover, they should conduct themselves in such a manner as to foster public confidence in the integrity of the Galveston County procurement organization.

To achieve the purpose of this Article, it is essential that those doing business with Galveston County also observe the ethical standards prescribed here.”

General Ethical Standards:

It shall be a breach of ethics to attempt to realize personal gain through public employment with Galveston County by any conduct inconsistent with the proper discharge of the employee's duties.

It shall be a breach of ethics to attempt to influence any public employee of Galveston County to breach the standards of ethical conduct set forth in this code.

It shall be a breach of ethics for any employee of Galveston County to participate directly or indirectly in a procurement when the employee knows that:

The employee or any member of the employee's immediate family, has a financial interest pertaining to the procurement;

A business or organization in which the employee or any member of the employee's immediate family, has a financial interest pertaining to the procurement; or

Any other person, business, or organization with which the employee or any member of the employee's immediate family is negotiating or has an arrangement concerning prospective employment is involved in the procurement.

Gratuities:

It shall be a breach of ethics for any person to offer, give, or agree to give any employee or former employee of Galveston County, or for any employee or former employee of Galveston County to solicit, demand, accept or agree to accept from another person, a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, preparation of any part of a program requirement or a purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any proceeding or application, request for ruling, determination, claim or controversy, or other particular matter, pertaining to any program requirement or a contract or subcontract, or to any solicitation or bid thereof.

Kickbacks:

It shall be a breach of ethics for any payment, gratuity or offer of employment to be made by or on behalf of a subcontractor under a contract to the prime contractor or higher tier subcontractor or to any person associated therewith as an inducement for the award of a subcontract or order.

Contract Clause:

The prohibition against gratuities and kickbacks prescribed above shall be conspicuously set forth in every contract and solicitation by Galveston County.

Confidential Information:

It shall be a breach of ethics for any employee or former employee of Galveston County to knowingly use confidential information for actual or anticipated personal gain, or for the actual or anticipated gain of any other person.

Prohibition against Contingent Fees:

It shall be a breach of ethical standards for a person to be retained, or to retain a person, to solicit or secure a Galveston County contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, except for retention of bona fide employees or bona fide established commercial selling agencies for the purpose of securing business. Failure to abide by this section constitutes a breach of ethical standards.

Representation:

Bidder represents and warrants, by signing and submitting its bid, that it has not retained anyone in violation of this section prohibiting contingent fees.

Contract Clause:

The representation prescribed above shall be conspicuously set forth in every contract and solicitation thereof.

51. SUBJECT TO APPROPRIATION OF FUNDS:

State law prohibits the obligation and expenditure of public funds beyond the fiscal year for which a budget has been approved by the Commissioners' Court. Galveston County anticipates this to be an integral part of future budgets to be approved during the periods of this contract, except for unanticipated needs or events which may prevent such payments against this contract. However, Galveston County cannot guarantee the availability of funds, and enters into this contract

only to the extent such funds are made available through appropriation (allocation) by the Commissioners' Court. This contract shall not be construed as creating any debt on behalf of the County of Galveston in violation of TEX. CONST. art. XI, § 7, and it is understood that all obligations of Galveston County are subject to the availability of funds.

52. NOTICE:

All notices or other communications required or permitted under this contract shall be in writing and shall be deemed to have been duly given if delivered personally in hand, transmitted by facsimile, or mailed certified mail, return receipt requested with proper postage affixed and addressed to the appropriate party at the following address or at such other address as may have been previously given in writing to the parties (Bidder shall provide its notice information with its Bid submission). If mailed, the notice 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, duly certified, return receipt requested, with proper postage affixed. If delivered in person, notice shall be deemed delivered when received for by, or actually received by, the receiving Party.

If transmitted by facsimile, notice shall be deemed delivered when receipt of such transmission is acknowledged.

To the County at:

Hon. Mark Henry,
County Judge of Galveston County
722 Moody (21st Street), Second (2nd) Floor
Galveston, Texas 77550

Fax: (409) 765-2653

With copies to:

Rufus Crowder, CPPO CPPB,
Galveston County Purchasing Agent
722 Moody (21st Street), Fifth (5th) Floor
Galveston, Texas 77550
Fax: (409) 621-7997

Robert Boemer, Director,
Galveston County Legal Department
722 Moody (21st Street), Fifth (5th) Floor
Galveston, Texas 77550
Fax: (409) 770-5560

To the Contractor at:

(Bidder to provide its contact name, address, and facsimile number for notice hereunder.)

53. NON-DISCRIMINATION:

- A. **Equal Employment Opportunity:** Bidder will not discriminate against any employee or applicant for employment because of race, color, religion, national origin, sex, disability, genetic information or veteran status. Bidder will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, national origin, sex, disability, genetic information or veteran status. Such action shall include, but not be limited to, the following: employment; upgrading; demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Bidder agrees to post in conspicuous places, available to employees and applicants for employment, notices of employment.

Bidder will, in all solicitation or advertisements for employees placed by or on behalf of Bidder, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, national origin, sex, disability, genetic information, or veteran status.

Bidder will cause the foregoing provisions to be inserted in all subcontracts for any work covered by this Agreement so that such provisions will be binding upon each subcontractor, provided that the foregoing provisions shall not apply to contracts or subcontracts for standard commercial supplies or raw materials.

Bidder will include the provisions herein in every subcontract or purchase order unless exempted.

- B. **Drug Free Work Place Act:** Bidder shall comply with all applicable requirements of the Drug-Free Workplace Act of 1988 and implementing regulations.
- C. **Americans with Disabilities Act:** Bidder shall comply with all applicable provisions of the Americans with Disabilities Act and implementing regulations.
- D. **OSHA Regulations:** Bidder agrees to maintain and to display any applicable materials for its employees in accordance with OSHA regulations.
- E. **Compliance with Immigration Laws and Use of E-Verify:** Bidder agrees to comply with all requirements of the U.S. Immigration Reform and Control Act of 1986, as amended, and any implementing regulations thereto. Bidder further agrees to utilize the E-Verify system through the Department of Homeland Security on its employees. Bidder shall not employ unauthorized aliens, and shall not assign services to be performed to any supplier or subcontractor who are unauthorized aliens. If any personnel performing any services hereunder are discovered to be an unauthorized alien, then Bidder will immediately remove such personnel from performing services hereunder and shall replace such personnel with personnel who are not unauthorized alien(s).

- F. **State and Federal Law Compliance:** Bidder agrees to comply with all other State and Federal laws and regulations applicable to the provision of services under this contract.

54. RECORD RETENTION AND RIGHT TO AUDIT:

Bidder shall keep and maintain all records associated with this contract for a minimum of five (5) years from the close of the contract or as required by Federal or State law or regulation, whichever period is longer. If awarded this contract, Bidder shall allow the County reasonable access to the records in Bidder's possession, custody, or control that the County deems necessary to assist it in auditing the services, costs, and payments provided hereunder. If this contract involves the use of Federal or State funds, then Bidder shall also allow reasonable access to representatives of the Office of Inspector General, the General Accounting Office, and the other Federal and/or State agencies overseeing the funds that such entities deem necessary to facilitate review by such agencies and Bidder shall maintain fiscal records and supporting documentation for all expenditures in a manner that conforms with OMB Circular A-87 (relocated to 2 C.F.R. Part 225) and this contract.

55. TITLE VI ASSURANCES/TxDOT:

The County is subject to Title VI of the Civil Rights Act of 1964 and the Federal and State laws and regulations of the United States Department of Transportation and Texas Department of Transportation (TxDOT). Pursuant to these requirements, the County must have its contractors provide required assurances on compliance with non-discrimination by itself and its subcontractors. The Title VI Assurances within this Subsection are not exhaustive – whenever any Federal, State, or Local requirement requires additional clauses, this list shall not be construed as limiting. Contractor agrees as follows:

- A. **Compliance with Regulations:** The Contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the Department of Transportation (hereinafter, DOT) Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time (hereinafter referred to as the Regulations), which are incorporated herein by reference and made a part of this contract.
- B. **Non-discrimination:** The Contractor, with regard to the work performed by it during the contract, shall not discriminate on the basis of race, color, national origin, religion, sex, age, disability or Veteran status in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.
- C. **Solicitations for Subcontractors, Including Procurement of Materials and Equipment:** In all solicitations either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurement of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the Contractor of the Contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, national origin, religion, sex, age, disability or Veteran status.
- D. **Information and Reports:** The Contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information and its facilities as may be determined by the Galveston County or the Texas Department of Transportation to be pertinent to ascertain compliance with such Regulations, orders and instructions. Where any information required of the Contractor is in the exclusive possession of another who fails or refuses to furnish this information the Contractor shall so certify to Galveston County or the Texas Department of Transportation as appropriate, and shall set forth what efforts it has made to obtain the information.

- E. **Sanctions for Non-compliance:** In the event of the Contractor's noncompliance with the nondiscrimination provisions of this contract, Galveston County shall impose such contract sanctions as it or the Texas Department of Transportation may determine to be appropriate, including, but not limited to:
- 1) withholding of payments to the Contractor under the contract until the Contractor complies, and/or;
 - 2) cancellation, termination, or suspension of the contract, in whole or in part.
- F **Incorporation of Provisions.** The Contractor shall include the provisions of paragraphs (1) through (6) in every subcontract, including procurement of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The Contractor shall take such action with respect to any subcontract or procurement as Galveston County or the Texas Department of Transportation may direct as a means of enforcing such provisions including sanctions for non-compliance: Provided, however, that, in the event Contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the Contractor may request Galveston County to enter into such litigation to protect the interests of Galveston County, and, in addition, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

56. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, PROPOSED DEBARMENT, AND OTHER RESPONSIBILITY MATTERS:

Bidder certifies that neither it, nor any of its Principals, are presently debarred, suspended, proposed for debarment, disqualified, excluded, or in any way declared ineligible for the award of contracts by any Federal agency. Contractor agrees that it shall refund Galveston County for any payments made to Contractor while ineligible. Contractor

acknowledges that Contractor's uncured failure to perform under this Agreement, if such should occur, may result in Contractor being debarred from performing additional work for the County, the GLO, the State, HUD, and other Federal and State entities. Further, Bidder has executed the Certification Regarding Debarment, Suspension, Proposed Debarment, and Other Responsibility Matters and returned the fully completed and executed original certification with the submission of its bid. **The truthful and fully completed and executed original of the**

Certification Regarding Debarment, Suspension, Proposed Debarment, and Other Responsibility Matters must be included with the submission of Bidder's Bid and is a mandatory requirement of this Invitation to Bid. Bidder's failure to include the fully completed and executed original of this Certification shall be considered non-compliance with the requirements of this Invitation to Bid and grounds for the rejection of Bidder's Bid.

57. SECTION 231.006, FAMILY CODE/DELINQUENT CHILD SUPPORT:

Pursuant to Title 5, Section 231.006 of the Texas Family Code, as applicable, Bidder certifies that it, including all of its principals, is/are current in child support payments and therefore, that it is eligible to receive payments from State funds under a contract for property, materials, or services. Bidder acknowledges and agrees that if it is awarded this contract, then the ensuing agreement may be terminated and payment withheld if this certification is inaccurate. Finally, by the submission of its bid, the Bidder certifies that it has included the names and social security numbers of each person with at least 25% ownership interest in Bidder within its response to the Invitation to Bid and that all such persons are current in child support payments.

58. LABOR STANDARDS:

If applicable to this solicitation, Bidder acknowledges that the contract to be awarded pursuant to this solicitation is on a grant program funded with Federal funds.

Bidder shall comply with the requirements of 29 CFR Part 5 and CFR Part 30 and shall be in conformity with Executive Order 11246, entitled "Equal Employment Opportunity", Copeland, "Anti-Kickback" Act (29 C.F.R. Part 3), the Davis-Bacon and Related Acts (29 C.F.R. Parts 1,3, and 5), the Contract Work Hours and Safety Standards Act (40 U.S.C. 3701

et seq.), and all other applicable Federal, State, and local laws and regulations pertaining to labor standards, insofar as those acts apply to the performance of this Agreement. Bidder is also responsible for ensuring that all subcontractors comply with the requirements of 29 CFR Part 5 and CFR Part 30 and shall be in conformity with Executive Order 11246, entitled "Equal Employment Opportunity", Copeland "Anti-Kickback" Act, the Davis-Bacon and Related Acts (29 CFR Parts 1, 3 and 5), the Contract Work Hours and Safety Standards Act (40 U.S.C. 3701 et seq.), and all other applicable Federal, State, and local laws and regulations pertaining to labor standards, insofar as those acts apply to the performance of this Agreement.

End of General Provision Section

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Title 29 - LABOR

Subtitle A - Office of The Secretary of Labor

**PART 3 - CONTRACTORS AND SUBCONTRACTORS ON PUBLIC BUILDING OR PUBLIC WORK
FINANCED IN WHOLE OR IN PART BY LOANS OR GRANTS FROM THE UNITED STATES**

- ✓ Sec.
- ✓ 3.1 Purpose and scope
- 3.2 Definitions
 - ✓ 3.3 Weekly statement with respect to payment of wages
- 3.4 Submission of weekly statements and the preservation and inspection of weekly payroll records.
- ✓ 3.5 Payroll deductions permissible without application to or approval of the Secretary of Labor.
- ✓ 3.6 Payroll deductions permissible with the approval of the Secretary of Labor.
- ✓ 3.7 Applications for the approval of the Secretary of Labor
- ✓ 3.8 Action by the Secretary of Labor upon applications.
- ✓ 3.9 Prohibited payroll deductions.
- 3.10 Methods of payment of wages.
- 3.11 Regulations part of contract.

AUTHORITY: The provisions of this Part 3 issued under R.S. 161, sec. 2, 48 Stat. §48; Reorg. Plan No. 14 of 1950, 64 Stat. 1267, 5 U.S.C. Appendix; 5 U.S.C. 301; 40 U.S.C. 276c.

SOURCE: The provisions of this Part 13 appear at 29 F.R. 97, Jan. 4, 1964, unless otherwise noted.

Section 3.1 Purpose and Scope

This part prescribes "anti-kickback" regulations under section 2 of the Act of June 13, 1934, as amended (40 U.S.C. 276c), popularly known as the Copeland Act. This part applies to any contract which is subject to Federal wage standards and which is for the construction, prosecution, completion, or repair of public buildings, public works or buildings or works financed in whole or in part by loans or grants from the United States. The part is intended to aid in the enforcement of the minimum wage provisions of the Davis-Bacon Act and the various statutes dealing with Federally-assisted construction that contain similar minimum wage provisions, including those provisions which are not subject to Reorganization Plan No. 14 (e.g., the College Housing Act of 1950, the Federal Water Pollution Control Act, and the Housing Act of 1959), and in the enforcement of the overtime provisions of the Contract Work Hours Standards Act whenever they are applicable to construction work. The part details the obligation of contractors and subcontractors relative to the weekly submission of statements regarding the wages paid on work covered thereby; sets forth the circumstances and procedures governing the making of payroll deductions from the wages of those employed on such work; and delineates the methods of payment permissible on such work.

Section 3.2 Definitions.

As used in the regulations in this part:

(a) The terms "building" or "work" generally include construction activity as distinguished from manufacturing, furnishing of materials, or servicing and maintenance work. The terms include, without limitation, buildings, structures, and improvements of all types, such as bridges) dams, plants) highways, parkways, streets) subways, tunnels, sewers, mains, power lines, pumping stations, railways, airports, terminals, docks, piers, wharves, ways, lighthouses, buoys, jetties, breakwaters, levees, and canals; dredging, shoring, scaffolding, drilling, blasting, excavating, clearing and landscaping. Unless conducted in connection with and at the site of such a building or work as is described in the foregoing *sentence*, the manufacture or furnishing of materials, articles, supplies, or equipment (whether or not a Federal or State agency acquires

title to such materials, articles, supplies, or equipment during the course of the manufacture or furnishing, or owns the materials from which they are manufactured or furnished) is not a "building" or "work" within the meaning of the regulations in this part.

(b) The terms "construction," "prosecution," "completion," or "repair" mean all types of work done on a particular building or work at the site thereof, including, without limitation, altering, remodeling, painting and decorating, the transporting of materials and supplies to or from the building or work by the employees of the construction contractor or construction subcontractor, and the manufacturing or furnishing of materials, articles, supplies, or equipment on the site of the building or work, by persons employed at the site by the contractor or subcontractor.

(c) The terms "public building" or "public work" include building or work for whose construction, prosecution, completion, or repair, as defined above, a Federal agency is a contracting party, regardless of whether title thereof is in a Federal agency.

(d) The term "building or work financed in whole or in part by loans or grants from the United States" includes building or work for whose construction, prosecution, completion, or repair, as defined above, payment or part payment is made directly or indirectly from funds provided by loans or grants by a Federal agency. The term includes building or work for which the Federal assistance granted is in the form of loan guarantees or insurance.

(e) Every person paid by a contractor or subcontractor in any manner for his labor in the construction, prosecution, completion, or repair of a public building or public work or building or work financed in whole or in part by loans or grants from the United States is "employed" and receiving "wages," regardless of any contractual relationship alleged to exist between him and the real employer.

(f) The term "any affiliated person" includes a spouse, child, parent, or other close relative of the contractor or subcontractor; a partner or officer of the contractor or subcontractor; a corporation closely connected with the contractor or subcontractor as parent, subsidiary or otherwise, and an officer or agent of such corporation.

(g) The term "Federal agency" means the United States, the District of Columbia, and all executive departments, independent establishments, administrative agencies, and instrumentality's of the United States and of the District of Columbia, including corporations, all or substantially all of the stock of which is beneficially owned by the United States, by the District of Columbia, or any of the foregoing departments, establishments, agencies, and instrumentality's.
{29 FR 97, Jan. 4, 1964, as amended at 33 FR 32575, Nov. 27, 1973}

Section 3.3 Weekly statement with respect to payment of wages.

(a) As used in this section, the term "employee" shall not apply to persons in classifications higher than that of laborer or mechanic and those who are the immediate supervisors of such employees.

(b) Each contractor or subcontractor engaged in the construction, prosecution, completion, or repair of any public building or public work, or building or work financed in whole or in part by loans or grants from the United States) shall furnish each week a statement with respect to the wages paid each of its employees engaged on work covered by 29 CFR Parts 3 and 5 during the preceding weekly payroll period. This statement shall be executed by the contractor or subcontractor or by an authorized officer or employee of the contractor or subcontractor who supervises the payment of wages, and shall be on form WH 348, "Statement of Compliance," or on an identical form on the back of WH 347, "Payroll (For Contractors Optional Use)" or on any form with identical wording. Sample copies of WH 347 and WH 348 may be obtained from the Government contracting or sponsoring agency, and copies of these form may be purchased at the Government Printing Office.

(c) The requirements of this section shall not apply to any contract of \$2,000 or less.

(d) Upon a written finding by the head of a Federal agency, the Secretary of Labor may provide reasonable limitations, variations, tolerances, and exemptions from the requirements of this section subject to such conditions as the Secretary of Labor may specify.

{29 F.R. 95, Jan. 4, 1964, as amended at 33 FR. 10186, July 17, 1968}

Section 3.4 Submission of weekly statements and the preservation and inspection of weekly payroll records.

(a) Each weekly statement required under §3.3 shall be delivered by the contractor or subcontractor, within seven days after the regular payment date of the payroll period, to a representative of a Federal or State agency in charge at the site of the building or work, or if there is no representative of a Federal or State agency at the site of the building or work, the

statement shall be mailed by the contractor or subcontractor, within such time, to a Federal or State agency contracting for or financing the building or work. After such examination and check as may be made, such statement, or a copy thereof, shall be kept available, or shall be transmitted together with a report of any violation, in accordance with applicable procedures prescribed by the United States Department of Labor.

(b) Each contractor or subcontractor shall preserve his weekly payroll records for a period of three years from date of completion of the contract. The payroll records shall set out accurately and completely the name and address of each laborer and mechanic, his correct classification, rate of pay, daily and weekly number of hours worked, deductions made, and actual wages paid. Such payroll records shall be made available at all times for inspection by the contracting officer or his authorized representative, and by authorized representatives of the Department of Labor.

Section 3.5 Payroll deductions permissible without application to or approval of the Secretary of Labor.

Deductions made under the circumstances or in the situations described in the paragraphs of this section may be made without application to and approval of the Secretary of Labor:

(a) Any deduction made in compliance with the requirements of Federal, State, or local law, such as Federal or State withholding income taxes and Federal social security taxes.

(b) Any deduction of sums previously paid to the employee as a bona fide prepayment of wages when such prepayment is made without discount or interest. A "bona fide prepayment of wages" is considered to have been made only when cash or its equivalent has been advanced to the person employed in such manner as to give him complete freedom of disposition of the advanced funds.

(c) Any deduction of amounts required by court process to be paid to another, unless, the deduction is in favor of the contractor, subcontractor or any affiliated person, or when collusion or collaboration exists.

(d) Any deduction constituting a contribution on behalf of the person employed to funds established by the employer or representatives of employees, or both, for the purpose of providing either from principal or income, or both, medical or hospital care, pensions, or annuities on retirement, death benefits, compensation for injuries, illness, accidents, sickness, or disability, or for insurance to provide any of the foregoing, or unemployment benefits, vacation pay, savings accounts, or similar payments for the benefit of employees, their families and dependents: Provided, however, That the following standards are met: (1) The deduction is not otherwise prohibited by law; (2) it is either: (i) Voluntarily consented to by the employee in writing and in advance of the period in which the work is to be done and such consent is not a condition either for the obtaining of or for the continuation of employment, or

(ii) provided for in a bona fide collective bargaining agreement between the contractor or subcontractor and representatives of its employees; (3) no profit or other benefit is otherwise obtained, directly or indirectly, by the contractor or subcontractor or any affiliated person in the form of commission, dividend, or otherwise; and (4) the deductions shall serve the convenience and interest of the employee.

(e) Any deduction contributing toward the purchase of United States Defense Stamps and Bonds when voluntarily authorized by the employee.

(f) Any deduction requested by the employee to enable him to re]lay loans to or to purchase shares in credit unions organized and operated in accordance with Federal and State credit union statutes.

(g) Any deduction voluntarily authorized by the employee for the making of contributions to governmental or quasi-governmental agencies, such as the American Red Cross.

(h) Any deduction voluntarily authorized by the employee for the making of contributions to Community Chests, United Givers Funds, and similar charitable organizations.

(i) Any deductions to pay regular union initiation fees and membership dues, not including fines or special assessments: Provided, however, that a collective bargaining agreement between the contractor or subcontractor and representatives of its employees provides for such deductions and the deductions are not otherwise prohibited by law.

(j) Any deduction not more than for the "reasonable cost" of board, lodging, or other facilities meeting the requirements of section 3(m) of the Fair Labor Standards Act of 1938, as amended, and Part 531 of this title. When such a deduction is made the additional records required under §516.27(a) of this title shall be kept.

(k) Any deduction for the cost of safety equipment of nominal value purchased by the employee as his own property for his personal protection in his work, such as safety shoes, safety glasses, safety gloves, and hard hats, if such equipment is not required by law to be furnished by the employer, if such deduction is not violative of the Fair Labor Standards Act or prohibited by other law, if the cost on which the deduction is based does not exceed the actual cost to the employer where the equipment is purchased from him and does not include any direct or indirect monetary return to the employer where the equipment is purchased from a third person, and if the deduction is either (1) voluntarily consented to be the employee in

writing and in advance of the period in which the work is to be done and such consent is not a condition either for the obtaining of employment or its continuance; or (2) provided for in a bona fide collective bargaining agreement between the contractor or subcontractor and representatives of its employees.
{36F.R. 9770, May 28, 1971.}

Section 3.6 Payroll deductions permissible with the approval of the Secretary of Labor.

Any contractor or subcontractor may apply to the Secretary of Labor for permission to make any deduction not permitted under §3 .5. The Secretary may grant permission whenever he finds that:

- (a) The contractor, subcontractor, or any affiliated person does not make a profit or benefit directly or indirectly from the deduction either in the form of a commission, dividend, or otherwise;
- (b) The deduction is not otherwise prohibited by law;
- (c) The deduction is either (1) voluntarily consented to by the employee in writing and in advance of the period in which the work is to be done and such consent is not a condition either for the obtaining of employment or its continuance, or (2) provided for in a bona fide collective bargaining agreement between the contractor or subcontractor and representatives of its employees; and
- (d) The deduction serves the convenience and interest of the employee.

Section 3.7 Applications for the approval of the Secretary of Labor.

Any application for the making of payroll deductions under §3.6 shall comply with the requirements prescribed in the following paragraphs of this section:

- (a) The application shall be in writing and shall be addressed to the Secretary of Labor.
- (b) The application need not identify the contract or contracts under which the work in question is to be performed. Permission will be given for deductions on all current and future contracts of the applicant for a period of 1 year. A renewal of permission to make such payroll deduction will be granted upon the submission of an application which makes reference to the original application, recites the date of the Secretary of Labor's approval of such deductions) states affirmatively that there is continued compliance with the standards set forth in the provisions of §3 .6, and specifies any conditions which have changed in regard to the payroll deductions.
{36 F.R. 9770, May 28, 1971.}
- (c) The application shall state affirmatively that there is compliance with the standards set forth in the provisions of §3.6. The affirmation shall be accompanied by a full statement of the facts indicating such compliance.
- (d) The application shall include a description of the proposed deduction, the purpose to be served thereby, and the classes of laborers or mechanics from whose wages the proposed deduction would be made,
- (e) The application shall state the name and business of any third person to whom any funds obtained from the proposed deductions are to be transmitted and the affiliation of such person, if any, with the applicant.

Section 3.8 Action by the Secretary of Labor upon applications.

The Secretary of Labor shall decide whether or not the requested deduction is permissible under provisions of §3.6; and shall notify the applicant in writing of his decision.

Section 3.9 Prohibited payroll deductions.

Deductions not elsewhere provided for by this part and which are not found to be permissible under §3.6 are prohibited.

Section 3.10 Methods of payment of wages.

The payment of wages shall be by cash, negotiable instruments payable on demand, or the additional forms of compensation for which deductions are permissible under this part. No other methods of payment shall be recognized on work subject to the Copeland Act.

Section 3.11 Regulations part of contract.

BID #B151027

OPEN DATE: 09/03/2015

TIME: 2:00 PM

All contracts made with respect to the construction, prosecution, completion, or repair of any public building or public work or building or work financed in whole or in part by loans or grants from the United States covered by the regulations in this part shall expressly bind the contractor or subcontractor to comply with such of the regulations in this part as may be applicable. In this regard, see §5.5(a) of this subtitle.



Texas General Land Office - Disaster Recovery

Form 6-2 Wage Rate Issuance Notice

The Davis-Bacon Act requires a valid Wage Decision be included in the bid package and construction contract specifications before bids are opened and be in effect on the date of the construction contract award. Obtain the most current Davis-Bacon wage decisions at www.wdol.gov

GLO Contract #:

Grantee Name:

GLO-DR Contract #: DRS

Labor Standards Officer Name:

Address:

Phone #:

I have determined the following General Wage Decision to be applicable for this construction work:**

**Wage Decision Number: _____

Published: _____

Type of Work (check one): Heavy Highway Building Residential

Description of Bid Activity _____

Estimated Bid Opening Date: _____

ISSUED BY:

Name: _____ Title: _____

Address: _____ City: _____

State: TX Zip: _____ Phone No: (_____) _____

****Attach wage decision to this form and retain in local files. Do not send a copy to GLO-DR****

This form effective 9/10/2012

General Decision Number: TX150094 01/02/2015 TX94

Superseded General Decision Number: TX20140094

State: Texas

Construction Type: Heavy

County: Galveston County in Texas.

HEAVY CONSTRUCTION PROJECTS Including Water and Sewer Lines
(Does Not Include Flood Control)

Note: Executive Order (EO) 13658 establishes an hourly minimum wage of \$10.10 for 2015 that applies to all contracts subject to the Davis-Bacon Act for which the solicitation is issued on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.10 (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/02/2015

* SFTX0669-001 07/01/2013

	Rates	Fringes
SPRINKLER FITTER (Fire Sprinklers).....	\$ 26.36	16.62

SUTX2005-021 08/05/2005		

HEAVY Including Water and Sewer Lines (Excluding Flood Control)

	Rates	Fringes
Carpenter.....	\$ 14.38	
Cement mason/concrete finisher.....	\$ 11.37	1.13
Electrician.....	\$ 18.40	1.34
FORM BUILDER/FORM SETTER.....	\$ 13.35	1.17
IRONWORKER, REINFORCING.....	\$ 11.29	
Laborers:		
Common.....	\$ 10.70	
Landscape.....	\$ 7.35	
Mason Tender Cement.....	\$ 9.96	
Pipelayer.....	\$ 10.07	
PIPEFITTER.....	\$ 17.00	0.04

Power equipment operators:

Excavator.....	\$ 16.74	
Backhoe.....	\$ 13.25	
Bulldozer.....	\$ 14.00	
Crane.....	\$ 14.91	0.58
Front End Loader.....	\$ 11.75	0.92
Grader.....	\$ 12.20	1.48
Tractor.....	\$ 12.38	1.51

TRUCK DRIVER.....\$ 12.28 0.98

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

=====

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and

non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an

interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

=====

END OF GENERAL DECISION



BID #B151027
OPEN DATE: 09/03/2015
TIME: 2:00 PM

SECTION IV

Project Scope
General Notes

Section 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 SCOPE OF WORK

- A. This section describes the project in general and provides an overview of the extent of the work to be performed by the CONTRACTOR. Detailed requirements and extent of work is stated in the applicable Specification sections and shown on the Plans. CONTRACTOR shall, except as otherwise specifically stated herein or in any applicable part of these Contract Documents, provide and pay for all labor, materials, equipment, tools, construction equipment, and other facilities and services necessary for proper execution, testing, and completion of the work.

- B. Any part or item of the work which is reasonably implied or normally required to make each installation satisfactorily operable shall be performed by the CONTRACTOR and the expense thereof shall be included in the applicable unit prices or lump sum prices bid for the work. It is the intent of these Specifications to provide the OWNER with the complete operable systems, subsystems, and other items of work. All miscellaneous appurtenances and other items of work that are incidental to meeting the intent of these Specifications shall be considered as having been included in the applicable unit prices or lump sum prices bid for the work even though these appurtenances and items may not be specifically called for in the Specifications.

1.02 DESCRIPTION OF THE PROJECT

- A. The Work for the Bolivar Port Plant includes construction of the following:
 - 1. Concrete Generator Platform
 - 2. Hot Dipped Galvanized Stairs
 - 3. Aluminum Handrail
 - 4. 250 kW Diesel Generator
 - 5. Complete Electrical System

- B. The Work for the Singing Sands Plant includes construction of the following:
 - 1. Concrete Generator Platform
 - 2. Hot Dipped Galvanized Stairs
 - 3. Aluminum Handrail
 - 4. 500 kW Diesel Generator
 - 5. Complete Electrical System

- C. The Work for the High Island North Plant includes construction of the following:
 - 1. Concrete Generator Platform
 - 2. Hot Dipped Galvanized Stairs

3. Aluminum Handrail
4. 275 kW Diesel Generator
5. Complete Electrical System

1.03 WORK SEQUENCE

- A. The CONTRACTOR is required to determine his own method of construction and detailed work sequence so long as the restraints are observed and the overall project completion time is achieved (identified in the Contract Documents).
- B. The CONTRACTOR shall, prior to notice to proceed, prepare and submit a construction schedule to the Engineer for approval. The CONTRACTOR shall be advised that the existing water production plant facilities are integral to the Bolivar Peninsula SUD water production and distribution system and as such must remain operable through-out the construction period of the project. The scope of work shall be scheduled by the Contractor and coordinated with the Engineer/Operator to maintain operation of the facilities.

1.04 CONSTRUCTION CRITERIA

- A. The CONTRACTOR shall maintain all public streets in a condition such that vehicles and pedestrian traffic may be maintained at all times. All excavated material, construction materials, construction equipment, and construction vehicles shall be placed so as not to cause traffic hazards. If CONTRACTOR'S operations cause traffic hazards, CONTRACTOR shall repair the road surface, provide temporary ways, erect wheel guards or fences or take other measures for safety satisfactory to the ENGINEER and the OWNER.
- B. The CONTRACTOR shall take all necessary precautions to prevent injury to the public in the construction area. Such precautions shall include, but not necessarily be limited to, the use of flagmen, the use of police, the erection of warning signs and/or the use of other means required by the OWNER. The CONTRACTOR shall be fully responsible for damage and injuries whether or not precautions have been provided.
- C. The CONTRACTOR shall sequence all work such that at least one lane is open to traffic in all public streets at all times. At all times that one traffic lane must be closed, the CONTRACTOR's Traffic Control Plan shall include uniformed flagmen. Also, work shall be sequenced such that all lanes of traffic are open and vehicular access is provided to all businesses and residences on Saturdays, Sundays, and Holidays.
- D. When detours are necessary, CONTRACTOR shall provide all necessary barriers, warning and direction signs, warning lights, flagmen, police protection, and/or any other protective devices required by the OWNER. The CONTRACTOR shall request detours from, coordinate with, and secure the required permits from the OWNER.
- E. The CONTRACTOR shall be responsible for the preservation of all public and private property and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account

- of any act, omission, neglect, or misconduct in the execution of the work on the part of the CONTRACTOR, such property shall be restored by the CONTRACTOR, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in other manners acceptable to the ENGINEER.
- F. During the course of the work, the CONTRACTOR shall keep the site of his operations in as clean and neat a condition as is possible. He shall dispose of all residue resulting from the construction work and, at the conclusion of the work, he shall remove and haul away any surplus excavation, broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operations, and shall leave the entire site of the work in a neat and orderly condition.

1.05 CONTRACTOR'S RESPONSIBILITIES

- A. Execute all work. The work of this Contract is generally specified in the Construction Documents.
- B. Arrange for the securing of any necessary permits and pay for the same.
- C. Arrange for the necessary temporary water service and pay for this service and all water consumed during the construction work.
- D. Provide adequate temporary sanitary facilities.
- E. Secure all necessary building permits and furnish, install, maintain, and remove all temporary electric service facilities for construction purposes, and pay for all electrical energy consumed for construction purposes, until final acceptance by the OWNER or until the ENGINEER certifies Substantial Completion. CONTRACTOR shall be responsible for determining the total temporary electrical need and shall provide it accordingly. The temporary electrical service shall meet NEC, OSHA, and all other local safety codes.
- F. Provide and pay for temporary service for lighting of temporary facilities.
- G. Provide initial and replacement lamps, wiring, switches, sockets, and other necessary electrical equipment required for temporary lighting and for small power tools.
- H. Provide wiring, equipment, and connections for portable or temporary heating units.
- I. Provide temporary heater; make all arrangements and pay all fuel costs; supervise and maintain all heating units.
- J. Provide adequate dewatering of the site as required for the work throughout the time required to complete the work as shown on the Plans and specified hereinafter.
- K. Provide all other temporary facilities, services, and all items as called for in the Contract Documents.

- L. CONTRACTOR shall be responsible to locate all underground utilities, pipelines, conduits, etc. for obstructions to the project as designed prior to commencing construction. CONTRACTOR shall notify engineer of said obstructions.

- M. Field verifications and modifications to design locations shall be considered incidental to project and included in the unit price bid found in these Construction Documents.

END OF SECTION

BID #
OPEN DATE
TIME

SECTION V

Project Specifications

00003
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END OF SECTION

Section 01026

SCHEDULE OF VALUES

PART 1 GENERAL

1.01 SECTION INCLUDES

Preparation and submittal of a Schedule of Values for stipulated price contracts or for major lump sum items on unit price contracts for which the Contractor requests progress payments.

1.02 DEFINITION

- A. The Schedule of Values is an itemized list that establishes the value of each part of the Work for a stipulated price contract or for major lump sum items. The Schedule of Values is used as the basis for preparing applications for payments. Quantities and unit prices may be included in the schedule when approved by or required by the Engineer.
- B. A major lump sum item is a lump sum item in the Schedule of Unit Price Work, which qualifies as Major Unit Price Work as defined in Section GC - General Conditions.

1.03 PREPARATION

- A. For stipulated price contracts, subdivide the Schedule of Values into logical portions of the Work, such as major work items or work in contiguous geographic areas. Then organize each portion using the Table of Contents of this Project Manual as an outline for listing the value of work by Sections. A pro rata share of mobilization, bonds, and insurance may be listed as separate items for each portion of the work.
- B. For unit price contracts, items should include a proportional share of Contractor's overhead and profit so that the total of all items will equal the Contract Price.
- C. For lump sum equipment items where submittal of operation/maintenance data and testing are required, include a separate item for equipment operation and maintenance data submittal valued at 5 percent of the lump sum amount and a separate item for testing and adjusting valued at 5 percent of the lump sum amount.
- D. Round off figures for each listed item to the nearest \$100.00 except for the value of one item, if necessary, to make the total of all items in the Schedule of Values equal the Contract Price for stipulated price contracts or the lump sum amount in the Schedule of Unit Price Work.
- E. Type the schedule of values on 8-1/2-inch by 11-inch white bond paper.

1.04 SUBMITTAL

- A. Submit the Schedule of at least 10 days prior to submitting the first application for progress payment.
- B. Revise the Schedule of Values and resubmit for items affected by contract modifications, change orders, and work change directives. After the changes are approved by the Engineer, make the submittal at least 10 days prior to submitting the next application for progress payment.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

Section 01270

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures for measurement and payment plus conditions for nonconformance assessment and nonpayment for rejected Products.

1.02 AUTHORITY

- A. Measurement methods delineated in Specification sections are intended to complement criteria of this Section. In event of conflict, requirements of the Specification section shall govern.
- B. Engineer will take all measurements and compute quantities accordingly.
- C. Assist by providing necessary equipment, workers, and survey personnel.
- D. Measurement and Payment paragraphs are included only in those Specification sections of Division 01 where direct payment will be made. Include costs in the total bid price for those Specification sections in Division 01 that do not contain Measurement and Payment paragraphs.

1.03 UNIT QUANTITIES SPECIFIED

- A. Quantity and measurement estimates stated in the Agreement are for contract purposes only. Quantities and measurements supplied or placed in the Work and verified by Engineer will determine payment as stated in Article 9 of Document 00700 - General Conditions.
- B. When actual work requires greater or lesser quantities than those quantities indicated in Document 00410 - Bid Form, provide required quantities at Unit Prices contracted, except as otherwise stated in Article 9 of Document 00700 - General Conditions.

1.04 MEASUREMENT OF QUANTITIES

- A. Measurement by Weight: Reinforcing steel, rolled or formed steel or other metal shapes are measured by CRSI or AISC Manual of Steel Construction weights. Welded assemblies are measured by CRSI or AISC Manual of Steel Construction or scale weights.
- B. Measurement by Volume:
 - 1. Stockpiles: Measured by cubic dimension using mean length, width, and height or thickness.

- 2. Excavation and Embankment Materials: Measured by cubic dimension using average end area method.
- C. Measurement by Area: Measured by square dimension using mean length and width or radius.
- D. Linear Measurement: Measured by linear dimension, at item centerline or mean chord.
- E. Stipulated Price Measurement: By unit designated in the Agreement.
- F. Other: Items measured by weight, volume, area, or linear means or combination, as appropriate, as completed item or unit of the Work.
- G. Measurement by Each: Measured by each instance or item provided.
- H. Measurement by Lump Sum: Measure includes all associated work.

1.05 PAYMENT

- A. Payment includes full compensation for all required supervision, labor, Products, tools, equipment, plant, transportation, services, and incidentals; and erection, application or Installation of an item of the Work; and Contractor's overhead and profit.
- B. Interim payments for stored materials will be made only for materials to be incorporated under items covered in Unit Prices, unless disallowed in Document 00800 - Supplementary Conditions.
- C. Progress payments will be based on Engineer's observations and evaluations of quantities incorporated in the Work multiplied by Unit Price.
- D. Final payment for work governed by Unit Prices will be made on the basis of actual measurements and quantities determined by Engineer multiplied by the Unit Price for work which is incorporated in or made necessary by the Work.

1.06 NONCONFORMANCE ASSESSMENT

- A. Remove and replace work, or portions of the Work, not conforming to the Contract documents.
- B. When not practical to remove and replace work, District Engineer will direct one of the following remedies:
- C. Nonconforming work will remain as is, but Unit Price will be adjusted lower at discretion of District Engineer.
- D. Nonconforming work will be modified as authorized by District Engineer, and the Unit Price will be adjusted lower at the discretion of District Engineer, when

modified work is deemed less suitable than specified.

- E. Specification sections may modify the above remedies or may identify a specific formula or percentage price reduction.
- F. Authority of District Engineer to assess nonconforming work and identify payment adjustment is final.

1.07 NONPAYMENT FOR REJECTED PRODUCTS

- A. Payment will not be made for any of the following:
 - 1. Products wasted or disposed of in an unacceptable manner.
 - 2. Products determined as nonconforming before or after placement.
 - 3. Products not completely unloaded from transporting vehicles.
 - 4. Products placed beyond lines and levels of required work.
 - 5. Products remaining on hand after completion of the Work, unless specified otherwise.
 - 6. Loading, hauling, and disposing of rejected Products.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

Section 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Submittal procedures for:

1. Schedule of Values
2. Construction Schedules and Cash Flow Curve (billing forecast).
3. Shop Drawings, Product Data and Samples
4. Operations and Maintenance (O&M) Data
5. Manufacturer's Certificates
6. Construction Photographs
7. Project Record Documents and monthly certification.
8. Video Tapes
9. Design Mixes

1.02 SUBMITTAL PROCEDURES

A. Scheduling and Handling:

1. Submit Shop Drawings, data and Samples for related components as required by Specifications and Engineer.
2. Schedule submittals well in advance of need for construction Products. Allow time for delivery of Products after submittal approval.
3. Develop submittal schedule that allows sufficient time for initial review, correction, resubmission and final review of all submittals. Allow a minimum of 30 days for initial review. Engineer will review and return submittals to Contractor as expeditiously as possible but time required for review will vary depending on complexity and quantity of data submitted.
4. Engineer's review of submittals covers only general conformity to Drawings, Specifications and dimensions that affect layout. Contractor is responsible for quantity determination. No quantities will be verified by Engineer. Contractor is responsible for errors, omissions or deviations from Contract requirements; review of submittals does not relieve Contractor from the

obligation to furnish required items in accordance with Drawings and Specifications.

5. Submit five copies of documents unless otherwise specified.
 6. Revise and resubmit submittals as required. Identify all changes made since previous submittal.
 7. Assume risk for fabricated Products delivered prior to approval. Do not incorporate Products into the Work, or include payment for Products in periodic progress payments, until approved by Engineer.
- A. Transmittal Form and Numbering:
1. Transmit each submittal to Engineer with Transmittal letter which includes:
 - a. Date and submittal number
 - b. Project title and number
 - c. Names of Contractor, Subcontractor, Supplier and manufacturer
 - d. Identification of Product being supplied
 - e. Location of where Product is to be Installed
 - f. Applicable Specification section number
 2. Identify deviations from Contract documents clouding submittal drawings. Itemize and detail on separate 8-1/2 by 11-inch sheets entitled "DEVIATIONS FOR _____." When no deviations exist, submit a sheet stating no deviations exist.
 3. Have design deviations signed and sealed by an appropriate design professional, registered in the State of Texas.
 4. Sequentially number transmittal letters beginning with number one. Use original number for resubmittals with an alphabetic suffix (i.e., 2A for the first resubmittal of submittal 2, or 15C for third resubmittal of submittal 15, etc.). Show only one type of work or Product on each submittal. Mixed submittals will not be accepted.
- C. Contractor's Stamp:
1. Apply Contractor's Stamp certifying that the items have been reviewed in detail by Contractor and that they comply with Contract requirements, except as noted by requested variances.
 2. As a minimum, Contractor's Stamp shall include:
 - a. Contractor's name
 - b. Job number
 - c. Submittal number
 - d. Certification statement Contractor has reviewed submittal and it is in compliance with the Contract
 - e. Signature line for Contractor

- D. Submittals will be returned with one of the following Responses:
1. "ACKNOWLEDGE RECEIPT" when no response and resubmittal is required.
 2. "NO EXCEPTION" when sufficient information has supplied to determine that item described is accepted and that no resubmittal is required.
 3. "EXCEPTIONS AS NOTED" when sufficient information has been supplied to determine that item will be acceptable subject to changes, or exceptions, which will be clearly stated. When exceptions require additional changes, the changes must be submitted for approval. Resubmittal is not required when exceptions require no further changes.
 4. "REJECTED-RESUBMIT" when submittal does not contain sufficient information, or when information provided does not meet Contract requirements. Additional data or details requested by Engineer must be submitted to obtain approval.

1.03 MANUFACTURER'S CERTIFICATES

- A. When required by Specification sections, submit manufacturers' certificate of compliance for review by Engineer.
- B. Place Contractor's Stamp on front of certification.
- C. Submit supporting reference data, affidavits, and certifications as appropriate.
- D. Product certificates may be recent or from previous test results, but must be acceptable to Engineer.

1.04 DESIGN MIXES

- A. When required by Specification sections, submit design mixes for review.
- B. Place Contractor's Stamp, as specified in this section, on the front of each design mix.
- C. Mark each mix to identify proportions, gradations, and additives for each class and type of mix submitted. Include applicable test results from samples for each mix. Perform tests and certifications within 12 months of the date of the submittal.
- D. Maintain copies of approved mixes at mixing plant.

1.05 CHANGES TO CONTRACT

- A. Changes to Contract may be initiated by completing a Request for Information form. Engineer will provide a response to Contractor by completing the form and returning it to Contractor.
 1. If Contractor agrees that the response will result in no increase in cost or time,

a Minor Change in the Work will be issued by City Engineer.

2. If Contractor and Engineer agree that an increase in time or cost is warranted, Engineer will forward the Request for Proposal for negotiation of a Change Order.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

Section 01340

SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 G E N E R A L

1.01 SECTION INCLUDES

- A. Methods, schedules, and processes to be followed for Shop Drawings, Product Data and Sample submittals.

1.02 REQUIREMENT

- A. Submit Shop Drawings, Product Data and Samples as required by Document 00700 - General Conditions and Specification sections, using procedures specified in Section 01330 - Submittal Procedures and the requirements of this Section.
- B. Shop Drawings, Product Data and Samples are not considered Contract documents.

1.03 SHOP DRAWING/SUBMITTAL SCHEDULE

- A. Submit a separate Shop Drawing submittal schedule at same time the Construction Schedule is submitted. List Products for which Shop Drawings and other submittals are required in the order that they appear in Specifications. Include Product Data and Sample submittals in the schedule. Payment Applications or Certificates for Payment will not be processed until Project Manager has approved the Shop Drawing submittal schedule.

1.04 SHOP DRAWINGS

- A. Submit a minimum of seven sets of Shop Drawings and Product Data in a form and quality suitable for microfilming. Review and sign Shop Drawings indicating compliance with the Contract.
- B. Place Contractor's Stamp on each drawing as described in Section 01330 - Submittal Procedures.
- C. Show the following accurately and distinctly:
 - 1. Field and erection dimensions;
 - 2. Arrangement and section views;
 - 3. Relation to adjacent materials or structure, including complete information for making connections between the Work and work under other contracts;
 - 4. Types of Products and finishes;

5. Parts list and descriptions;
 6. Assembly drawings of equipment components and accessories showing respective positions and relationships to the complete equipment package;
 7. Identify details by referencing drawing sheet and detail numbers, schedule or room numbers as shown on the Contract drawings, where necessary for clarity.
- D. Scale drawings to provide a true representation of the specific equipment or item Furnished.
- E. Coordinate and submit components, necessary for Project Manager to adequately review submittal, as a complete package. Reproduction of the Drawings for use in Shop Drawings is not allowed.
- F. For major changes to original documents, submit Computer-Aided Design (CAD) drawings on a media acceptable to Project Manager.

1.05 **PRODUCT DATA**

- A. Submit Product Data for review as required in Specifications.
- B. Place Contractor's stamp, on each data item submitted, as described in Section 01330 - Submittal Procedures.
- C. Mark each copy to identify applicable Products, models, and options to be used in the Work. Where required by Specifications, supplement manufacturers' standard data to provide information unique to the Work.
- D. Give manufacturers, trade name, model or catalog designation and applicable reference standard for Products specified only by reference standards.
- E. Pre-approved and Pre-qualified Products.
 1. For "pre-approved", "pre-qualified" and "approved" Products named in the City standard products list, provide an appropriate list designation, as described in Section 01630 - Product Substitution Procedures, within 30 days after Notice to Proceed.
 2. For Products proposed as alternates to "approved" products, provide information required to demonstrate that the proposed Products meet the level of quality and performance criteria of the "approved" product.

1.06 **SAMPLES**

- A. Submit Samples for review as required by Specifications. Have Samples reviewed and signed by a Registered Professional.

- B. Place Contractor's stamp on each Sample or firmly attach a sheet of paper with Contractor's stamp, as described in Section 01330 - Submittal Procedures.
- C. Submit the number of Samples specified in Specifications; Project Manager will retain one.
- D. Reviewed Samples that may be used in the Work are identified in Specifications.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

Section 01454

TESTING LABORATORY SERVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Testing laboratory services and Contractor responsibilities related to those services.

1.02 REFERENCES

- A. ASTM C 1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
- B. ASTM D 3666 - Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials.
- C. ASTM D 3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
- D. ASTM E 329 - Standard Specification for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.
- E. ISO/TEC Guide 25 - General Requirements for the Competence of Calibration and Testing Laboratories.

1.03 SELECTION AND PAYMENT

- A. The District will select, employ, and pay for services of an independent testing laboratory to perform inspection and testing identified in Part 3 of individual Specification sections.
- B. Employment of a testing laboratory by the District shall not relieve Contractor of its obligation to perform work in accordance with requirements of Contract documents.
- C. The District will deduct a minimum two-hour charge for testing laboratory time from periodic progress payment when operations requiring testing or inspection are canceled without prior notification.
- D. The District will deduct cost of retesting from periodic progress payment whenever failed work is removed, replaced and retested.

1.04 QUALIFICATION OF LABORATORY

- A. Meet laboratory requirements of ASTM E 329 and applicable requirements of ASTM C 1077, ASTM D 3666, and ASTM D 3740.

- B. Meet ISO/TEC Guide 17025 conditions for accreditation by the American Association for Laboratory Accreditation (A2LA) in specific fields of testing required in individual Specification sections.
- C. If laboratory subcontracts are part of the testing services, such work will be placed with a laboratory complying with the requirements of this Section.

1.05 LABORATORY REPORTS

- A. Testing laboratory shall provide and distribute copies of laboratory reports to the distribution list Project Manager provides at the pre-construction conference.
- B. Keep one copy of each laboratory report distributed or faxed at the site field office for duration of the Work.
- C. Laboratory will fax material supplier, Contractor and Project Manager reports that indicate failing test results by no later than close of business on the working day following test completion and review.

1.06 LIMITS ON TESTING LABORATORY AUTHORITY

- A. Laboratory may not release, revoke, alter, or enlarge requirements of the Contract.
- B. Laboratory may not approve or accept any portion of the Work.
- C. Laboratory may not assume Contractor duties.
- D. Laboratory has no authority to stop the Work.

1.07 CONTRACTOR RESPONSIBILITIES

- A. Provide safe access to the Work and to manufacturer's facilities for Project Manager and for testing laboratory personnel.
- B. Provide testing laboratory with a copy of the Construction Schedule and a copy of each update to Construction Schedule.
- C. Notify Project Manager and testing laboratory during normal working hours of the day previous to expected time for operations requiring inspection and testing services. When Contractor fails to make timely prior notification, do not proceed with the operations requiring inspection and testing services.
- D. Notify Design Consultant 24 hours in advance when Specification requires presence of Design Consultant for sampling or testing.
- E. Request and monitor testing as required to provide timely results and to avoid delays to the Work. Provide samples to laboratory in sufficient time to allow required test to be performed in accordance with specified test methods before intended use of the Product.

- F. Cooperate with laboratory personnel in collecting samples on site. Provide incidental labor and facilities for safe access to the Work to be tested, to obtain and handle samples at site or at source of Products to be tested, and to facilitate tests and inspections including storage and curing of test samples.
- G. Make arrangements with laboratory through Project Manager. Payment for additional testing will be made in accordance with Document 00700 - General Conditions:
 - 1. Re-testing required for failed tests.
 - 2. Re-testing for nonconforming work.
 - 3. Additional sampling and tests requested beyond specified requirements.
 - 4. Insufficient notification of cancellation of tests for work scheduled but not performed.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.01 CONDUCTING TESTING

- A. Conform to laboratory sampling and testing methods specified in individual Specification sections to the latest issues of ASTM standards, TxDOT methods, or other recognized test standards as approved by Project Manager.
- B. Requirements of this Section shall also apply to those tests for approval of materials, for mix designs, and for quality control of materials as performed by employed testing laboratories.

END OF SECTION

Section 01576

WASTE MATERIAL DISPOSAL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Disposal of waste material and salvageable material.

1.2 UNIT PRICES

- A. No separate payment will be made for waste material disposal under this Section. Include payment in lump sum price for work.

1.3 SUBMITTALS

- A. Submittals shall conform to requirements of Section 01330 - Submittal Procedures.
- B. Obtain and submit disposal permits for proposed disposal sites if required by local ordinances.
- C. Submit a copy of written permission from property owner, along with description of property, prior to disposal of excess material adjacent to the Project. Submit a written and signed release from property owner upon completion of disposal work.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 SALVAGEABLE MATERIAL

- A. Excavated Material: When indicated on Drawings, load, haul, and deposit excavated material at a location selected by the Contractor and approved by the Engineer.
- B. Base, Surface, and Bedding Material: Load shell, gravel, bituminous, or other base and surfacing material shall be disposed of offsite to a location selected by the Contractor and approved by the Engineer.
- C. Pipe Culvert: Load culverts shall be disposed of offsite to a location selected by the Contractor and approved by the Engineer.
- D. Other Salvageable Materials: Conform to requirements of individual Specification Sections.

3.2 EXCESS MATERIAL

- A. Vegetation, rubble, broken concrete, debris, asphaltic concrete pavement, excess soil, and other materials not designated for salvage, shall become the property of Contractor and shall be removed from the job site and legally disposed of.
- B. Excess soil may be deposited on private property adjacent to the Project when written permission is obtained from property owner. See Paragraph 1.03 D above.
- C. Verify the flood plain status of any proposed disposal site. Do not dispose of excavated materials in an area designated as within the 100-year Flood Hazard Area.
- D. Waste materials shall be removed from the site on a daily basis, such that the site is maintained in a neat and orderly condition.

END OF SECTION

Section 01578

CONTROL OF GROUND AND SURFACE WATER

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Dewatering, depressurizing, draining, and maintaining trenches, shaft excavations, structural excavations and foundation beds in stable condition, and controlling ground water conditions for tunnel excavations.
- B. Protecting work against surface runoff and rising floodwaters.
- C. Trapping suspended sediment in the discharge from the surface and ground water control systems.

1.02 MEASUREMENT AND PAYMENT

A. UNIT PRICES

- 1. When noted, dewatering of trench or excavation during course of project shall be measured per linear foot and paid for at contract unit prices for dewatering, when directed to perform such work by Project Manager. Dewatering must be fully detailed in submittal and submittal must be approved prior to performing dewatering work before payment will be made for dewatering. No payment will be made for work unless directed to perform work by Project Manager.
- 2. Presence of a pump on project does not constitute dewatering for payment under bid item "Ground Water Control for Open Cut Construction."
- 3. Dewatering required during course of project to lower water table for other utility installation less than 24 inches in diameter, construction of structures, removal of standing water, surface drainage seepage, or to protect against rising waters or floods shall be considered incidental to Work unless otherwise noted.
- 4. No separate payment will be made for groundwater control associated with augering, tunnels or casing. Include cost in unit price for augering.
- 5. Refer to Section 01270 - Measurement and Payment for unit price procedures.

- B. Stipulated Price (Lump Sum) Contract. If the Contract is a Stipulated Price Contract, include payment for work under this section in the total Stipulated Price.

1.03 REFERENCES

- A. ASTM D 698 - Standard Test Methods for Laboratory Compaction of Soils Using Standard Effort (12,400 ft-lbf/ft³ (600kN-m/m³))

- B. Federal Regulations, 29 CFR Part 1926, Standards-Excavation, Occupational Safety and Health Administration (OSHA)
- C. Storm Water Management Handbook for Construction Activities prepared by City of Houston, Harris County and Harris County Flood Control District.

1.04 DEFINITIONS

- A. Ground water control system: system used to dewater and depressurize water-bearing soil layers.
 - 1. Dewatering: lowering the water table and intercepting seepage that would otherwise emerge from slopes or bottoms of excavations, or into tunnels and shafts; and disposing of removed water. Intent of dewatering is to increase stability of tunnel excavations and excavated slopes, prevent dislocation of material from slopes or bottoms of excavations, reduce lateral loads on sheeting and bracing, improve excavating and hauling characteristics of excavated material, prevent failure or heaving of bottom of excavations, and to provide suitable conditions for placement of backfill materials and construction of structures and other installations.
 - 2. Depressurization: includes reduction in piezometric pressure within strata not controlled by dewatering alone, necessary to prevent failure or heaving of excavation bottom or instability of tunnel excavations.
- B. Excavation drainage: includes keeping excavations free of surface and seepage water.
- C. Surface drainage: includes use of temporary drainage ditches and dikes and installation of temporary culverts and sump pumps with discharge lines necessary to protect Work from any source of surface water.
- D. Monitoring facilities for ground water control system: includes piezometers, monitoring wells and flow meters for observing and recording flow rates.

1.05 PERFORMANCE REQUIREMENTS

- A. Conduct subsurface investigations to identify groundwater conditions and provide parameters for design, installation, and operation of groundwater control systems. Submit proposed method and spacing of readings for review prior to obtaining water level readings.
- B. Design ground water control system, compatible with requirements of Federal Regulations 29 CFR Part 1926 and Section 02260 - Trench Safety Systems, to produce following results:
 - 1. Effectively reduce hydrostatic pressure affecting:
 - a. Excavations
 - b. Tunnel excavation, face stability or seepage into tunnels

2. Develop substantially dry and stable subgrade for subsequent construction operations
 3. Preclude damage to adjacent properties, buildings, structures, utilities, installed facilities and other work
 4. Prevent loss of fines, seepage, boils, quick condition, or softening of foundation strata
 5. Maintain stability of sides and bottom of excavations
- C. Provide ground water control systems that include single-stage or multiple-stage well point systems, eductor and ejector-type systems, deep wells, or combinations of these equipment types.
- D. Provide drainage of seepage water and surface water, as well as water from other sources entering excavation. Excavation drainage may include placement of drainage materials, crushed stone and filter fabric, together with sump pumping.
- E. Provide ditches, berms, pumps and other methods necessary to divert and drain surface water from excavation and other work areas.
- F. Locate ground water control and drainage systems so as not to interfere with utilities, construction operations, adjacent properties, or adjacent water wells.
- G. Assume sole responsibility for ground water control systems and for any loss or damage resulting from partial or complete failure of protective measures and settlement or resultant damage caused by ground water control operations. Modify ground water control systems or operations if they cause or threaten to cause damage to new construction, existing site improvements, adjacent property, adjacent water wells, or potentially contaminated areas. Repair damage caused by ground water control systems or resulting failure of system to protect property as required.
- H. Install an adequate number of piezometers installed at proper locations and depths, necessary to provide meaningful observations of conditions affecting excavation, adjacent structures and water wells.
- I. Install environmental monitoring wells at proper locations and depths necessary to provide adequate observations of hydrostatic conditions and possible contaminant transport from contamination sources into work area or ground water control system.

1.06 SUBMITTALS

- A. Conform to requirements of Section 01330 - Submittals Procedures.
- B. Submit Ground Water and Surface Water Control Plan for review by Project Manager prior to start of excavation work. Include the following:
 1. Results of subsurface investigations and description of extent and

- characteristics of water bearing layers subject to ground water control
2. Names of equipment Suppliers and installation Subcontractors
 3. Description of proposed ground water control systems indicating arrangement, location, depth and capacities of system components, installation details and criteria and operation and maintenance procedures
 4. Description of proposed monitoring facilities indicating depths and locations of piezometers and monitoring wells, monitoring installation details and criteria, type of equipment and instrumentation with pertinent data and characteristics
 5. Description of proposed filters including types, sizes, capacities and manufacturer's application recommendations
 6. Design calculations demonstrating adequacy of proposed systems for intended applications. Define potential area of influence of ground water control operation near contaminated areas.
 7. Operating requirements, including piezometric control elevations for dewatering and depressurization
 8. Excavation drainage methods including typical drainage layers, sump pump application and other
 9. Surface water control and drainage installations
 10. Proposed methods and locations for disposing of removed water
- C. Submit following records upon completion of initial installation:
1. Installation and development reports for well points, eductors, and deep wells
 2. Installation reports and baseline readings for piezometers and monitoring wells
 3. Baseline analytical test data of water from monitoring wells
 4. Initial flow rates
- D. Submit the following records weekly during control of ground and surface water operations:
1. Records of flow rates and piezometric elevations obtained during monitoring of dewatering and depressurization. Refer to Paragraph 3.02, Requirements for Eductor, Well Points, or Deep Wells.
 2. Maintenance records for ground water control installations, piezometers and

monitoring wells

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Comply with requirements of agencies having jurisdiction.
- B. Comply with Texas Commission on Environmental Quality regulations and Texas Water Well Drillers Association for development, drilling, and abandonment of wells used in dewatering system.
- C. Obtain necessary permits from agencies with jurisdiction over use of groundwater and matters affecting well installation, water discharge, and use of existing storm drains and natural water sources. Since review and permitting process may be lengthy, take early action to obtain required approvals.
- D. Monitor ground water discharge for contamination while performing pumping in vicinity of potentially contaminated sites.

PART 2 P R O D U C T S

2.01 EQUIPMENT AND MATERIALS

- A. Select equipment and materials necessary to achieve desired results for dewatering. Selected equipment and materials are subject to review by Project Manager through submittals required in Paragraph 1.06, Submittals.
- B. Use experienced contractors, regularly engaged in ground water control system design, installation, and operation, to furnish and install and operate educators, well points, or deep wells, when needed
- C. Maintain equipment in good repair and operating condition.
- D. Keep sufficient standby equipment and materials available to ensure continuous operation, where required.
- E. Portable Sediment Tank System: Standard 55-gallon steel or plastic drums, free of hazardous material contamination.
 - 1. Shop or field fabricate tanks in series with main inlet pipe, inter-tank pipes and discharge pipes, using quantities sufficient to collect sediments from discharge water.

PART 3 E X E C U T I O N

3.01 GROUND WATER CONTROL

- A. Perform necessary subsurface investigation to identify water bearing layers, piezometric pressures and soil parameters for design and installation of ground water

- control systems. Perform pump tests, if necessary to determine draw down characteristics. Present results in the Ground Water and Surface Water Control Plan Submittal.
- B. Provide labor, material, equipment, techniques and methods to lower, control and handle ground water in manner compatible with construction methods and site conditions. Monitor effectiveness of installed system and its effect on adjacent property.
 - C. Install, operate, and maintain ground water control systems in accordance with the Ground Water and Surface Water Control Plan. Notify Project Manager in writing of changes made to accommodate field conditions and changes to Work. Provide revised drawings and calculations with notification.
 - D. Provide continuous system operation, including nights, weekends, and holidays. Arrange appropriate backup if electrical power is primary energy source for dewatering system.
 - E. Monitor operations to verify systems lower ground water piezometric levels at rate required to maintain dry excavation resulting in stable subgrade for subsequent construction operations.
 - F. Depressurize zones where hydrostatic pressures in confined water bearing layers exist below excavations to eliminate risk of uplift or other instability of excavation or installed works. Define allowable piezometric elevations in the Ground Water and Surface Water Control Plan.
 - G. Removal of ground water control installations.
 - 1. Remove pumping system components and piping when ground water control is no longer required.
 - 2. Remove piezometers, including piezometers installed during design phase investigations and left for Contractor's use, upon completion of testing, as required in accordance with Part 3 of applicable specification.
 - 3. Remove monitoring wells when directed by Project Manager.
 - 4. Grout abandoned well and piezometer holes. Fill piping that is not removed with cement-bentonite grout or cement-sand grout.
 - H. During backfilling, maintain water level a minimum of 5 feet below prevailing level of backfill. Do not allow the water level to cause uplift pressures in excess of 80 percent of downward pressure produced by weight of structure or backfill in place. Do not allow water levels to rise into cement-stabilized sand until at least 48 hour after placement.
 - I. Provide uniform pipe diameter for each pipe drain run constructed for dewatering. Remove pipe drains when no longer required. If pipe removal is impractical, grout

connections at 50-foot intervals and fill pipe with cement-bentonite grout or cement-sand grout after removal from service.

- J. The extent of ground water control for structures with permanent perforated underground drainage systems may be reduced, for units designed to withstand hydrostatic uplift pressure. Provide a means to drain affected portions of underground systems, including standby equipment. Maintain drainage systems during construction operations.
- K. Remove systems upon completion of construction or when dewatering and control of surface or ground water is no longer required.
- L. Compact backfill to not less than 95 percent of maximum dry density in accordance with ASTM D 698.
- M. Foundation Slab: Maintain saturation line at least 3 feet below lowest elevations where concrete is to be placed. Drain foundations in areas where concrete is to be placed before placing reinforcing steel. Keep free from water for 3 days after concrete is placed.

3.02 REQUIREMENTS FOR EDUCTOR, WELL POINTS, OR DEEP WELLS

- A. For aboveground piping in ground water control system, include a 12-inch minimum length of clear, transparent piping between each eductor well or well point and discharge header to allow visual monitoring of discharge from each installation.
- B. Install sufficient piezometers or monitoring wells to show that trench or shaft excavations in water bearing materials are pre-drained prior to excavation. Provide separate piezometers for monitoring of dewatering and for monitoring of depressurization. Install piezometers and monitoring wells for tunneling as appropriate for selected method of work.
- C. Install piezometers or monitoring wells at least one week in advance of the start of associated excavation.
- D. Dewatering may be omitted for portions of under drains or other excavations, where auger borings and piezometers or monitoring wells show that soil is pre-drained by existing systems and that ground water control plan criteria are satisfied.
- E. Replace installations that produce noticeable amounts of sediments after development.
- F. Provide additional ground water control installations, or change method of control if, ground water control plan does not provide satisfactory results based on performance criteria defined by plan and by specifications. Submit revised plan according to Paragraph 1.06B.

3.03 SEDIMENT TRAPS

- A. Install sediment tank as shown on approved plan.

- B. Inspect daily and clean out tank when one-third of sediment tank is filled with sediment.

3.04 SEDIMENT SUMP PIT

- A. Install sediment sump pits as shown on approved plan.
- B. Construct standpipe by perforating 12 inch to 24-inch diameter corrugated metal or PVC pipe.
- C. Extend standpipe 12 inches to 18 inches above lip of pit.
- D. Convey discharge of water pumped from standpipe to sediment trapping device.
- E. Fill sites of sump pits, compact to density of surrounding soil and stabilize surface when construction is complete.

3.05 EXCAVATION DRAINAGE

- A. Use excavation drainage methods if well-drained conditions can be achieved. Excavation drainage may consist of layers of crushed stone and filter fabric, and sump pumping, in combination with sufficient ground water control wells to maintain stable excavation and backfill conditions.

3.06 MAINTENANCE AND OBSERVATION

- A. Conduct daily maintenance and observation of piezometers or monitoring wells while ground water control installations or excavation drainage is operating at the site, or water is seeping into tunnels, and maintain systems in good operating condition.
- B. Replace damaged and destroyed piezometers or monitoring wells with new piezometers or wells as necessary to meet observation schedules.
- C. Cut off piezometers or monitoring wells in excavation areas where piping is exposed, only as necessary to perform observation as excavation proceeds. Continue to maintain and make specified observations
- D. Remove and grout piezometers inside or outside of excavation area when ground water control operations are complete. Remove and grout monitoring wells when directed by Project Manager.

3.07 MONITORING AND RECORDING

- A. Monitor and record average flow rate of operation for each deep well, or for each wellpoint or eductor header used in dewatering system. Also, monitor and record water level and ground water recovery. Record observations daily until steady conditions are achieved and twice weekly thereafter.
- B. Observe and record elevation of water level daily as long as ground water control

system is in operation, and weekly thereafter until Work is completed or piezometers or wells are removed, except when Project Manager determines more frequent monitoring and recording are required. Comply with Project Manager's direction for increased monitoring and recording and take measures necessary to ensure effective dewatering for intended purpose.

3.08 SURFACE WATER CONTROL

- A. Intercept surface water and divert it away from excavations through use of dikes, ditches, curb walls, pipes, sumps or other approved means. Requirement includes temporary works required to protect adjoining properties from surface drainage caused by construction operations.
- B. Divert surface water and seepage water into sumps and pump it into drainage channels or storm drains, when approved by agencies having jurisdiction. Provide settling basins when required by agencies.

END OF SECTION

Section 01770

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedures to establish Date of Substantial Completion.
- B. Closeout procedures for final submittals, O&M data, warranties, spare parts and maintenance materials.
- C. Texas Department of Licensing and Regulation (TDLR) inspection for Texas Accessibility Standards (TAS) compliance.

1.02 SUBSTANTIAL COMPLETION

- A. Comply with Document 00700 - General Conditions regarding Date of Substantial Completion when Contractor considers the Work, or portion thereof designated by Engineer, to be substantially complete.
- B. Insure the following items have been completed when included in the Work, prior to presenting a list of items to be inspected by Engineer for issuance of a Certificate of Substantial Completion :
 - 1. cutting, plugging, and abandoning of water, wastewater, and storm sewer lines, as required by Contract documents for each item;
 - 2. construction of, and repairs to, pavement, driveways, sidewalks, and curbs and gutters;
 - 3. sodding and hydromulch seeding, unless waived by Engineer in writing;
 - 4. general clean up including pavement markings, transfer of services, successful testing and landscape;
 - 5. additional requirements contained in Section 01110 - Summary of Work.
- C. Assist Engineer with inspection of Contractor's list of items and complete or correct the items, including items added by Engineer, within specified time period.
- D. Should Engineer's inspection show failure of Contractor to comply with requirements to obtain Date of Substantial Completion, including those items in Paragraph 1.02 B. of this section, Contractor shall complete or correct the items, before requesting another inspection by Engineer.

1.03 CLOSEOUT PROCEDURES

- A. Comply with Document 00700 - General Conditions regarding final completion and final payment when the Work is complete and ready for Engineer's final inspection.
- B. Provide Project Record Documents in accordance with Section 01785 - Project Record Documents.
- C. Complete or correct items on punch list, with no new items added. Address new items during warranty period.
- D. The District will occupy portions of the Work as specified in other sections.

1.04 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. For facilities, clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Clean equipment and fixtures to sanitary condition.
- D. Clean or replace filters of operating equipment.
- E. Clean debris from roofs, gutters, down spouts, and drainage systems.
- F. Clean site; sweep paved areas, and rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and temporary construction facilities from site following final test of utilities and completion of the Work.

1.05 ADJUSTING

- A. Adjust operating equipment to ensure smooth and unhindered operation. Value of this testing and adjusting is five percent of Lump Sum Price in the Schedule of Values for item being tested.

1.06 OPERATION AND MAINTENANCE DATA

- A. Submit O&M data as noted in Section 01330 - Submittal Procedures.
- B. Five percent of lump sum amount of each piece of equipment as indicated in Schedule of Unit Price Work or Schedule of Values will be paid after the required O&M data submittals are received and approved by Engineer.

1.07 WARRANTIES

- A. Provide one original of each warranty from Subcontractors, Suppliers, and

manufacturers.

- B. Provide Table of Contents and assemble warranties in a 3-ring/D binder with durable plastic cover.
- C. Submit warranties prior to final progress payment.
- D. Warranties shall commence in accordance with the requirements in Document 00700 - General Conditions.

1.08 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide Products, spare parts, maintenance and extra materials in quantities specified in individual Specification sections.
- B. Deliver to a location within the District limits as directed by Engineer. Applicable items must be delivered prior to issuance of a final Certificate for Payment.

PART 2 P R O D U C T S - Not Used

PART 3 E X E C U T I O N - Not Used

END OF SECTION

Section 02316

EXCAVATION AND BACKFILL FOR STRUCTURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Excavation, backfilling, and compaction of backfill for structures.

1.02 MEASUREMENT AND PAYMENT

- A. Unit Prices.
 - 1. No payment will be made for structural excavation and backfill under this Section. Include payment in lump sum price.
- B. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for work in this Section is included in the total Stipulated Price.

1.03 DEFINITIONS

- A. Unsuitable Material: Unsuitable soil materials are the following:
 - 1. Materials that are classified as ML, CL-ML, MH, PT, OH, and OL according to ASTM D 2487.
 - 2. Materials that cannot be compacted to the required density due to either gradation, plasticity, or moisture content.
 - 3. Materials that contain large clods, aggregates, stones greater than 4 inches in any dimension, debris, vegetation, waste or any other deleterious materials.
 - 4. Materials that are contaminated with hydrocarbons or other chemical contaminants.
- B. Suitable Material: Suitable soil materials are those meeting specification requirements. Unsuitable soils meeting specification requirements for suitable soils after treatment with lime or cement shall be considered suitable, unless otherwise indicated.
- C. Select Material: Material as defined in Section 02320 - Utility Backfill Materials.
- D. Backfill: Select material meeting specified quality requirements, placed and compacted under controlled conditions around structures.
- E. Foundation Backfill Materials: Natural soil or manufactured aggregate meeting Class I requirements and geotextile filter fabrics as required, to control drainage and material

separation. Foundation backfill material is placed and compacted as backfill where needed to provide stable support for the structure foundation base. Foundation backfill materials may include concrete fill and seal slabs.

- F. Foundation Base: For foundation base material, use crushed stone aggregate with filter fabric as required, cement stabilized sand, or concrete seal slab. The foundation base provides a smooth, level working surface for the construction of the concrete foundation.
- G. Foundation Subgrade: Foundation subgrade is the surface of the natural soil which has been excavated and prepared to support the foundation base or foundation backfill, where needed.
- H. Ground Water Control Systems: Installations external to the excavation such as well points, eductors, or deep wells. Ground water control includes dewatering to lower the ground water, intercepting seepage which would otherwise emerge from the side or bottom of the excavation, and depressurization to prevent failure or heaving of the excavation bottom. Refer to Section 01578 - Control of Ground Water and Surface Water.
- I. Surface Water Control: Diversion and drainage of surface water runoff and rain water away from the excavation. Remove rain water and surface water which accidentally enters the excavation as a part of excavation drainage.
- J. Excavation Drainage: Removal of surface and seepage water in the excavation by sump pumping and using French drains surrounding the foundation to intercept the water.
- K. Over-Excavation and Backfill: Excavation of subgrade soils with unsatisfactory bearing capacity or composed of otherwise unsuitable materials below the foundation as shown on Drawings, and backfilled with foundation backfill material.
- L. Shoring System: A structure that supports the sides of an excavation to maintain stable soil conditions and prevent cave-ins.

1.04 REFERENCES

- A. ASTM D 558 - Test Methods for Moisture-Density Relations of Soil Cement Mixtures.
- B. ASTM D 698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures, Using 5.5-lb (2.49-kg) Rammer and 12-in. (304.88-mm) Drop.
- C. ASTM D 1556 - Density of Soil in Place by the Sand-Cone Method.
- D. ASTM D 2487 - Classification of Soils for Engineering Purposes.
- E. ASTM D 2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

- F. ASTM D 3017 - Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depths).
- G. ASTM D 4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- H. TxDOT Tex-101-E - Preparation of Soil and Flexible Base Materials for Testing.
- I. TxDOT Tex-110-E - Determination of Particle Size Analysis of Soils.
- J. Federal Regulations, 29 CFR, Part 1926, Standards - Excavation, Occupational Safety and Health Administration (OSHA).

1.05 SUBMITTALS

- A. Conform to requirements of Section 01300 - Submittal Procedures.
- B. Submit a work plan for excavation and backfill for each structure with complete written description which identifies details of the proposed method of construction and the sequence of operations for construction relative to excavation and backfill activities. The descriptions, with supporting illustrations, shall be sufficiently detailed to demonstrate to the Engineer that the procedures meet the requirements of the Specifications and Drawings.
- C. Submit excavation safety system plan.
 - 1. The excavation safety system plan shall be in accordance with applicable OSHA requirements for all excavations.
 - 2. The excavation safety system plan shall be in accordance with the requirements of Section 01561 - Trench Safety System, for all excavations that fall under State and Federal trench safety laws.
- D. Submit a ground and surface water control plan in accordance with requirements in this Section and Section 01578 - Control of Ground Water and Surface Water.
- E. Submit backfill material sources and product quality information in accordance with requirements of Section 02320 - Utility Backfill Materials.
- F. Submit project record documents under provisions of Section 01785 - Project Record Documents. Record location of utilities, as installed, referenced to survey benchmarks. Include location of utilities encountered or rerouted. Give horizontal dimensions, elevations, inverts and gradients.

1.06 TESTS

- A. Testing and analysis of backfill materials for soil classification and compaction during construction will be performed by an independent laboratory provided by the District in

accordance with requirements of Section 01454 - Testing Laboratory Services and as specified in this Section.

- B. Contractor shall perform embedment and backfill material source qualification testing in accordance with requirements of Section 02320- Utility Backfill Materials.

PART 2 P R O D U C T S

2.01 EQUIPMENT

- A. Perform excavation with equipment suitable for achieving the requirements of this Specification.
- B. Use equipment which will produce the degree of compaction specified. Backfill within 3 feet of walls shall be compacted with hand operated equipment. Do not use equipment weighing more than 10,000 pounds closer to walls than a horizontal distance equal to the depth of the fill at that time. Use hand operated power compaction equipment where use of heavier equipment is impractical or restricted due to weight limitations.

2.02 MATERIAL CLASSIFICATIONS

- A. Backfill materials shall conform to the classifications and product descriptions of Section 02320 - Utility Backfill Materials. The classification or product description for backfill applications shall be as shown on the Drawings and as specified.

PART 3 E X E C U T I O N

3.01 PREPARATION

- A. Conduct an inspection to determine condition of existing structures and other permanent installations.
- B. Set up necessary street detours and barricades in preparation for excavation if construction will affect traffic. Conform to requirements of Section 01555 - Traffic Control and Regulation. Maintain barricades and warning devices at all times for streets and intersections where work is in progress, or where affected by the Work, and is considered hazardous to traffic movements.
- C. Perform work in accordance with OSHA standards. Employ an excavation safety system as specified in Section 01561 - Trench Safety Systems.
- D. Remove existing pavements and structures, including sidewalks and driveways, in accordance with requirements of Section 02221 - Removing Existing Pavements and Structures.

- E. Install and operate necessary dewatering and surface water control measures in accordance with requirements of Section 01578 - Control of Ground Water and Surface Water.

3.02 PROTECTION

- A. Protect trees, shrubs, lawns, existing structures, and other permanent objects outside of grading limits and within the grading limits as designated on the Drawings, and in accordance with requirements of Section 01562 - Tree and Plant Protection.
- B. Protect and support above-grade and below-grade utilities which are to remain.
- C. Restore damaged permanent facilities to pre-construction conditions unless replacement or abandonment of facilities is indicated on the Drawings.
- D. Prevent erosion of excavations and backfill. Do not allow water to pond in excavations.
- E. Maintain excavation and backfill areas until start of subsequent work. Repair and recompact slides, washouts, settlements, or areas with loss of density at no additional cost to the District.

3.03 EXCAVATION

- A. Perform excavation work so that the underground structure can be installed to depths and alignments shown on Drawings. Use caution during excavation work to avoid disturbing surrounding ground and existing facilities and improvements. Keep excavation to the absolute minimum necessary. No additional payment will be made for excess excavation not authorized by Engineer.
- B. Upon discovery of unknown utilities, badly deteriorated utilities not designated for removal, or concealed conditions, discontinue work at that location. Notify Engineer and obtain instructions before proceeding in such areas.
- C. Immediately notify the agency or company owning any line which is damaged, broken or disturbed. Obtain approval from Engineer and agency for any repairs or relocations, either temporary or permanent.
- D. Avoid settlement of surrounding soil due to equipment operations, excavation procedures, vibration, dewatering, or other construction methods.
- E. Provide surface drainage during construction to protect work and to avoid nuisance to adjoining property. Where required, provide proper dewatering and piezometric pressure control during construction.
- F. Conduct hauling operations so that trucks and other vehicles do not create a dirt nuisance in streets. Verify that truck beds are sufficiently tight and loaded in such a manner that objectionable materials will not spill onto streets. Promptly clear away any dirt, mud, or other materials that spill onto streets or are deposited onto streets by vehicle tires.

- G. Maintain permanent benchmarks, monumentation, and other reference points. Unless otherwise directed, replace those which are damaged or destroyed by the Work.
- H. Provide sheeting, shoring, and bracing where required to safely complete the Work, to prevent excavation from extending beyond limits indicated on Drawings, and to protect the Work and adjacent structures or improvements. Sheeting, shoring, and bracing used to protect workmen and the public shall conform to requirements of Section 02260 - Trench Safety Systems.
- I. Prevent voids from forming outside of sheeting. Immediately fill voids with grout, concrete fill, cement stabilized sand, or other material approved by Engineer.
- J. After completion of the structure, remove sheeting, shoring, and bracing unless shown on Drawings to remain in place or directed by Engineer in writing that such temporary structures may remain. Remove sheeting, shoring and bracing in such a manner as to maintain safety during backfilling operations and to prevent damage to the Work and adjacent structures or improvements.
- K. Immediately fill and compact voids left or caused by removal of sheeting with cement stabilized sand or material approved by Engineer.

3.04 HANDLING EXCAVATED MATERIALS

- A. Classify excavated materials. Place material which is suitable for use as backfill in orderly piles at a sufficient distance from excavation to prevent slides or cave-ins.
- B. Provide additional backfill material in accordance with requirements of Section 02319 - Borrow, if adequate quantities of suitable material are not available from excavation and trenching operations at the site.

3.05 DEWATERING

- A. Provide ground water control per Section 01578 - Control of Ground Water and Surface Water.
- B. Keep ground water surface elevation a minimum of 2 feet below the bottom of the foundation base.
- C. Maintain ground water control as directed by Section 01578 - Control of Ground Water and Surface Water and until the structure is sufficiently complete to provide the required weight to resist hydrostatic uplift with a minimum safety factor of 1.2.

3.06 FOUNDATION EXCAVATION

- A. Notify Engineer at least 48 hours prior to planned completion of foundation excavations. Do not place the foundation base until the excavation is accepted by the Engineer.

- B. Excavate to elevations shown on Drawings, as needed to provide space for the foundation base, forming a level undisturbed surface, free of mud or soft material. Remove pockets of soft or otherwise unstable soils and replace with foundation backfill material or a material as directed by the Engineer. Prior to placing material over it, recompact the subgrade where indicated on the Drawings, scarifying as needed, to 95 percent of the maximum Standard Dry Density according to ASTM D 698. If the specified level of compaction cannot be achieved, moisture condition the subgrade and recompact until 95 percent is achieved, over-excavate to provide a minimum layer of 24 inches of foundation backfill material, or other means acceptable to the Engineer.
- C. Fill unauthorized excessive excavation with foundation backfill material or other material as directed by the Engineer.
- D. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in a satisfactory, undisturbed condition. Keep excavations free of standing water and completely free of water during concrete placement.
- E. Soils which become unsuitable due to inadequate dewatering or other causes, after initial excavation to the required subgrade, shall be removed and replaced with foundation backfill material, as directed by Engineer, at no additional cost to the District.
- F. Place foundation base, or foundation backfill material where needed, over the subgrade on same day that excavation is completed to final grade. Where base of excavations are left open for longer periods, protect them with a seal slab or cement-stabilized sand.
- G. Crushed aggregate, and other free draining Class I materials, shall have a filter fabric as specified in Section 02621 - Geotextile, separating it from native soils or select material backfill. The fabric shall overlap a minimum of 12 inches beyond where another material stops contact with the soil.
- H. Crushed aggregate, and other Class I materials, shall be placed in uniform layers of 8-inch maximum thickness. Compaction shall be by means of at least two passes of a vibratory compactor.

3.07 FOUNDATION BASE

- A. After the subgrade is properly prepared, including the placement of foundation backfill where needed, the foundation base shall be placed. The foundation base shall consist of a 12-inch layer of crushed stone aggregate or cement stabilized sand. Alternately, a seal slab with a minimum thickness of 4 inches may be placed. The foundation base shall extend a minimum of 12 inches beyond the edge of the structure foundation, unless shown otherwise on the Drawings.
- B. Where the foundation base and foundation backfill are of the same material, both can be placed in one operation.

3.08 BACKFILL

- A. Complete backfill to surface of natural ground or to lines and grades shown on Drawings. Use existing material that qualifies as select material, unless indicated otherwise. Deposit backfill in uniform layers and compact each layer as specified.
- B. Do not place backfill against concrete walls or similar structures until laboratory test breaks indicate that the concrete has reached a minimum of 85 percent of the specified compressive strength. Where walls are supported by slabs or intermediate walls, do not begin backfill operations until the slab or intermediate walls have been placed and concrete has attained sufficient strength.
- C. Remove concrete forms before starting backfill and remove shoring and bracing as work progresses.
- D. Maintain fill material at no less than 2 percent below nor more than 2 percent above optimum moisture content. Place fill material in uniform 8-inch maximum loose layers. Compaction of fill shall be to at least 95 percent of the maximum Standard Dry Density according to ASTM D 698 under paved areas. Compact to at least 90 percent around structures below unpaved areas.
- E. Where backfill is placed against a sloped excavation surface, run compaction equipment across the boundary of the cut slope and backfill to form a compacted slope surface for placement of the next layer of backfill.
- F. Place backfill using cement stabilized sand in accordance with Section 02321 - Cement Stabilized Sand.

3.09 FIELD QUALITY CONTROL

- A. Testing will be performed under provisions of Section 01454 - Testing Laboratory Services.
- B. Tests will be performed initially on minimum of one different sample of each material type for plasticity characteristics, in accordance with ASTM D 4318, and for gradation characteristics, in accordance with Tex-101-E and Tex-110-E. Additional classification tests will be performed whenever there is a noticeable change in material gradation or plasticity.
- C. In-place density tests of compacted subgrade and backfill will be performed according to ASTM D 1556, or ASTM D 2922 and ASTM D 3017, and at the following frequencies and conditions:
 - 1. A minimum of one test for every 100 cubic yards of compacted backfill material.
 - 2. A minimum of three density tests for each full work shift.
 - 3. Density tests will be performed in all placement areas.

4. The number of tests will be increased if inspection determines that soil types or moisture contents are not uniform or if compacting effort is variable and not considered sufficient to attain uniform density.
- D. At least one test for moisture-density relationships will be initially performed for each type of backfill material in accordance with ASTM D 698. Additional moisture-density relationship tests will be performed whenever there is a noticeable change in material gradation or plasticity.
- E. If tests indicate work does not meet specified compaction requirements, recondition, recompact, and retest at Contractor's expense.

3.10 DISPOSAL OF EXCESS MATERIAL

Dispose of excess materials in accordance with requirements of Section 01576 - Waste Material Disposal.

END OF SECTION

Section 02317

EXCAVATION AND BACKFILL FOR UTILITIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Excavation, trenching, foundation, embedment, and backfill for installation of utilities, including manholes and other pipeline structures.

1.02 MEASUREMENT AND PAYMENT

- A. Unit Prices.
 - 1. No additional payment will be made for trench excavation, embedment and backfill under this Section. Include cost in the lump sum price.
 - 2. No separate or additional payment will be made for surface water control, ground water control, or for excavation drainage.
- B. Stipulated Price (Lump Sum). If the Contract is a Stipulated Price Contract, payment for work in this Section is included in the total Stipulated Price.

1.03 DEFINITIONS

- A. Pipe Foundation: Suitable and stable native soils that are exposed at the trench subgrade after excavation to depth of bottom of the bedding as shown on the Drawings, or foundation backfill material placed and compacted in over-excavations.
- B. Pipe Bedding: The portion of trench backfill that extends vertically from top of foundation up to a level line at bottom of pipe, and horizontally from one trench sidewall to opposite sidewall.
- C. Haunching: The material placed on either side of pipe from top of bedding up to springline of pipe and horizontally from one trench sidewall to opposite sidewall.
- D. Initial Backfill: The portion of trench backfill that extends vertically from springline of pipe (top of haunching) up to a level line 12 inches above top of pipe, and horizontally from one trench sidewall to opposite sidewall.
- E. Pipe Embedment: The portion of trench backfill that consists of bedding, haunching and initial backfill.
- F. Trench Zone: The portion of trench backfill that extends vertically from top of pipe embedment up to pavement subgrade or up to final grade when not beneath pavement.

- G. Unsuitable Material: Unsuitable soil materials are the following:
1. Materials that are classified as ML, CL-ML, MH, PT, OH, and OL according to ASTM D 2487.
 2. Materials that cannot be compacted to required density due to either gradation, plasticity, or moisture content.
 3. Materials that contain large clods, aggregates, stones greater than 4 inches in any dimension, debris, vegetation, waste or any other deleterious materials.
 4. Materials that are contaminated with hydrocarbons or other chemical contaminants.
- H. Suitable Material: Suitable soil materials are those meeting specification requirements. Unsuitable soils meeting specification requirements for suitable soils after treatment with lime or cement are considered suitable, unless otherwise indicated.
- I. Backfill: Suitable material meeting specified quality requirements, placed and compacted under controlled conditions.
- J. Ground Water Control Systems: Installations external to trench, such as well points, eductors, or deep wells. Ground water control includes dewatering to lower ground water, intercepting seepage which would otherwise emerge from side or bottom of trench excavation, and depressurization to prevent failure or heaving of excavation bottom. Refer to Section 01578 - Control of Ground Water and Surface Water.
- K. Surface Water Control: Diversion and drainage of surface water runoff and rain water away from trench excavation. Rain water and surface water accidentally entering trench shall be controlled and removed as a part of excavation drainage.
- L. Excavation Drainage: Removal of surface and seepage water in trench by sump pumping and using a drainage layer, as defined in ASTM D 2321, placed on the foundation beneath pipe bedding or thickened bedding layer of Class I material.
- M. Trench Conditions are defined with regard to the stability of trench bottom and trench walls of pipe embedment zone. Maintain trench conditions that provide for effective placement and compaction of embedment material directly on or against undisturbed soils or foundation backfill, except where structural trench support is necessary.
1. Dry Stable Trench: Stable and substantially dry trench conditions exist in pipe embedment zone as a result of typically dry soils or achieved by ground water control (dewatering or depressurization) for trenches extending below ground water level.
 2. Stable Trench with Seepage: Stable trench in which ground water seepage is controlled by excavation drainage.

- a. Stable Trench with Seepage in Clayey Soils: Excavation drainage is provided in lieu of or to supplement ground water control systems to control seepage and provide stable trench subgrade in predominately clayey soils prior to bedding placement.
 - b. Stable Wet Trench in Sandy Soils: Excavation drainage is provided in the embedment zone in combination with ground water control in predominately sandy or silty soils.
3. Unstable Trench: Unstable trench conditions exist in the pipe embedment zone if ground water inflow or high water content causes soil disturbances, such as sloughing, sliding, boiling, heaving or loss of density.
- N. Subtrench: Subtrench is a special case of benched excavation. Subtrench excavation below trench shields or shoring installations may be used to allow placement and compaction of foundation or embedment materials directly against undisturbed soils. Depth of a subtrench depends upon trench stability and safety as determined by the Contractor.
- O. Trench Dam: A placement of low permeability material in pipe embedment zone or foundation to prohibit ground water flow along the trench.
- P. Over-Excavation and Backfill: Excavation of subgrade soils with unsatisfactory bearing capacity or composed of otherwise unsuitable materials below top of foundation as shown on Drawings, and backfilled with foundation backfill material.
- Q. Foundation Backfill Materials: Natural soil or manufactured aggregate of controlled gradation, and geotextile filter fabrics as required, to control drainage and material separation. Foundation backfill material is placed and compacted as backfill to provide stable support for bedding. Foundation backfill materials may include concrete seal slabs.
- R. Trench Safety Systems include both protective systems and shoring systems as defined in Section 02260 - Trench Safety Systems.
- S. Trench Shield (Trench Box): A portable worker safety structure moved along the trench as work proceeds, used as a protective system and designed to withstand forces imposed on it by cave-in, thereby protecting persons within the trench. Trench shields may be stacked if so designed or placed in a series depending on depth and length of excavation to be protected.
- T. Shoring System: A structure that supports sides of an excavation to maintain stable soil conditions and prevent cave-ins, or to prevent movement of the ground affecting adjacent installations or improvements.
- U. Special Shoring: A shoring system meeting special shoring as specified in Paragraph 1.08, Special Shoring Design Requirements, for locations identified on the Drawings.

1.04 REFERENCES

- A. ASTM C 12 - Standard Practice for Installing Vitrified Clay Pipe Lines.
- B. ASTM D 558 - Test Methods for Moisture-Density Relations of Soil Cement Mixtures.
- C. ASTM D 698 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 5.5-lb (2.49-kg) Rammer and 12-in. (304.8-mm) Drop.
- D. ASTM D 1556 - Test Method for Density in Place by the Sand-Cone Method.
- E. ASTM D 2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications.
- F. ASTM D 2487 - Classification of Soils for Engineering Purposes.
- G. ASTM D 2922 - Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- H. ASTM D 3017 - Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
- I. ASTM D 4318 - Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
- J. TxDOT Tex-101-E - Preparation of Soil and Flexible Base Materials for Testing.
- K. TxDOT Tex-110-E - Determination of Particle Size Analysis of Soils.
- L. Federal Regulations, 29 CFR Part 1926, Standards-Excavation, Occupational Safety and Health Administration (OSHA).

1.05 SCHEDULING

- A. Schedule work so that pipe embedment can be completed on the same day that acceptable foundation has been achieved for each section of pipe installation, manhole, or other structures.

1.06 SUBMITTALS

- A. Conform to Section 01300 - Submittal Procedures.
- B. Submit a written description for information only of the planned typical method of excavation, backfill placement and compaction, including:
 - 1. Sequence of work and coordination of activities.
 - 2. Selected trench widths.

3. Procedures for foundation and embedment placement, and compaction.
 4. Procedure for use of trench boxes and other premanufactured systems while assuring specified compaction against undisturbed soil.
 5. Procedure for installation of Special Shoring at locations identified on the Drawings.
- C. Submit a ground and surface water control plan in accordance with requirements in this Section and Section 01578 - Control of Ground Water and Surface Water.
 - D. Submit backfill material sources and product quality information in accordance with requirements of Section 02320 - Utility Backfill Materials.
 - E. Submit a trench excavation safety program in accordance with requirements of Section 01561 - Trench Safety System. Include designs for special shoring meeting the requirements defined in Paragraph 1.08, Special Shoring Design Requirements.
 - F. Submit record of location of utilities as installed, referenced to survey control points. Include locations of utilities encountered or rerouted. Give stations, horizontal dimensions, elevations, inverts, and gradients.

1.07 TESTS

- A. Testing and analysis of backfill materials for soil classification and compaction during construction will be performed by an independent laboratory provided by the City in accordance with requirements of Section 01454 - Testing Laboratory Services and as specified in this Section.
- B. Perform backfill material source qualification testing in accordance with requirements of Section 02320- Utility Backfill Materials.

1.08 SPECIAL SHORING DESIGN REQUIREMENTS

- A. Have special shoring designed or selected by the Contractor's Professional Engineer to provide support for the sides of the excavations, including soils and hydrostatic ground water pressures as applicable, and to prevent ground movements affecting adjacent installations or improvements such as structures, pavements and utilities. Special shoring may be a premanufactured system selected by the Contractor=s Professional Engineer to meet the project site requirements based on the manufacturer=s standard design.

PART 2 P R O D U C T S

2.01 EQUIPMENT

- A. Perform excavation with hydraulic excavator or other equipment suitable for achieving the requirements of this Section.

- B. Use only hand-operated tamping equipment until a minimum cover of 12 inches is obtained over pipes, conduits, and ducts. Do not use heavy compacting equipment until adequate cover is attained to prevent damage to pipes, conduits, or ducts.
- C. Use trench shields or other protective systems or shoring systems which are designed and operated to achieve placement and compaction of backfill directly against undisturbed native soil.
- D. Use special shoring systems where required which may consist of braced sheeting, braced soldier piles and lagging, slide rail systems, or other systems meeting requirements as specified in Paragraph 1.09, Shoring Design Requirements.

2.02 MATERIAL CLASSIFICATIONS

- A. Embedment and Trench Zone Backfill Materials: Conform to classifications and product descriptions of Section 02320 - Utility Backfill Materials.
- B. Concrete Backfill: Conform to requirements for Class B concrete as specified in Section 03315 - Concrete for Utility Construction.
- C. Geotextile (Filter Fabric): Conform to requirements of Section 02621- Geotextile.
- D. Concrete for Trench Dams: Concrete backfill or 3 sack premixed (bag) concrete.
- E. Timber Shoring Left in Place: Untreated oak.

PART 3 EXECUTION

3.01 STANDARD PRACTICE

- A. Install flexible pipe, including "semi-rigid" pipe, to conform to standard practice described in ASTM D 2321, and as described in this Section. Where an apparent conflict occurs between the standard practice and the requirements of this Section, this Section governs.
- B. Install rigid pipe to conform with standard practice described in ASTM C 12, and as described in this Section. Where an apparent conflict occurs between the standard practice and the requirements of this Section, this Section governs.

3.02 PREPARATION

- A. Establish traffic control to conform with requirements of Section 01555 - Traffic Control and Regulation. Maintain barricades and warning lights for streets and intersections affected by the Work, and is considered hazardous to traffic movements.
- B. Perform work to conform with applicable safety standards and regulations. Employ a trench safety system as specified in Section 01561 - Trench Safety Systems.

- C. Immediately notify the agency or company owning any existing utility line which is damaged, broken, or disturbed. Obtain approval from the City Engineer and agency for any repairs or relocations, either temporary or permanent.
- D. Remove existing pavements and structures, including sidewalks and driveways, to conform with requirements of Section 02221 - Removing Existing Pavements and Structures, as applicable.
- E. Install and operate necessary dewatering and surface water control measures to conform with Section 01578 - Control of Ground Water and Surface Water.
- F. Maintain permanent benchmarks, monumentation, and other reference points. Unless otherwise directed in writing, replace those which are damaged or destroyed in accordance with Section 01725 - Field Surveying.

3.03 PROTECTION

- A. Protect trees, shrubs, lawns, existing structures, and other permanent objects outside of grading limits and within the grading limits as designated on the Drawings, and in accordance with requirements of Section 01562 - Tree and Plant Protection.
- B. Protect and support above-grade and below-grade utilities which are to remain.
- C. Restore damaged permanent facilities to pre-construction conditions unless replacement or abandonment of facilities are indicated on the Drawings.
- D. Take measures to minimize erosion of trenches. Do not allow water to pond in trenches. Where slides, washouts, settlements, or areas with loss of density or pavement failures or potholes occur, repair, recompact, and pave those areas at no additional cost to City.

3.04 EXCAVATION

- A. Except as otherwise specified or shown on the Drawings, install underground utilities in open cut trenches with vertical sides.
- B. Perform excavation work so that pipe, conduit, and ducts can be installed to depths and alignments shown on the Drawings. Avoid disturbing surrounding ground and existing facilities and improvements.
- C. Determine trench excavation widths using the following schedule as related to pipe outside diameter (O.D.). Maximum trench width shall be the minimum trench width plus 24 inches.

<u>Nominal Pipe Size, Inches</u>	<u>Minimum Trench Width, Inches</u>
Less than 18	O.D. + 18
18 to 30	O.D. + 24
Greater than 30	O.D. + 36

- D. Use sufficient trench width or benches above the embedment zone for installation of well point headers or manifolds and pumps where depth of trench makes it uneconomical or impractical to pump from the surface elevation. Provide sufficient space between shoring cross braces to permit equipment operations and handling of forms, pipe, embedment and backfill, and other materials.
- E. Upon discovery of unknown utilities, badly deteriorated utilities not designated for removal, or concealed conditions, discontinue work at that location. Notify the City Engineer and obtain instructions before proceeding.
- F. Shoring of Trench Walls.
 - 1. Install Special Shoring in advance of trench excavation or simultaneously with the trench excavation, so that the soils within the full height of the trench excavation walls will remain laterally supported at all times.
 - 2. For all types of shoring, support trench walls in the pipe embedment zone throughout the installation. Provide trench wall supports sufficiently tight to prevent washing the trench wall soil out from behind the trench wall support.
 - 3. Unless otherwise directed by the City Engineer, leave sheeting driven into or below the pipe embedment zone in place to preclude loss of support of foundation and embedment materials. Leave rangers, walers, and braces in place as long as required to support sheeting, which has been cut off, and the trench wall in the vicinity of the pipe zone.
 - 4. Employ special methods for maintaining the integrity of embedment or foundation material. Before moving supports, place and compact embedment to sufficient depths to provide protection of pipe and stability of trench walls. As supports are moved, finish placing and compacting embedment.
 - 5. If sheeting or other shoring is used below top of the pipe embedment zone, do not disturb pipe foundation and embedment materials by subsequent removal. Maximum thickness of removable sheeting extending into the embedment zone shall be the equivalent of a 1-inch-thick steel plate. Fill voids left on removal of supports with compacted backfill material.
- G. Use of Trench Shields. When a trench shield (trench box) is used as a worker safety device, the following requirements apply:
 - 1. Make trench excavations of sufficient width to allow shield to be lifted or pulled freely, without damage to the trench sidewalls.
 - 2. Move trench shields so that pipe, and backfill materials, after placement and compaction, are not damaged nor disturbed, nor the degree of compaction reduced.

3. When required, place, spread, and compact pipe foundation and bedding materials beneath the shield. For backfill above bedding, lift the shield as each layer of backfill is placed and spread. Place and compact backfill materials against undisturbed trench walls and foundation.
4. Maintain trench shield in position to allow sampling and testing to be performed in a safe manner.

3.05 HANDLING EXCAVATED MATERIALS

- A. Use only excavated materials which are suitable as defined in this Section and conforming with Section 02320 - Utility Backfill Materials. Place material suitable for backfilling in stockpiles at a distance from the trench to prevent slides or cave-ins.
- B. When required, provide additional backfill material conforming with requirements of Section 02320 - Utility Backfill Materials.
- C. Do not place stockpiles of excess excavated materials on streets and adjacent properties. Protect excess stockpiles for use on site. Maintain site conditions in accordance with Section 01504 - Temporary Facilities and Controls.

3.06 GROUND WATER CONTROL

- A. Implement ground water control according to Section 01578 - Control of Ground Water and Surface Water. Provide a stable trench to allow installation in accordance with the Specifications.

3.07 TRENCH FOUNDATION

- A. Excavate bottom of trench to uniform grade to achieve stable trench conditions and satisfactory compaction of foundation or bedding materials.
- B. Place trench dams in Class I foundations in line segments longer than 100 feet between manholes, and not less than one in every 500 feet of pipe placed. Install additional dams as needed to achieve workable construction conditions. Do not place trench dams closer than 5 feet from manholes.

3.08 PIPE EMBEDMENT, PLACEMENT, AND COMPACTION

- A. Immediately prior to placement of embedment materials, the bottoms and sidewalls of trenches shall be free of loose, sloughing, caving, or otherwise unsuitable soil.
- B. Place embedment including bedding, haunching, and initial backfill as shown on Drawings.
- C. For pipe installation, manually spread embedment materials around the pipe to provide uniform bearing and side support when compacted. Do not allow materials to free-fall

from heights greater than 24 inches above top of pipe. Perform placement and compaction directly against the undisturbed soils in the trench sidewalls, or against sheeting which is to remain in place.

- D. Do not place trench shields or shoring within height of the embedment zone unless means to maintain the density of compacted embedment material are used. If moveable supports are used in embedment zone, lift the supports incrementally to allow placement and compaction of the material against undisturbed soil.
- E. Place geotextile to prevent particle migration from the in-situ soil into open-graded (Class I) embedment materials or drainage layers.
- F. Do not damage coatings or wrappings of pipes during backfilling and compacting operations. When embedding coated or wrapped pipes, do not use crushed stone or other sharp, angular aggregates.
- G. Place haunching material manually around the pipe and compact it to provide uniform bearing and side support. If necessary, hold small-diameter or lightweight pipe in place during compaction of haunch areas and placement beside the pipe with sand bags or other suitable means.
- H. Place electrical conduit, if used, directly on foundation without bedding.
- I. Shovel in-place and compact embedment material using pneumatic tampers in restricted areas, and vibratory-plate compactors or engine-powered jumping jacks in unrestricted areas. Compact each lift before proceeding with placement of next lift. Water tamping is not allowed.
- J. For water lines construction embedment, use bank run sand, concrete sand, gem sand, pea gravel, or crushed limestone as specified in Section 02320 - Utility Backfill Material. For water lines adhere to the following subparagraph numbers 1 and 2; for utility installation other than water, adhere to numbers 3 and 4 below:
 - 1. Class I, II, and III Embedment Materials:
 - a. Maximum 6 inches compacted lift thickness.
 - b. Compact to achieve a minimum of 95 percent of maximum dry density as determined according to ASTM D 698.
 - c. Moisture content to be within -3 percent to +5 percent of optimum as determined according to ASTM D 698, unless otherwise approved by City Engineer.
 - 2. Cement Stabilized Sand:
 - a. Maximum 6 inches compacted thickness.

- b. Compact to achieve a minimum of 95 percent of maximum dry density as determined according to ASTM D 698.
 - c. Moisture content to be on dry side of optimum as determined according to ASTM D 698 but sufficient for effective hydration.
3. Class I embedment materials.
- a. Maximum 6-inches compacted lift thickness.
 - b. Systematic compaction by at least two passes of vibrating equipment. Increase compaction effort as necessary to effectively embed the pipe to meet the deflection test criteria.
 - c. Moisture content as determined by Contractor for effective compaction without softening the soil of trench bottom, foundation or trench walls.
4. Class II embedment and cement stabilized sand.
- a. Maximum 6-inches compacted thickness.
 - b. Compaction by methods determined by Contractor to achieve a minimum of 95 percent of the maximum dry density as determined according to ASTM D 698 for Class II materials and according to ASTM D 558 for cement stabilized materials.
 - c. Moisture content of Class II materials within 3 percent of optimum as determined according to ASTM D 698. Moisture content of cement stabilized sands on the dry side of optimum as determined according to ASTM D 558 but sufficient for effective hydration.
- K. Place trench dams in Class I embedments in line segments longer than 100 feet between manholes, and not less than one in every 500 feet of pipe placed. Install additional dams as needed to achieve workable construction conditions. Do not place trench dams closer than 5 feet from manholes.

3.09 TRENCH ZONE BACKFILL PLACEMENT AND COMPACTION

- A. Place backfill for pipe or conduits and restore surface as soon as practicable. Leave only the minimum length of trench open as necessary for construction.
- B. Where damage to completed pipe installation work is likely to result from withdrawal of sheeting, leave the sheeting in place. Cut off sheeting 1.5 feet or more above the crown of the pipe. Remove trench supports within 5 feet from the ground surface.
- C. For sewer pipes, use backfill materials described here as determined by trench limits. As trench zone backfill in paved areas for streets and to one foot back of curbs and pavements, use cement stabilized sand for pipe of nominal sizes less than 36 inches.

Uniformly backfill trenches partially within limits one foot from streets and curbs according to the paved area criteria. Use select backfill within one foot below pavement subgrade for rigid pavement. For asphalt concrete, use flexible base material within one foot below pavement subgrade.

- D. For water lines, backfill in trench zone, including auger pits, with bank run sand, select fill, or random backfill material as specified in Section 02320 - Utility Backfill materials.
- E. When shown on Drawings, a random backfill of suitable material may be used in trench zone for trench excavations outside pavements.
- F. Place trench zone backfill in lifts and compact by methods selected by the Contractor. Fully compact each lift before placement of the next lift.
 - 1. Bank run sand.
 - a. Maximum 9-inches compacted lift thickness.
 - b. Compaction by vibratory equipment to a minimum of 95 percent of the maximum dry density determined according to ASTM D 698.
 - c. Moisture content within 3 percent of optimum determined according to ASTM D 698
 - 2. Cement-stabilized sand.
 - a. Maximum lift thickness determined by Contractor to achieve uniform placement and required compaction, but not exceeding 24 inches.
 - b. Compaction by vibratory equipment to a minimum of 95 percent of the maximum dry density determined according to ASTM D 558.
 - c. Moisture content on the dry side of optimum determined according to ASTM D 558 but sufficient for cement hydration.
 - 3. Select fill.
 - a. Maximum 6-inches compacted thickness.
 - b. Compaction by equipment providing tamping or kneading impact to a minimum of 95 percent of the maximum dry density determined according to ASTM D 698.
 - c. Moisture content within 2 percent of optimum determined according to ASTM D 698.
- G. For trench excavations outside pavements, a random backfill of suitable material may be used in the trench zone.

1. Fat clays (CH) may be used as trench zone backfill outside paved areas at the Contractor's option. If the required density is not achieved, the Contractor, at his option and at no additional cost to the City, may use lime stabilization to achieve compaction requirements or use a different suitable material.
2. Maximum 9-inch compacted lift thickness for clayey soils and maximum 12-inch lift thickness for granular soils.
3. Compact to a minimum of 90 percent of the maximum dry density determined according to ASTM D 698.
4. Moisture content as necessary to achieve density.

H. For electric conduits, remove form work used for construction of conduits before placing trench zone backfill.

3.10 MANHOLES, JUNCTION BOXES, AND OTHER PIPELINE STRUCTURES

A. Meet the requirements of adjoining utility installations for backfill of pipeline structures, as shown on the Drawings.

3.11 FIELD QUALITY CONTROL

A. Test for material source qualifications as defined in Section 02320 - Utility Backfill Materials.

B. Provide excavation and trench safety systems at locations and to depths required for testing and retesting during construction at no additional cost to City.

C. Tests will be performed on a minimum of three different samples of each material type for plasticity characteristics, in accordance with ASTM D 4318, and for gradation characteristics, in accordance with Tex-101-E and Tex-110-E. Additional classification tests will be performed whenever there is a noticeable change in material gradation or plasticity.

D. At least three tests for moisture-density relationships will be performed initially for backfill materials in accordance with ASTM D 698, and for cement-stabilized sand in accordance with ASTM D 558. Additional moisture-density relationship tests will be performed whenever there is a noticeable change in material gradation or plasticity.

E. In-place density tests of compacted pipe foundation, embedment and trench zone backfill soil materials will be performed according to ASTM D 1556, or ASTM D 2922 and ASTM D 3017, and at the following frequencies and conditions.

1. A minimum of one test for every 20 cubic yards of compacted embedment and for every 50 cubic yards of compacted trench zone backfill material.
2. A minimum of three density tests for each full shift of Work.

3. Density tests will be distributed among the placement areas. Placement areas are: foundation, bedding, haunching, initial backfill and trench zone.
 4. The number of tests will be increased if inspection determines that soil type or moisture content are not uniform or if compacting effort is variable and not considered sufficient to attain uniform density, as specified.
 5. Density tests may be performed at various depths below the fill surface by pit excavation. Material in previously placed lifts may therefore be subject to acceptance/rejection.
 6. Two verification tests will be performed adjacent to in-place tests showing density less than the acceptance criteria. Placement will be rejected unless both verification tests show acceptable results.
 7. Recompacted placement will be retested at the same frequency as the first test series, including verification tests.
- F. Recondition, recompact, and retest at Contractor's expense if tests indicate Work does not meet specified compaction requirements. For hardened soil cement with nonconforming density, core and test for compressive strength at Contractor's expense.
- G. Acceptability of crushed rock compaction will be determined by inspection.

3.12 DISPOSAL OF EXCESS MATERIAL

- A. Dispose of excess materials in accordance with requirements of Section 01576 - Waste Material Disposal

END OF SECTION

Section 02465

DRILLED SHAFT FOUNDATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Construction of foundations consisting of reinforced concrete drilled shafts.

1.02 MEASUREMENT AND PAYMENT

- A. Unit Prices.
 - 1. No separate payment will be made for drilled shaft foundations under this Section. Include cost in lump sum payment for structure requiring drilled shaft foundations.
 - 2. Refer to Section 01270 - Measurement and Payment for unit price procedures
- B. Stipulated Price (Lump Sum). If Contract is Stipulated Price Contract, payment for Work in this Section is included in total Stipulated Price.

1.03 SUBMITTALS

- A. Conform to requirements of Section 01330 - Submittal Procedures.
- B. Submit work plan for each structure with complete written description which identifies details of proposed method of construction and sequence of operations for construction relative to drilled shaft activities. Descriptions, with supporting illustrations, shall be sufficiently detailed to demonstrate to Project Manager that procedures meet requirements of Specifications and Drawings.
- C. Submit project record documents under provisions of Section 01785 - Project Record Documents. Record locations of drilled shafts, as installed referenced to survey benchmarks. Include location of utilities encountered or rerouted. Give horizontal dimensions, elevations, inverts and gradients.

1.04 REFERENCE STANDARDS

- A. ACI 336.1 - Standard Specification for Construction of Drilled Piers
- B. TxDOT Standard Specification Item 416 - Drilled Shaft Foundations

PART 2 PRODUCTS

2.01 EQUIPMENT

- A. Perform excavation with equipment suitable for achieving requirements of this Specification.

2.02 MATERIAL

- A. For cast-in-place concrete, use Class A concrete. Refer to Section 03310 - Structural Concrete.
- B. For reinforcing steel, refer to Section 03211 - Reinforcing Steel

PART 3 EXECUTION

3.01 PREPARATION

- A. Conduct an inspection to determine condition and locations of existing structures and other permanent installations, prior to commencing work.

3.02 EXCAVATION

- A. Perform excavation required for drilled cylindrical shafts, at locations shown on Drawings through whatever materials encountered, to dimensions and elevations shown or required by site conditions. When satisfactory material is not encountered at plan depth, bottom of shaft will be adjusted or foundation altered, as determined by Project Manager, to satisfactorily comply with design requirements.
- B. Do not make shaft excavations within 3 shaft diameters (edge to edge) of shafts which have been concreted within previous 24 hours.
- C. Inspect drilled shaft excavations for verticality and side sloughing. Verticality is specified at one inch in 10 feet of shaft length. Check to full depth of dry auguring prior to introducing drilling mud. Straighten or add suitable reinforcing steel to shafts not meeting specified tolerance.
- D. Slurry is to contain 4 to 8 percent by weight of bentonite additive and satisfy slurry specifications set forth in ACI 336.1, Section 2.3.5.2e. These requirements are more stringent than TxDOT Standard Specification Item 416.3.1. Stricter slurry specifications are required to assure suspension of detritus from drilling operations, and to ensure adequate cleaning of slurry prior to concreting. Cleaning of slurry is important to prevent deposition of detritus on reinforcement cages and ensure that inclusions of detritus will not be formed within concrete mass.
- E. At final bearing elevation, clean bottom of each shaft and remove seepage water for examination by Project Manager before reinforcing steel and concrete is placed. Suitable access and lighting for proper inspection of completed excavation is to be

provided. Reinforcing steel and concrete is to be placed in drilled shaft without delay after approval of excavation by Project Manager.

3.03 DRILLED SHAFT CONSTRUCTION

- A. Drilled shaft construction and installation is to follow TxDOT Standard Specification Item 416 (with exceptions noted below) and ACI 336.1.
- B. Before placing concrete, clean out shaft bottom with drilling bucket in order to remove sediments which may not be displaced by concrete. Clean shaft bottom with "clean-out" bucket until rotation on bottom without crowd (i.e., penetration under force) produces little spoil. Probing after cleaning out is essential to verify condition of base of shaft.
- C. Concrete is to conform to requirements of ACI 336.1 Section 2.3.5.5.
- D. Concrete is to be placed continuously in shaft to construction joint indicated on Drawings or as directed in TxDOT Standard Specification Item 416.3.3. Concrete is to be placed through suitable tube or tremie to prevent segregation of materials. Tremie pipe diameter is to be at least 8 times as large as largest concrete aggregate size.
- E. Computation of final concrete volume for each shaft is to be made. Core and check the integrity of shafts taking an unreasonably high or low volume of concrete.
- F. If caving soil conditions or excessive groundwater is encountered, use of temporary casing is permitted to prevent caving of material around shaft and to control seepage of groundwater into excavation.
- G. Casing material is to be metal of ample strength to withstand handling stresses, pressure of concrete and of surrounding earth or backfill materials and is to be water-tight. Casing shall be smooth, clean and free of accumulations of hardened concrete. Outside diameter of casing is not to be less than specified diameter of drilled shaft.
- H. Elapsed time is not to exceed one hour from beginning of concrete placement in cased portion of shaft, until extraction of casing is begun.
- I. Withdraw temporary casings as shaft is filled with concrete, or immediately following concreting operation. Bottom of casing is to always remain at least one foot below level of concrete during placement to overcome hydrostatic pressure. Smoothly extract casing with vibratory hammer. Casing extraction is to be at slow, uniform rate with pull in line with vertical axis of shaft. Leave no casing in place.
- J. If upward movement of concrete or reinforcing steel occurs inside casing at beginning of pulling operation or at anytime during pulling, stop pulling immediately and leave casing in place.
- K. If casing must be left in place, Project Manager is to be informed to determine shaft

capacity calculations.

3.04 FIELD QUALITY CONTROL

- A. Testing will be performed under provisions of Section 01454 - Testing Laboratory Services.

3.05 DISPOSAL OF EXCESS MATERIAL

- A. Dispose of excess materials in accordance with requirements of Section 01504 - Temporary Facilities and Control or Section 01576 - Waste Material Disposal.

END OF SECTION

Section 03211

REINFORCING STEEL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Structural concrete reinforcement and grouting of reinforcement dowel bars into hardened concrete.

1.02 UNIT PRICES

- A. No separate payment will be made for reinforcing steel or grouting that is part of the Work as bid.
- B. Measurement for reinforcing steel installed as extra work is on a per-pound basis.
- C. Include price of reinforcing steel in lump sum bid of project.

1.03 REFERENCES

- A. ACI 315 - Details and Detailing of Concrete Reinforcement.
- B. ACI 318 - Building Code Requirements for Reinforced Concrete.
- C. ASTM A 36 - Standard Specification for Structural Steel.
- D. ASTM A 82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.
- E. ASTM A 185 - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
- F. ASTM A 497 - Standard Specification for Steel Welded Wire Fabric, Deformed, for Concrete Reinforcement.
- G. ASTM A 615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- H. ASTM A 675 - Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties.
- I. ASTM A 775/A 775M - Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
- J. ASTM C 881 - Specification for Epoxy-Resin-Base Bonding Systems for Concrete.
- K. AWS D 1.4 - Structural Welding Code - Reinforcing Steel.

- L. WRI - Manual of Standard Practice for Welded Wire Fabric.
- M. CRSI MSP-1 - Manual of Standard Practice.

1.04 SUBMITTALS

- A. Conform to Section 01330 – Submittal Procedures.
- B. Shop Drawings:
 - 1. Submit shop drawings detailing reinforcement fabrication, bar placement location, splices, spacing, bar designation, bar type, length, size, bending, number of bars, bar support type and other pertinent information, including dimensions. Provide sufficient detail for placement of reinforcement without use of Contract Drawings. Information shall correspond directly to data listed on bill of materials.
 - 2. Use of reproductions of Contract Drawings by Contractor, Subcontractor, erector, fabricator or material supplier in preparation of shop drawings (or in lieu of preparation of shop drawings) signifies acceptance by that party of information shown thereon as correct, and acceptance of obligation to pay for any job expense, real or implied, arising due to errors that may occur thereon. Remove references to Design Engineer, including seals, when reproductions of Contract Drawings are used as shop drawings.
 - 3. Detail shop drawings in accordance with ACI 315, Figure 6.
 - 4. Submit shop drawings showing location of proposed additional construction joints.
- C. Bill of Materials: Submit with shop drawings.
- D. Product Data:
 - 1. Mechanical Bar Splices: Submit manufacturer's technical literature, including specifications and installation instructions.
 - 2. Epoxy grout proposed for anchoring reinforcing dowels to hardened concrete: Submit manufacturer's technical literature including recommended installation procedures.
- E. Certificates:
 - 1. Submit steel manufacturer's certificates of mill tests giving properties of steel proposed for use. List manufacturer's test number, heat number, chemical analysis, yield point, tensile strength and percentage of elongation. Identify proposed location of steel in work.
 - 2. Foreign-manufactured reinforcing bars shall be tested for conformance to ASTM

requirements by a certified independent testing laboratory located in United States. Certification from any other source is not acceptable. Submit test reports for review. Do not begin fabrication of reinforcement until material has been approved.

1.05 HANDLING AND STORAGE

- A. Store steel reinforcement above ground on platforms, skids or other supports. Protect reinforcing from mechanical injury, surface deterioration and formation of excessive, loose or flaky rust caused by exposure to weather. Protect epoxy-coated reinforcing from formation of any amount of rust.

1.06 QUALITY ASSURANCE

- A. Notify Engineer at least 48 hours before concrete placement so that reinforcement may be inspected, and errors corrected, without delaying Work.

PART 2 PRODUCTS

2.01 MATERIAL

- A. Reinforcing Bars: Deformed bars conforming to ASTM A 615, grade as indicated on Drawings, except column spirals and those shown on Drawings to be smooth bars. Where grade is not shown on Drawings, use Grade 60.
- B. Smooth Bars: Where indicated on Drawings, use smooth bars conforming to ASTM A 36; ASTM A 615, Grade 60; or ASTM A 675, Grade 70.
- C. Column Spirals: Bars conforming to ASTM A 615, Grade 60, or wire conforming to ASTM A 82.
- D. Epoxy-Coated Deformed Bars, Column Spirals and Smooth Bars: Conform to ASTM A 775/A 775M.
- E. Welded Wire Fabric:
 - 1. Welded Smooth Wire Fabric: Conform to ASTM A 185.
 - 2. Welded Deformed Wire Fabric: Conform to ASTM A 497.
 - 3. Provide wire size, type and spacing as shown. Where type is not shown on Drawings, use welded smooth wire fabric.
 - 4. Furnish welded wire fabric in flat sheets only.
- F. Tie Wire: 16-1/2 gage or heavier annealed steel wire. Use plastic-coated tie wire with epoxy-coated reinforcing steel.

- G. Bar Supports: Provide chairs, riser bars, ties and other accessories made of plastic or metal, except as otherwise specified. Use bar supports and accessories of sizes required to provide required concrete cover. Where concrete surfaces are exposed to weather, water or wastewater, provide plastic accessories only; do not use galvanized or plastic-tipped metal in such locations. Provide metal bar supports and accessories rated Class 1 or 2 conforming to CRSI MSP-1 Manual of Standard Practice. Use epoxy-coated bar supports with epoxy-coated reinforcing bars.
- H. Slabs on Grade: Provide chairs with sheet metal bases or provide precast concrete bar supports 3 inches wide, 6 inches long, and thick enough to allow required cover. Embed tie wires in 3-inch by 6-inch side.
- I. Mechanical Bar Splices:
 - 1. Conform to ACI 318; use where indicated on Drawings.
 - a. Compression splices shall develop ultimate stress of reinforcing bar.
 - b. Tension splices shall develop 125 percent of minimum yield point stress of reinforcing bar.
 - 2. Regardless of chemical composition of steel, any heat effect shall not adversely affect performance of reinforcing bar.
- J. Welded Splices:
 - 1. Provide welded splices where shown and where approved by the Engineer. Welded splices of reinforcing steel shall develop a tensile strength exceeding 125 percent of the yield strength of the reinforcing bars connected.
 - 2. Provide materials for welded splices conforming to AWS D1.4.
- K. Epoxy Grout: High-strength rigid epoxy adhesive, conforming to ASTM C 881, Type IV, manufactured for purpose of anchoring dowels into hardened concrete and the moisture condition, application temperature and orientation of the hole to be filled. Unless otherwise shown, depth of embedment shall be as required to develop the full tensile strength (125 percent of yield strength) of dowel, but not less than 12 diameters.

2.01.1 FABRICATION

- A. Bending: Fabricate bars to shapes indicated on Drawings by cold bending. Bends shall conform to minimum bend diameters specified in ACI 318. Do not straighten or rebend bars. Fabricate epoxy-coated reinforcing steel to required shapes in a manner that will not damage epoxy coating. Repair any damaged epoxy coating with patching material conforming to Item 4.4 of ASTM A 775/A 775M.
- B. Splices:
 - 1. Locate splices as indicated on Drawings. Do not locate splices at other locations without approval of Engineer. Use minimum number of splices located at points

- of minimum stress. Stagger splices in adjacent bars.
2. Length of lap splices: As shown on Drawings.
 3. Prepare ends of bars at mechanical splices in accordance with splice manufacturer's requirements.
- C. Construction Joints: Unless otherwise shown, continue reinforcing through construction joints.
- D. Bar Fabrication Tolerances: Conform to tolerances listed in ACI 315, Figures 4 and 5.
- E. Standard Hooks: Conform to the requirements of ACI 318.
- F. Marking: Clearly mark bars with waterproof tags showing number of bars, size, mark, length and yield strength. Mark steel with same designation as member in which it occurs.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean reinforcement of scale, loose or flaky rust and other foreign material, including oil, mud or coating that will reduce bond to concrete.

3.02 INSTALLATION

- A. Placement Tolerances: Place reinforcement within tolerances of Table 03211A at the end of this Section. Bend tie wire away from forms to maintain the specified concrete coverage.
- B. Interferences: Maintain 2-inch clearance from embedded items. Where reinforcing interferes with location of other reinforcing steel, conduit or embedded items, bars may be moved within specified tolerances or one bar diameter, whichever is greater. Where greater movement of bars is required to avoid interference, notify Engineer. Do not cut reinforcement to install inserts, conduit, mechanical openings or other items without approval of Engineer.
- C. Concrete Cover: Provide clear cover measured from reinforcement to face of concrete as listed in Table 03211B at the end of this Section, unless otherwise indicated on Drawings.
- D. Placement in Forms: Use spacers, chairs, wire ties and other accessory items necessary to assemble, space and support reinforcing properly. Provide accessories of sufficient number, size and strength to prevent deflection or displacement of reinforcement due to construction loads or concrete placement. Use appropriate accessories to position and

- support bolts, anchors and other embedded items. Tie reinforcing bars at each intersection, and to accessories. Blocking reinforcement with concrete or masonry is prohibited.
- E. Placement for Concrete on Ground: Support bar and wire reinforcement on chairs with sheet metal bases or precast concrete blocks spaced at approximately 3 feet on centers each way. Use minimum of one support for each 9 square feet. Tie supports to reinforcing bars and wires.
- F. Vertical Reinforcement in Columns: Offset vertical bars by at least one bar diameter at splices. Provide accurate templates for column dowels to ensure proper placement.
- G. Splices:
1. Do not splice bars, except at locations indicated on Drawings or reviewed shop drawings, without approval of Engineer.
 2. Lap Splices: Unless otherwise shown or noted, Class B, conforming to ACI 318-89, Section 12.15.1. Tie securely with wire prior to concrete placement, to prevent displacement of splices during concrete placement.
 3. Mechanical Bar Splices: Use only where indicated on Drawings or approved by the Engineer. Install in accordance with manufacturer's instructions.
 - a. Couplers located at a joint face shall be of a type which can be set either flush or recessed from the face as shown. Seal couplers prior to concrete placement to completely eliminate concrete or cement paste from entering.
 - b. Couplers intended for future connections: Recess 1/2 inch minimum from concrete surface. After concrete is placed, plug coupler and fill recess with sealant to prevent contact with water or other corrosive materials.
 - c. Unless noted otherwise, match mechanical coupler spacing and capacity to that shown for the adjacent reinforcing.
- H. Construction Joints: Place reinforcing continuous through construction joints, unless noted otherwise.
- I. Welded Wire Fabric: Install wire fabric in as long lengths as practicable. Unless otherwise indicated on Drawings, lap adjoining pieces at least 6 inches or one full mesh plus 2 inches, whichever is larger. Lace splices with wire. Do not make end laps midway between supporting beams, or directly over beams of continuous structures. Offset end laps in adjacent widths to prevent continuous laps. Conform to WRI - Manual of Standard Practice for Welded Wire Fabric.
- J. Field Bending: Shape reinforcing bent during construction operations to conform to

- Drawings. Bars shall be cold-bent; do not heat bars. Closely inspect reinforcing for breaks. When reinforcing is damaged, replace, Cadweld, or otherwise repair, as directed by Engineer. Do not bend reinforcement after it is embedded in concrete.
- K. Epoxy-coated Reinforcing Steel: Install in accordance with Paragraph 3.02J, Field Bending, and in a manner that will not damage epoxy coating. Repair damaged epoxy coating with patching material as specified in Paragraph 2.02A, Bending.
 - L. Field Cutting: Cut reinforcing bars by shearing or sawing. Do not cut bars with cutting torch.
 - M. Welding of reinforcing bars is prohibited, except where shown on Drawings.

3.03 GROUTING OF REINFORCING AND DOWEL BARS

- A. Use epoxy grout for anchoring reinforcing and dowel steel to existing concrete in accordance with epoxy manufacturer's instructions. Drill hole not more than 1/4 inch larger than steel bar diameter (including height of deformations for deformed bars) in existing concrete. Just before installation of steel, blow hole clean of all debris using compressed air. Partially fill hole with epoxy, using enough epoxy so when steel bar is inserted, epoxy grout will completely fill hole around bar. Dip end of steel bar in epoxy and twist bar while inserting into partially-filled hole.

Table 03211A
 REINFORCEMENT PLACEMENT TOLERANCES

PLACEMENT	TOLERANCE IN INCHES
Clear Distance - To formed soffit: To other formed surfaces: Minimum spacing between bars:	-1/4 ±1/4 -1/4
Clear distance from unformed surface to top reinforcement - Members 8 inches deep or less: Members more than 8 inches deep but less than 24 inches deep: Members 24 inches deep or greater: Uniform spacing of bars (but the required number of bars shall not be reduced): Uniform spacing of stirrups and ties (but the required number of stirrups and ties shall not be reduced):	±1/4 -1/4, +1/2 -1/4, +1 ±2 ±1
Longitudinal locations of bends and ends of reinforcement - General: Discontinuous ends of members: Length of bar laps:	±2 ±1/2 -1-1/2
Embedded length - For bar sizes No. 3 through 11: For bar sizes No. 14 and 18:	-1 -2

Table 03211B
 MINIMUM CONCRETE COVER FOR REINFORCEMENT

SURFACE	MINIMUM COVER IN INCHES
Slabs and Joists - Top and bottom bars for dry conditions - No. 14 and No. 18 bars: No. 11 bars and smaller:	 1-1/2 1
Formed concrete surfaces exposed to earth, water or weather; over, or in contact with, sewage; and for bottoms bearing on work mat, or slabs supporting earth cover - No. 5 bars and smaller: No. 6 through No. 18 bars:	 1-1/2 2
Beams and Columns - For dry conditions - Stirrups, spirals and ties: Principal reinforcement: Exposed to earth, water, sewage or weather - Stirrups and ties: Principal reinforcement:	 1-1/2 2 2 2-1/2
Walls - For dry conditions - No. 11 bars and smaller: No. 14 and No. 18 bars: Formed concrete surfaces exposed to earth, water, sewage or weather, or in contact with ground - Circular tanks with ring tension: All others:	 1 1-1/2 2 2
Footings and Base Slabs - At formed surfaces and bottoms bearing on concrete work mat: At unformed surfaces and bottoms in contact with earth: Over top of piles: Top of footings -- same as slabs	 2 3 2

END OF SECTION

Section 03310

STRUCTURAL CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cast-in-place normal-weight structural concrete and mass concrete.

1.02 UNIT PRICES

- A. Measurement for structural concrete is on lump-sum basis for the project. The Contractor should estimate the amount of structural concrete required to complete the structures on the project, and incorporate into the lump sum bid and reflect in the Schedule of Values.
- B. Measurement for extra structural concrete is on cubic-yard basis. Payment includes related work performed in accordance with related sections.

1.03 REFERENCES

- A. ACI 301 - Specifications for Structural Concrete for Buildings.
- B. ACI 304.2R - Placing Concrete by Pumping Methods
- C. ACI 305R - Hot Weather Concreting.
- D. ACI 306.1 - Standard Specification for Cold Weather Concreting.
- E. ACI 309R - Guide for Consolidation of Concrete.
- F. ACI 318 - Building Code Requirements for Reinforced Concrete.
- G. ACI 350R - Environmental Engineering Concrete Structures.
- H. ASTM C 31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
- I. ASTM C 33 - Standard Specification for Concrete Aggregates.
- J. ASTM C 39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- K. ASTM C 42 - Standard Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

- L. ASTM C 88 - Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
- M. ASTM C 94 - Standard Specifications for Ready-Mixed Concrete.
- N. ASTM C 127 - Standard Test Method for Specific Gravity and Absorption of Coarse Aggregate.
- O. ASTM C 131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- P. ASTM C 136 - Sieve Analyses of Fine and Coarse Aggregates.
- Q. ASTM C 143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
- R. ASTM C 150 - Standard Specification for Portland Cement.
- S. ASTM C 157 - Test Method for Length Change of Hardened Hydraulic Cement Mortar and Concrete.
- T. ASTM C 172 - Standard Practice for Sampling Freshly Mixed Concrete.
- U. ASTM C 173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
- V. ASTM C 192 - Method of Making and Curing Concrete Test Specimens in the Laboratory.
- W. ASTM C 231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- X. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete.
- Y. ASTM C 330 - Standard Specification for Lightweight Aggregates for Structural Concrete.
- Z. ASTM C 494 - Standard Specification for Chemical Admixtures for Concrete.
- AA. ASTM C 535 - Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
- AB. ASTM C 567 - Standard Test Method for Unit Weight of Structural Lightweight Concrete.
- AC. ASTM C 1064 - Standard Test Method for Temperature of Freshly Mixed Portland Cement Concrete.

- AD. Concrete Plant Manufacturer's Bureau (CPMB), Plant Mixer Manufacturers Division: Concrete Plant Mixer Standards.
- AE. National Ready-Mixed Concrete Association (NRMCA): Certification of Ready-Mixed Concrete Production Facilities (checklist with instructions).
- AF. John Wiley and Sons, Interscience Publishers Division, "Encyclopedia of Industrial Chemical Analysis," Vol. 15, Page 230 (alkalinity test procedure).

1.04 DEFINITIONS

- A. Mass Concrete: Concrete sections 4 feet or more in least dimension.
- B. Hot Weather: Any combination of high air temperature, low relative humidity and wind velocity tending to impair quality of fresh or hardened concrete or otherwise resulting in abnormal properties.
- C. Cold Weather: Period when, for more than 2 successive days, mean daily temperature is below 40 degrees F.

1.05 SUBMITTALS

- A. Conform to Section 01330 – Submittal Procedures.
- B. Mill Certificates: Required for bulk cement.
- C. Design Mixes:
 - 1. Submit test data on proposed design mixes for each type of concrete in the Work, including each class, and variations in type, source or quantity of material. Include type, brand and amount of cementitious materials; type, brand and amount of each admixture; slump; air content; aggregate sources, gradations, specific gravity and absorption; total water (including moisture in aggregate); water/cement ratio; compressive strength test results for 7 and 28 days; and shrinkage tests for Class C and D concrete at 21 or 28 days of drying.
 - 2. Submit abrasion loss and soundness test results for limestone aggregate.
 - 3. Testing of aggregates, including sieve analysis, shall be performed by a certified independent testing laboratory. Tests shall have been performed no earlier than 3 months before Notice to Proceed.
 - 4. Provide standard deviation data for plant producing concrete. Data shall include copies of laboratory test results and standard deviation calculated in accordance with ACI 318, Item 5.3.1. Laboratory tests shall have been performed within past 12 months. When standard deviation data is not available, comply with ACI 318, Table 5.3.2.2.

5. Review and acceptance of mix design does not relieve Contractor of responsibility to provide concrete of quality and strength required by these Specifications.
- D. Admixtures: Submit manufacturer's technical information, including following:
1. Air-Entraining Admixture: Give requirements to control air content under all conditions, including temperature variations and presence of other admixtures.
 2. Chemical Admixtures: Give requirements for quantities and types to be used under various temperatures and job conditions to produce uniform, workable concrete mix. Submit evidence of compatibility with other admixtures and cementitious materials proposed for use in design mix.
- E. High-range Water Reducer (Superplasticizer): When proposed for use, submit manufacturer's technical information and instructions for use of superplasticizer. State whether superplasticizer will be added at ready-mix plant or job site. When superplasticizer will be added at job site, submit proposed plan for measuring and adding superplasticizer to concrete mix at job site, and establish dosing area on site with holding tanks and metering devices. When superplasticizer is to be added at ready-mix plant, submit contingency plans for adding additional superplasticizer at job site when required due to delay in placing concrete. Identify portions of Work on which superplasticizer is proposed for use.
- F. Hot and Cold Weather Concreting: Submit, when applicable, proposed plans for hot and cold weather concreting. Review and acceptance of proposed procedure will not relieve Contractor of responsibility for quality of finished product.
- G. Project Record Drawings: Accurately record actual locations of embedded utilities and components which are concealed from view.

1.06 QUALITY ASSURANCE

- A. Provide necessary controls during evaluation of materials, mix designs, production and delivery of concrete, placement and compaction to assure that the Work will be accomplished in accordance with Contract Documents. Maintain records of concrete placement. Record dates, locations, quantities, air temperatures, and test samples taken.
- B. Code Requirements: Concrete construction for buildings shall conform to ACI 318. Concrete construction for water and wastewater treatment and conveying structures shall conform to ACI 318 with modifications by ACI 350R, Item 2.6. Where this Specification conflicts with ACI 318 or ACI 350R, this Specification governs.
- C. Testing and Other Quality Control Services:
1. Concrete testing required in this section, except concrete mix design, limestone aggregate test data, and testing of deficient concrete, will be performed by an

independent commercial testing laboratory employed and paid by the District in accordance with Section 01454 - Testing Laboratory Services.

2. Provide material for and cooperate fully with City's testing laboratory technician in obtaining samples for required tests.
3. Standard Services: The following testing and quality control services will be provided by District in accordance with Section 01454, Testing Laboratory Services:
 - a. Verification that plant equipment and facilities conform to NRMCA "Certification of Ready-Mix Concrete Production Facilities".
 - b. Testing of proposed materials for compliance with this Specification.
 - c. Review of proposed mix design submitted by Contractor.
 - d. Obtaining production samples of materials at plants or stockpiles during work progress and testing for compliance with this Specification.
 - e. Strength testing of concrete according to following procedures:
 - (1) Obtaining samples for field test cylinders from every 100 cubic yards and any portion less than 100 cubic yards for each mix design placed each day, according to ASTM C 172, with each sample obtained from a different batch of concrete on a representative, random basis. Selecting test batches by any means other than random numbers chosen before concrete placement begins is not allowed.
 - (2) Molding four specimens from each sample according to ASTM C 31, and curing under standard moisture and temperature conditions as specified in Sections 7(a) and (b) of ASTM C 31.
 - (3) Testing two specimens at 7 days and two specimens at 28 days according to ASTM C 39, reporting test results averaging strengths of two specimens. However, when one specimen evidences improper sampling, molding or testing, it will be discarded and remaining cylinder considered test result. When high-early-strength concrete is used, specimens will be tested at 3 and 7 days.
 - f. Air content: For each strength test, determination of air content of normal weight concrete according to ASTM C 231.
 - g. Slump: For each strength test, and whenever consistency of concrete appears to vary, conducting slump test in accordance with ASTM C 143.

- h. Temperature: For each strength test, checking concrete temperature in accordance with ASTM C 1064.
- i. Lightweight concrete: For each strength test, or more frequently when requested by Project Manager, determination of air content by ASTM C 567 and unit weight by ASTM C 567.
- j. Monitoring of current and forecasted climatic conditions to determine when rate of evaporation, as determined by Figure 2.1.5 of ACI 305R, will produce loss of 0.2 pounds of water, or more, per square foot per hour. Testing lab representative will advise Contractor to use hot weather precautions when such conditions will exist during concrete placement, and note on concrete test reports when Contractor has been advised that hot weather conditions will exist.
- k. Class A and D Concrete Shrinkage Tests: Performance of drying shrinkage tests for trial batches as follows:
 - (1) Preparation and Testing of Specimens: Compression and drying shrinkage test specimens will be taken in each case from the same concrete sample; shrinkage tests will be considered a part of the normal compression tests for the project. 4-inch by 4-inch by 11-inch prisms with an effective gage length of 10 inches, fabricated, cured, dried and measured in accordance with ASTM C 157, modified as follows:
 - (a) Wet curing: Remove specimens from molds at an age of 23 hours \pm 1 hour after trial batching and immediately immerse in water at 70 degrees F \pm 3 degrees F for at least 30 minutes;
 - (b) Measure within 30 minutes after first 30 minutes of immersion to determine original length (not to be confused with "base length");
 - (c) Then submerge in saturated limewater, at 73 degrees F \pm 3 degrees F, for 7 days;
 - (d) Then measure at age 7 days to establish "base length" for drying shrinkage calculations ("zero" days drying age);
 - (e) Calculate expansion (base length expressed as a percentage of original length);
 - (f) Immediately store specimens in a temperature- and humidity-controlled room maintained at 73 degrees F, \pm 3 degrees F and 50 percent \pm 4 percent relative humidity, for the remainder of the test.

- (g) Measure to determine shrinkage, expressed as percentage of base length. Compute the drying shrinkage deformation of each specimen as the difference between the base length (at “zero” days drying age) and the length after drying at each test age. Compute the average drying shrinkage deformation of the specimens to the nearest 0.0001 inch at each test age. If the drying shrinkage of any specimen departs from the average of that test age by more than 0.0004 inch, disregard the results obtained from that specimen. Report results of shrinkage tests to the nearest 0.001 percent of shrinkage.
 - (h) Report shrinkage separately for 7, 14, 21, and 28 days of drying after 7 days of moist curing.
- 4. Additional Testing and Quality Control Services: The following will be performed by an independent commercial testing laboratory employed and paid by the District in accordance with Section 01454, Testing Laboratory Services, when requested by District Engineer.
 - a. Checking of batching and mixing operations.
 - b. Review of manufacturer's report of each cement shipment and conducting laboratory tests of cement.
 - c. Molding and testing reserve 7-day cylinders or field cylinders.
 - d. Conducting additional field tests for slump, concrete temperature and ambient temperature.
 - e. Alkalinity Tests: For concrete used in sanitary structures, one test for each structure. Perform alkalinity tests on concrete covering reinforcing steel on the inside of the pipe or structure in accordance with "Encyclopedia of Industrial Chemical Analysis," Vol. 15, page 230.
- 5. Contractor shall provide the following testing and quality control services:
 - a. Employ an independent commercial testing laboratory, acceptable to District, to prepare and test design mix for each class of concrete for which material source has been changed.
 - b. Notify commercial testing laboratory employed by District 24 hours prior to placing concrete.
- 6. Testing of deficient concrete in place:
 - a. When averages of three consecutive strength test results fail to equal or exceed specified strength, or when any individual strength test result falls

- below specified strength by more than 500 psi, strength of concrete shall be considered potentially deficient and core testing, structural analysis or load testing may be required by Project Manager.
- b. When concrete in place proves to be deficient, Contractor shall pay costs, including costs due to delays, incurred in providing additional testing and analysis services provided by the District Engineer, or the independent commercial testing laboratory selected by the District.
 - c. Replace concrete work judged inadequate by core tests, structural analysis or load tests at no additional cost to the District.
 - d. Core Tests:
 - (1) Obtain and test cores in accordance with ASTM C 42. Where concrete in structure will be dry under service conditions, air dry cores (temperature 60 to 80 degrees F, relative humidity less than 60 percent) for 7 days before test; test dry. Where concrete in structure will be more than superficially wet under service conditions, test cores after moisture conditioning in accordance with ASTM C 42.
 - (2) Take at least three representative cores from each member or area of concrete in place that is considered potentially deficient. Location of cores shall be determined by Project Manager so as to least impair strength of structure. When, before testing, one or more cores shows evidence of having been damaged during or after removal from structure, replace the damaged cores.
 - (3) Concrete in area represented by core test will be considered adequate when average strength of cores is equal to at least 85 percent of specified strength, and when no single core is less than 75 percent of specified strength.
 - e. Structural Analysis: When core tests are inconclusive or impractical to obtain, Project Manager may perform additional structural analysis at Contractor's expense to confirm safety of structure.
 - f. Load Tests: When core tests and structural analysis do not confirm safety of structure, load tests may be required, and their results evaluated, in accordance with ACI 318.
 - g. Testing by impact hammer, sonoscope, probe penetration tests (Windsor probe), or other nondestructive device may be permitted by Project Manager to determine relative strengths at various locations in structure, to evaluate concrete strength in place, or for selecting areas to be cored. However, such tests, unless properly calibrated and correlated with other

test data, shall not be used as basis for acceptance or rejection of structure's safety.

1.07 STORAGE AND HANDLING OF MATERIALS

- A. Cement: Store cement in weathertight buildings, bins or silos to provide protection from dampness and contamination and to minimize warehouse set. When there is any doubt as to expansive potential of shrinkage-compensating cements because of method or length of storage and exposure, laboratory test cement before use.
- B. Aggregate: Arrange and use aggregate stockpiles to avoid excessive segregation or contamination with other materials or with other sizes of like aggregates. Build stockpiles in successive horizontal layers not exceeding 3 feet in thickness. Complete each layer before next is started.
- C. Fine Aggregate: Before using, allow fine aggregate to drain until uniform moisture content is reached.
- D. Admixtures: Store admixtures to avoid contamination, evaporation or damage. For those used in form of suspensions or nonstable solutions, provide suitable agitating equipment to assure uniform distribution of ingredients. Protect liquid admixtures from freezing and other temperature changes which would adversely affect their characteristics.
- E. Lightweight Aggregates: Uniformly predampen lightweight aggregates as necessary to prevent excessive variations in moisture content. Allow predampened aggregates to remain in stockpiles, under continuous fog spray, for minimum of 24 hours before use. Provide adequate drainage in stockpile areas to eliminate excess water and accumulation of contaminated fines.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Cement:
 - 1. Use same brand of cement used in concrete mix design. Use only one brand of each type in each structure, unless otherwise indicated on Drawings.
 - 2. Portland Cement: ASTM C 150, Type I or Type II, gray in color. Use Type III only when specifically authorized by District Engineer in writing. Use Type II, including the requirements of Table 2, in construction of liquid-containing structures and cooling towers, unless shown otherwise on Drawings.

- B. Admixtures:
1. Do not use calcium chloride, thiocyanate or admixtures containing more than 0.05 percent chloride ions.
 2. Air-Entraining Admixtures: ASTM C 260, compatible with other admixtures used.
 3. Chemical Admixtures: Polymer type, nonstaining, chloride-free admixtures conforming to ASTM C 494, Type A, C, D or E.
 4. High-Range Water Reducer (Superplasticizer): ASTM C 494, Type F or G, compatible with and by the same manufacturer as other admixtures.
- C. Mixing Water: Use clean, potable water, free from harmful amounts of oils, acids, alkalis or other deleterious substances, meeting requirements of ASTM C 94.
- D. Aggregates: Use coarse aggregate from only one source, and fine aggregate from only one source, for exposed concrete in any single structure.
1. Coarse Aggregate: Gravel, crushed gravel or crushed limestone conforming to ASTM C 33.
 2. Fine Aggregate: Natural sand complying with ASTM C 33.
 3. Limestone aggregate shall conform to ASTM C 33 and the following additional requirements: Clean, hard, strong and durable particles free of chemicals and coatings of silt, clay, or other fine materials that may affect hydration and bond of cement paste. Select crushed limestone: High-calcium limestone (minimum 95 percent CaCO_3 and maximum 3.5 percent MgCO_3) with maximum Los Angeles Abrasion loss of 38 percent, when tested in accordance with ASTM C 131 or ASTM C 535. Test aggregate for soundness in accordance with ASTM C 88; maximum loss shall not exceed 18 percent after 5 cycles of magnesium sulfate test.
 4. Maximum size of coarse aggregate:
 - a. Normal weight concrete, except as noted below: 1-1/2 inches.
 - b. Formed members 6 inches or less in least dimension: 1/5 least dimension.
 - c. Slabs: 1/3 depth of slab.
 - d. Drilled shafts: 1/3 clearance between reinforcing steel, but not greater than 3/4 inch.
 - e. Concrete fill, seal slabs and bonded concrete topping in clarifiers: 3/8 inch.

5. Coarse aggregate for lightweight concrete: ASTM C 330. Grading limits: 3/4 inch to No. 4.
 6. Abrasive Aggregate: Conform to requirements of Section 03350 - Concrete Finishing.
- E. Calcium Chloride: Not permitted.
- F. Evaporation Retardant: Masterbuilders "Confilm", Euclid "Eucobar", or equal.
- G. Miscellaneous Materials:
1. Bonding Agent: Two-component modified epoxy resin.
 2. Vapor barrier: 6 mil clear polyethylene film of type recommended for below-grade application.
 3. Non-shrink grout: premixed compound consisting of non-metallic aggregate, cement and water-reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days.

2.01 CONCRETE MIX

- A. Objective: Select proportions of ingredients to produce concrete having proper placability, durability, strength, appearance, and other specified properties.
- B. Mix Design: Employ and pay an independent commercial testing laboratory, acceptable to District, to prepare and test mix designs for each type of concrete specified. Proportion mix design ingredients by weight. Submit mix designs and test results for approval.
1. During the trial batches, aggregate proportions may be adjusted by the testing laboratory using two coarse aggregate size ranges to obtain the required properties. If one size range produces an acceptable mix, a second size range need not be used. Such adjustments shall be considered refinements to the mix design and shall not be the basis for extra compensation to the Contractor. Concrete shall conform to the requirements of this Section, whether the aggregate proportions are from the Contractor's preliminary mix design, or whether the proportions have been adjusted during the trial batch process. Prepare trial batches using the aggregates, cement and admixtures proposed for the project. Make trial batches large enough to obtain 3 drying shrinkage test specimens and 6 compression test specimens from each batch. Shrinkage testing is required only for Class A and D concrete.
 2. Determine compressive strength by testing 6-inch diameter by 12-inch high cylinders, made, cured and tested in accordance with ASTM C 192 and ASTM C 39. Test 3 compression test cylinders at 7 days and 3 at 28 days. Average

compressive strength for the 3 cylinders tested at 28 days for any given trial batch shall be not less than 125 percent of the specified compressive strength.

3. Perform sieve analysis of the combined aggregate for each trial batch according to of ASTM C 136. Report percentage passing each sieve.
4. In mix designs for Class A and D concrete, fine aggregate shall not exceed 41 percent of total aggregate by weight.

C. Shrinkage Limitations, Class A and D Concrete

1. Maximum concrete shrinkage for specimens cast in the laboratory from the trial batch: 0.036 percent as measured at 21-day drying age, or 0.042 percent at 28-day drying age. Use for construction only mix designs that meet trial batch shrinkage requirements. Shrinkage limitations apply only to Class A and D concrete.
2. Maximum concrete shrinkage for specimens cast in the field shall not exceed the trial batch maximum shrinkage requirement by more than 25 percent.
3. If the required shrinkage limitation is not met during construction, take any or all of the following actions, at no additional cost to the District, for securing the specified shrinkage requirements: Changing the source or aggregates, cement or admixtures; reducing water content; washing of aggregate to reduce fines; increasing the number of construction joints; modifying the curing requirements; or other actions designed to minimize shrinkage or its effects.

D. Selecting Ingredient Proportions for Concrete:

1. Proportion concrete mix according to ACI 301, Chapter 3.
2. Establish concrete mix design by laboratory trial batches prepared by independent testing laboratory, or on basis of previous field experience in accordance with provisions of ACI 318, Item 5.3; however, minimum cement content for each class of concrete shall not be less than specified.
3. Concrete mix design data submitted for review shall have average 28-day compressive strength calculated in accordance with ACI 318, Item 5.3.2.1. When data is not available to determine standard deviation in accordance with ACI 318, Item 5.3.1, average 28-day strength of mix design shall conform to ACI 318, Table 5.3.2.2.

E. Water-Cement Ratios:

1. Maximum allowable water-cement ratios shall be as follows:
 - a. Concrete for liquid-containing structures: 0.45.
 - b. Concrete subjected to brackish water, salt spray or deicers: 0.40.

- c. All other concrete: 0.55.
- 2. Superplasticizer may be added to maintain specified maximum water-cement ratios. Include free water in aggregate in water-cement ratio computations.
- F. Adjustment of Mix Proportions: After sufficient data becomes available during construction, mix may be adjusted upon approval of Project Manager, in accordance with ACI 318, Item 5.5; however, minimum cement content for each class of concrete shall not be less than specified.
- G. Entrained Air: Air-entrain all concrete except drilled shafts. Total air content in accordance with ASTM C 173: 4 to 6 percent.
- H. Consistency, Workability, and Slump:

- 1. The quantity of water in a batch of concrete shall be just sufficient, with a normal mixing period, to produce concrete which can be worked properly into place without segregation, and which can be compacted by vibratory methods as specified, to give the desired strength, density, impermeability and smoothness of surface. Change the quantity of water as necessary, with variations in the nature or moisture content of the aggregates, to maintain uniform production of a desired consistency. Determine the consistency of the concrete in successive batches by slump tests in accordance with ASTM C 143. Slumps shall be as follows:

<u>Concrete Type</u>	<u>Minimum Slump</u>	<u>Maximum Slump</u>
Portland Cement Concrete:	2"	4"
Concrete to be dosed with superplasticizer:	1"	3"
Normal Weight Concrete after dosing with superplasticizer:	4"	9"
Lightweight Concrete after dosing with superplasticizer:	4"	7"
Drilled Shaft Concrete:	4"*	8"

* Minimum slump where drilled shafts are cast in temporary casings: 5 inches.

- 2. Specified slump shall apply at time when concrete is discharged at job site. Perform slump tests to monitor uniformity and consistency of concrete delivered to job site; however, do not use as basis for mix design. Do not exceed water-cement ratios specified.
- I. Admixtures: Proportion admixtures according to manufacturer's recommendations. Use of accelerator is permitted when air temperature is less than 40 degrees F. Use of retarder is permitted when temperature of placed concrete exceeds 65 degrees F.

J. High-Range Water Reducers (Superplasticizers): Use superplasticizer to improve workability of concrete or delay hydration of cement, in accordance with requirements and recommendations of product manufacturer and approved submittals.

K. Concrete Classification and Strength:

1. Strength: Conform to values for class of concrete indicated on Drawings for each portion of Work. Requirements are based on 28-day compressive strength. If high early-strength concrete is allowed, requirements are based on 7-day compressive strength.

2. Classification:

Class (Normal- weight)	Minimum 28-Day Compressive Strength (psi)	Minimum Cement Content Pounds per Cubic Yard
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Concrete for Structures Containing Water or Wastewater

A	4000	564 (6 Sacks)
B	1500	329 (3-1/2 Sacks)
C	3000	470 (5 Sacks)
D	5000	658 (7 Sacks)
H	3000	611 (6-1/2 Sacks)

Concrete for Buildings, Slabs on Grade and Miscellaneous Structures

AB	4000	Not Applicable
BB	1500	Not Applicable
CB	3000	Not Applicable
DB	5000	Not Applicable

Class (Light- weight)	Minimum 28-Day Compressive Strength (psi)	Minimum Cement Content Pounds per Cubic Yard
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E	3000	Not Applicable
F	4000	Not Applicable
G	5000	Not Applicable

3. Maximum size aggregate for Class H concrete: 3/8 inch. Maximum size aggregate for all other normal-weight concrete: 1-1/2 inches, except as specified in Paragraph 2.01D.4.

4. When required strength is not obtained with minimum cement content as specified, add cement, lower water-cement ratio or provide other aggregates as necessary.

5. In addition to conforming to specified strength, lightweight concrete must be within specified unit weight limits. Maximum air-dry unit weight is 118 pounds per cubic foot; minimum is 110 pounds per cubic foot unless shown otherwise on

Drawings. Determine air-dry unit weight in accordance with ASTM C 567. Correlate air-dry unit weight with fresh unit weight of the same concrete as a basis for acceptance during construction.

L. Use of Classes of Concrete:

1. Use classes of concrete as indicated on the Drawings and in other specifications.
2. Liquid-containing structures: If not otherwise indicated, use the following classes for structures containing water or wastewater and for utility applications in the locations described:
 - a. Class A: All reinforced concrete and where not otherwise defined.
 - b. Class B: Unreinforced concrete used for plugging pipes, seal slabs, thrust blocks and trench dams, unless indicated otherwise.
 - c. Class H: Fill and topping. Where concrete fill thickness exceeds 3 inches in the majority of a placement and is not less than 1.5 inches thick, Class A concrete may be used.
3. All other structures: If not otherwise indicated, use the following classes in the locations described:
 - a. Class AB: All reinforced concrete and where not otherwise defined.
 - b. Class CB: Duct banks; see Section 16402 - Underground Duct Banks for additional requirements.
 - c. Class BB: Unreinforced concrete fill under structures.

2.02 MIXING NORMAL WEIGHT CONCRETE

A. Conform to ACI 301, Chapter 7.

B. Ready-Mixed Concrete:

1. Measure, batch, mix and transport ready-mixed concrete according to ASTM C 94. Plant equipment and facilities shall conform to NRMCA "Certification of Ready Mixed Concrete Production Facilities".
2. Provide batch tickets with information specified in ASTM C 94. Deliver batch ticket with concrete and give to District's on-site testing laboratory representative.

C. Batch Mixing at Site:

1. Mix concrete in batch mixer conforming to requirements of CPMB "Concrete Plant Mixer Standards". Use mixer equipped with suitable charging hopper, water storage tank and water measuring device. Batch mixer shall be capable of mixing aggregates, cement and water into uniform mass within specified mixing time, and of discharging mix without segregation. Operate mixer according to rated capacity and recommended revolutions per minute printed on manufacturer's rating plate.
2. Charge batch into mixer so some water will enter before cement and aggregates. Keep water running until one-fourth of specified mixing time has elapsed. Provide controls to prevent discharging until required mixing time has elapsed. When concrete of normal weight is specified, provide controls to prevent addition of water during mixing. Discharge entire batch before mixer is recharged.
3. Mix each batch of 2 cubic yards or less for not less than 1 minute and 30 seconds. Increase minimum mixing time 15 seconds for each additional cubic yard or fraction of cubic yard.
4. Keep mixer clean. Replace pick-up and throw-over blades in drum when they have lost 10 percent of original depth.

D. Admixtures:

1. Charge air-entraining and chemical admixtures into mixer as solution using automatic dispenser or similar metering device. Measure admixture to accuracy within ± 3 percent. Do not use admixtures in powdered form.
2. Two or more admixtures may be used in same concrete, provided that admixtures in combination retain full efficiency and have no deleterious effect on concrete or on properties of each other. Inject admixtures separately during batching sequence.
3. Add retarding admixtures as soon as practicable after addition of cement.

E. Temperature Control:

1. When ambient temperature falls below 40 degrees F, keep as-mixed temperature above 55 degrees F to maintain concrete above minimum placing temperature.
2. When water or aggregate has been heated, combine water with aggregate in mixer before cement is added. Do not add cement to mixtures of water and aggregate when temperature of mixture is greater than 100 degrees F.
3. In hot weather, maintain temperature of concrete below maximum placing temperature. When necessary, temperature may be lowered by cooling ingredients, cooling mixer drum by fog spray, using chilled water or well-crushed ice in whole or part for added water, or arranging delivery sequence so

that time of transport and placement does not generate unacceptable temperatures.

4. Submit hot weather and cold weather concreting plans for approval.

2.03 MIXING LIGHTWEIGHT CONCRETE

- A. Determining Absorption of Aggregates: Mixing procedures vary according to total absorption by weight of lightweight aggregates. Determine total absorption by weight before predampening in accordance with ASTM C 127.
- B. Ten Percent or Less Absorption: Follow same requirements as for mixing normal-weight concrete when preparing concrete made with low-absorptive lightweight aggregates having 10 percent or less total absorption by weight. To be low-absorptive, aggregates must absorb less than 2 percent additional water in first hour after mixing.
- C. More Than 10 Percent Absorption: Batch and mix concrete made with lightweight aggregates having more than 10 percent total absorption by weight, as follows:
 1. Place approximately 80 percent of mixing water in mixer.
 2. If aggregates are pre-dampened, add air-entraining admixture and all aggregates. Mix for minimum of 30 seconds, or 5 to 10 revolutions of truck mixer.
 3. When aggregates have not been predampened, mix aggregates and water for minimum of 1 minute and 30 seconds, or 15 to 30 revolutions of truck mixer. Then add air-entraining admixture and mix for additional 30 seconds.
 4. Then, in the following sequence, add specified or permitted admixtures (other than air-entraining agent), all cement, and mixing water previously withheld.
 5. Complete mixing using procedures for normal-weight concrete.

2.04 MASS CONCRETE

- A. Do not use high early-strength cement (Type III) or accelerating admixtures.
- B. Use high-range water-reducing admixture (superplasticizer) to minimize water content and cement content.
- C. Specified water-reducing retarding admixture may be required to prevent cold joints when placing large quantities of concrete, to permit revibration of concrete, to offset effects of high temperature in concrete or weather, and to reduce maximum temperature or rapid temperature rise.

2.05 EQUIPMENT

- A. Select equipment of size and design to ensure continuous flow of concrete at delivery end. Conform to following equipment and operations requirements.

- B. Truck mixers, agitators and manner of operation: Conform to ASTM C 94. Use of non-agitating equipment for transporting concrete is not permitted.
- C. Belt conveyors: Configure horizontally, or at a slope causing no segregation or loss. Use approved arrangement at discharge end to prevent separation. Discharge long runs without separation into hopper.
- D. Chutes: Metal or metal-lined (other than aluminum). Arrange for vertical-to-horizontal slopes not more than 1 to 2 nor less than 1 to 3. Chutes longer than 20 feet or not meeting slope requirements may be used if concrete is discharged into hopper before distribution.
- E. Do not use aluminum or aluminum-alloy pipe or chutes for conveying concrete.

PART 3 EXECUTION

3.01 SPECIAL CONSIDERATIONS

- A. Concreting Under Water: Not permitted except where shown otherwise on Drawings or approved by District Engineer. When shown or permitted, deposit concrete under water by methods acceptable to the District Engineer so fresh concrete enters mass of previously-placed concrete from within, causing water to be displaced with minimum disturbance at surface of concrete.
- B. Protection from Adverse Weather: Unless adequate protection is provided or District Engineer's approval is obtained, do not place concrete during rain, sleet, snow or freezing weather. Do not permit rainwater to increase mixing water or to damage surface finish. If rainfall occurs after placing operations begin, provide adequate covering to protect Work.

3.02 PREPARATION OF SURFACES FOR CONCRETING

- A. Earth Surfaces:
 - 1. Under interior slabs on grade, install vapor barrier. Lap joints at least 6 inches and seal watertight with tape, or sealant applied between overlapping edges and ends. repair vapor barrier damaged during placement of reinforcing and inserts with vapor barrier material; lap over damaged areas at least 6 inches and seal watertight.
 - 2. Other Earth Surfaces: Thoroughly wet by sprinkling prior to placing concrete, and keep moist by frequent sprinkling up to time of placing concrete thereon. Remove standing water. Surfaces shall be free from standing water, mud and debris at the time of placing concrete.

- B. Construction Joints:
1. Definition: Concrete surfaces upon or against which concrete is to be placed, where the placement of the concrete has been interrupted so that, in the judgment of the Project Manager, new concrete cannot be incorporated integrally with that previously placed.
 2. Interruptions: When placing of concrete is to be interrupted long enough for the concrete to take a set, use forms or other means to shape the working face to secure proper union with subsequent work. Make construction joints only where acceptable to the Project Manager.
 3. Preparation: Give horizontal joint surfaces a compacted, roughened surface for good bond. Except where the Drawings call for joint surfaces to be coated, clean joint surfaces of laitance, loose or defective concrete and foreign material by hydroblasting or sandblasting (exposing aggregate), roughen surface to expose aggregate to a depth of at least 1/4 inch and wash thoroughly. Remove standing water from the construction joint surface before new concrete is placed.
 4. After surfaces have been prepared cover approximately horizontal construction joints with a 3-inch lift of a grout mix consisting of Class A concrete batched without coarse aggregate; place and spread grout uniformly. Place wall concrete on the grout mix immediately thereafter.
- C. Set and secure reinforcement, anchor bolts, sleeves, inserts and similar embedded items in the forms where indicated on Contract Drawings, shop drawings and as otherwise required. Obtain Project Manager's acceptance before concrete is placed. Accuracy of placement is the sole responsibility of the Contractor.
- D. Place no concrete until at least 4 hours after formwork, inserts, embedded items, reinforcement and surface preparation have been completed and accepted by the Project Manager. Clean surfaces of forms and embedded items that have become encrusted with grout or previously-placed concrete before placing adjacent concrete.
- E. Casting New Concrete Against Old: Where concrete is to be cast against old concrete (any concrete which is greater than 60 days of age), thoroughly clean and roughen the surface of the old concrete by hydro-blasting or sandblasting (exposing aggregate). Coat joint surface with epoxy bonding agent following manufacturer's written instructions, unless indicated otherwise. Unless noted otherwise, this provision does not apply to vertical wall joints where waterstop is installed.
- F. Protection from Water: Place no concrete in any structure until water entering the space to be filled with concrete has been properly cut off or diverted and carried out of the forms, clear of the work. Deposit no concrete underwater. Do not allow still water to rise on any concrete until concrete has attained its initial set. Do not allow water to flow over the surface of any concrete in a manner and at a velocity that will damage the surface finish of the concrete. Pumping, dewatering and other necessary operations for removing ground water, if required, are subject to Project Manager's review.

- G. **Corrosion Protection:** Position and support pipe, conduit, dowels and other ferrous items to be embedded in concrete construction prior to placement of concrete so there is at least a 2 inch clearance between them and any part of the concrete reinforcement. Do not secure such items in position by wiring or welding them to the reinforcement.
- H. Where practicable, provide for openings for pipes, inserts for pipe hangers and brackets, and setting of anchors during placing of concrete.
- I. Accurately set anchor bolts and maintain in position with templates while they are being embedded in concrete.
- J. **Cleaning:** Immediately before concrete is placed, thoroughly clean dirt, grease, grout, mortar, loose scale, rust and other foreign substances from surfaces of metalwork to be in contact with concrete.

3.03 HANDLING, TRANSPORTING AND PLACING CONCRETE

- A. Conform to applicable requirements of Chapter 8 of ACI 301 and this Section. Use no aluminum materials in conveying concrete.
- B. **Rejected Work:** Remove concrete found to be defective or non-conforming in materials or workmanship. Replace rejected concrete with concrete meeting requirements of Contract Documents, at no additional cost to the District.
- C. **Unauthorized Placement:** Place no concrete except in the presence of the Project Manager. Notify the Project Manager in writing at least 24 hours before placement of concrete.
- D. **Placement in Wall Forms:**
 - 1. Do not drop concrete through reinforcing steel.
 - 2. Do not place concrete in any form so as to leave an accumulation of mortar on form surfaces above the concrete.
 - 3. Pump concrete or use hoppers and, if necessary, vertical ducts of canvas, rubber or metal (other than aluminum) for placing concrete in forms so it reaches the place of final deposit without separation. Free fall of concrete shall not exceed 4 feet below the ends of pump hoses, ducts, chutes or buggies. Uniformly distribute concrete during depositing.
 - 4. Do not displace concrete in forms more than 6 feet in horizontal direction from place where it was originally deposited.
 - 5. Deposit in uniform horizontal layers not deeper than 2 feet; take care to avoid inclined layers or inclined construction joints except where required for sloping members.

6. Place each layer while the previous layer is still soft. Rate of placement shall not exceed 5 feet of vertical rise per hour.
 7. Provide sufficient illumination in form interior so concrete at places of deposit is visible from the deck or runway.
- E. **Conveyors and Chutes:** Design and arrange ends of chutes, hopper gates and other points of concrete discharge in the conveying, hoisting and placing system so concrete passing from them will not fall separated into whatever receptacle immediately receives it. Conveyors, if used, shall be of a type acceptable to the District Engineer. Do not use chutes longer than 50 feet. Slope chutes so concrete of specified consistency will readily flow. If a conveyor is used, it shall be wiped clean by a device operated in such a manner that none of the mortar adhering to the belt will be wasted. All conveyors and chutes shall be covered.
- F. **Placement of Slabs:** In hot or windy weather, conducive to plastic shrinkage cracks, apply evaporation retardant to slab after screeding in accordance with manufacturer's instructions and recommendations. Do not use evaporation retardant to increase water content of the surface cement paste. Place concrete for sloping slabs uniformly from the bottom of the slab to the top, for the full width of the placement. As work progresses, vibrate and carefully work concrete around slab reinforcement. Scream the slab surface in an up-slope direction.
- G. **Concrete Temperature:** When placed, not more than 90 degrees F nor less than 55 degrees F for sections less than 12 inches thick, nor less than 50 degrees for all other sections. Do not heat concrete ingredients to a temperature higher than that necessary to keep the temperature of the mixed concrete, as placed, from falling below the specified minimum temperature. When concrete temperature is 85 degrees F or above, do not exceed 60 minutes between introduction of cement to the aggregates and discharge. When the weather is such that the concrete temperature would exceed 90 degrees F, employ effective means, such as pre-cooling of aggregates and mixing water, using ice or placing at night, as necessary to maintain concrete temperature, as placed, below 90 degrees F.
- H. **Cold Weather Placement:** Conform to ACI 306.1 - Standard Specification for Cold Weather Concreting, and the following.
1. Remove snow, ice and frost from surfaces, including reinforcement, against which concrete is to be placed. Before beginning concrete placement, thaw the subgrade to a minimum depth of 6 inches. Warm reinforcement and embedded items to above 32 degrees F prior to concrete placement.
 2. Maintain concrete temperature above 50 degrees F for at least 3 days after placement.

3.04 PUMPING OF CONCRETE

- A. If pumped concrete does not produce satisfactory results, in the judgment of the Project Manager, discontinue pumping operations and proceed with the placing of concrete using conventional methods.
- B. **Pumping Equipment:** Use a 2-cylinder pump designed to operate with only one cylinder if one is not functioning, or have a standby pump on site during pumping.
- C. The minimum hose (conduit) diameter: Comply with ACI 304.2R.
- D. Replace pumping equipment and hoses (conduits) that do not function properly.
- E. Do not use aluminum conduits for conveying concrete.
- F. **Field Control:** Take samples for slump, air content and test cylinders at the placement (discharge) end of the line.

3.05 CONCRETE PLACEMENT SEQUENCE

- A. Place concrete in a sequence acceptable to the Engineer. To minimize effects of shrinkage, place concrete in units bounded by construction joints shown. Place alternate units so each unit placed has cured at least 7 days for hydraulic structures, or 3 days for other structures, before contiguous unit or units are placed, except do not place corner sections of vertical walls until the 2 adjacent wall panels have cured at least 14 days for hydraulic structures and 7 days for other structures.
- B. Level the concrete surface whenever a run of concrete is stopped. To ensure straight and level joints on the exposed surface of walls, tack a wood strip at least 3/4-inch thick to the forms on these surfaces. Carry concrete about 1/2 inch above the underside of the strip. About one hour after concrete is placed, remove the strip, level irregularities in the edge formed by the strip with a trowel and remove laitance.

3.06 TAMPING AND VIBRATING

- A. Thoroughly settle and compact concrete throughout the entire depth of the layer being consolidated, into a dense, homogeneous mass; fill corners and angles, thoroughly embed reinforcement, eliminate rock pockets and bring only a slight excess of water to the exposed surface of concrete during placement. Use ACI 309R Group 3 immersion-type high-speed power vibrators (8,000 to 12,000 rpm) in sufficient number and with sufficient (at least one) standby units. Use Group 2 vibrators only when accepted by the District Engineer for specific locations.
- B. Use care in placing concrete around waterstops. Carefully work concrete by rodding and vibrating to make sure air and rock pockets have been eliminated. Where flat-strip type waterstops are placed horizontally, work concrete under waterstops by hand, making sure air and rock pockets have been eliminated. Give concrete surrounding the waterstops

additional vibration beyond that used for adjacent concrete placement to assure complete embedment of waterstops in concrete.

- C. Concrete in Walls: Internally vibrate, ram, stir, or work with suitable appliances, tamping bars, shovels or forked tools until concrete completely fills forms or excavations and closes snugly against all surfaces. Do not place subsequent layers of concrete until previously-placed layers have been so worked. Provide vibrators in sufficient numbers, with standby units as required, to accomplish the results specified within 15 minutes after concrete of specified consistency is placed in the forms. Keep vibrating heads from contact with form surfaces. Take care not to vibrate concrete excessively or to work it in any manner that causes segregation of its constituents.

3.07 PLACING MASS CONCRETE

- A. Observe the following additional restrictions when placing mass concrete.
 - 1. Use specified superplasticizer.
 - 2. Maximum temperature of concrete when deposited: 70 degrees F.
 - 3. Place in lifts approximately 18 inches thick. Extend vibrator heads into previously-placed layer.

3.08 REPAIRING SURFACE DEFECTS AND FINISHING

- A. Subject to approval by the District Manager and Engineer.

3.09 CURING

- A. No formwork shall be removed no earlier than 3 days following a pour and is subject to approval by the District Engineer prior to stripping the forms.

3.10 PROTECTION

- A. Protect concrete against damage until final acceptance by the District.
- B. Protect fresh concrete from damage due to rain, hail, sleet or snow. Provide such protection while the concrete is still plastic and whenever such precipitation is imminent or occurring.
- C. Do not backfill around concrete structures or subject them to design loadings until all components of the structure needed to resist the loading are complete and have reached the specified 28-day compressive strength, except as authorized otherwise by the District Engineer.

END OF SECTION

SECTION 05500

METAL FABRICATIONS

PART 1 GENERAL

1.01 SCOPE

A. Shop Drawings

1. Include information necessary for fabrication and erection of component parts of structure.
2. Indicate location, type, and size of bolts and welds distinguishing between shop and field connections.
3. Detail splices.

B. Test Reports

1. Submit mill test reports for structural steel.

C. Certificate

1. Submit welders qualifications certified by qualified testing laboratory.

1.02 QUALITY ASSURANCE

A. Welding Requirements

1. Welders shall be qualified in accordance with AWS D1.1.
2. Welds shall be pre-qualified or qualified in accordance with AWS D1.1.
3. Certify to qualification of welds and welders.

1.03 HANDLING

A. Avoid bending and other damage to structural steel members and connection material in handling.

B. Store on skids above ground to keep clean and drained.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Plates, Bars, and Structural Shapes: ASTM A36, Grade B.
- B. Structural Pipe: ASTM A53, Type E or S, Grade B; or ASTM A501.
- C. Structural Tubing: ASTM A500, Grade B.
- D. Bolts: ASTM A307 or A325, as shown on Drawings.
- E. Washers: Comply with ASTM requirements for bolts used.
- F. Filler Metal for Welding:
 - 1. Welding electrodes for manual shielded metal arc welding - AWS A5.1 or A5.5.
 - 2. Bare electrodes and granular flux used in submerged-arc process - F60 or F70 complying with AWS A5.17.
 - 3. E60S or E70S electrodes used in gas metal-arc process - AWS A5.18.
 - 4. E60T or E70T electrodes used in flux-corded-arc process - AWA A5.20.
- G. Grout
 - 1. Nonmetallic, premixed, and nonshrink, COE CRD-C621.
 - 2. Bleed free at 25 sec. flow cone fluidity, COE CRD-621.
 - 3. Acceptable products:
 - a. "Masterflow 713", Master Builders Co.
 - b. "Supreme Grout", Gifford-Hill and Co.
 - c. "Crystex", L and M Construction Chemicals, Inc.
 - d. "SikaGrout 212", Sika Corporation

2.02 PROTECTIVE COATING

- A. Structural Steel, Nongalvanized:
 - 1. Surface preparation: Commercial blast cleaning, SSPC SP6.
 - 2. Primer:
 - a. Type: Red or brown one coat shop paint, SSPC Paint 13.

- b. Number of coats: One.
- c. Dry film thickness: 2.5 mils minimum.
- 3. Finish: See Painting, Section 09900.
- B. Structural Steel, Galvanized:
 - 1. Steel: ASTM A123 with minimum coating of 2 oz. per sq ft of zinc.
 - 2. Bolts, nuts, and washers in steel exposed to weather: ASTM A153, chase threads after galvanizing, galvanize bolts used with galvanized material.
 - 3. Touch-up coating:
 - a. One coat 1.0 to 1.5 mils dry film thickness, zinc-rich compound.
 - b. Acceptable products:
 - 1) "Galvanox", Subox, Inc.
 - 2) "PPG Zinc Rich (non-Catayzed) 97-671/672", Pittsburgh Paint Company.
 - 3) "Z.R.C.", ZRC Products Company.
 - 4. Finish Coat(s): See Painting, Section 09900.

2.03 FABRICATION

- A. Fabricate structural steel in accordance with AISC S326.
- B. Coordinate holes, clips, loose lintels, tie rods, temporary anchors, and attachments with other trades.

PART 3 EXECUTION

3.01 ERECTION

- A. Erect structural steel in accordance with AISC S326.
- B. High Strength Bolts:
 - 1. High-strength bolted connections: Friction type.
 - 2. Use high strength bolts with suitable identifying mark placed on top of head before leaving factory.
 - 3. Use "Turn-of-the-Nut" method to tighten nuts.
 - 4. Mark bolts that have been completely tightened with identifying symbol.

- C. Welding
 - 1. Technique, appearance, quality of welds, and methods used in correcting defective work shall comply with AISC S326 and AWS D1.1.
- D. Setting Plates and Column Base Plates
 - 1. Set leveling plates and similar items solid in specified grout in compliance with manufacturer's recommendations.
- E. Washers and Nuts:
 - 1. Provide beveled washers where required to match sloping surfaces of connection material.
 - 2. Upset bolt threads or tack weld nuts to bolts to prevent backing-off of nuts.
- F. Structural steel members having splices not detailed on shop drawings will be rejected.
- G. Burning holes in structural steel members is prohibited.

3.02 FIELD QUALITY CONTROL

- A. Materials and workmanship shall be subject to inspection in mill, shop, and field.
- B. Correction of Defective Welds.
 - 1. Repair weld areas containing defects and make additional tests of repaired areas.
 - 2. If 20 percent or more of welds made by one welder contain defects requiring repair, 100 percent radiographic inspection of welder's work will be required.

END OF SECTION

SECTION 05530

ALUMINUM HANDRAILS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum mechanical sub-assembled guardrails and fittings.
- B. Guardrail extension at new walkover.

1.02 REFERENCES

- A. ASTM 6061-T6 and/or ASTM 6063-T6.

1.03 DESIGN REQUIREMENTS

- A. Railing assembly and attachments to resist a concentrated load of 200 pounds applied in any direction at any point and a uniform load of 50 pounds per lineal foot applied to the horizontal rails in any direction. The loads shall not be applied simultaneously.
- B. Space support posts 6 feet on center, maximum.
- C. Guard Rail Extension - Space support posts 3 feet on center.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01300 - Submittals.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

PART 2 PRODUCTS

2.01 RAILING SYSTEM

- A. Railings shall be constructed 1-1/2 inch diameter aluminum pipe schedule 40 with anodized satin finish. Finish to be clear anodized (0.7 mil). All fittings shall be extruded aluminum pre-engineered for railing application.
- B. All railing shall be mounted to the side of concrete walkway surfaces using 1/2 inch diameter stainless steel expansion anchors.
- C. All hardware used on the railing system shall be stainless steel.

- D. All railing surfaces in contact with concrete or dissimilar metals shall receive one coat of zinc chromate.
- E. All fittings shall be secured to the post and railing with #17 x 1" stainless steel set screws.
- F. Railings shall be provided with two horizontal rails.
- G. Toe boards shall be 4 inch extruded aluminum "Z" shape. Toe boards shall be connected to each railing post with a minimum of two fasteners in horizontal slotted holes. Splices shall be located and detailed to allow for thermal expansion and contraction.
- H. Openings in rail shall be provided for access to gates and valves. Provide double strand 3/16 inch diameter stainless steel chain.
- I. Provide expansion joints at maximum 24 ft centers using splice sleeves.
- J. Manufacturer: Golden Railings, Inc., 15611 W. 6th. Avenue, Golden, CO 80401-5051 or approved equal.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

3.02 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects.
- B. Provide anchors and sockets required for connecting railings to concrete.

END OF SECTION

00003
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Section 16010

BASIC ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Basic requirements specifically applicable to the work of Divisions 13, 15 and 16.
- B. The Contractor shall furnish equipment, materials, and labor for assembly and installation plus check-out and start-up of the complete electrical system as shown on the Drawings and stipulated in the Specifications.

1.02 REFERENCES

- A. As a minimum requirement, the electrical system shall be constructed in accordance with:
 - 1. American National Standards Institute/National Fire Protection Association (ANSI/NFPA), No. 70 - National Electrical Code (NEC).
 - 2. City of Angleton and Brazoria County Building Codes.
 - 3. Texas New Mexico Power requirements.
 - 4. Other applicable Codes and Standards as referenced in other specifications.
- B. Comply with local, county, state and federal regulations and codes in effect as of date of purchase or construction.
- C. Equipment of foreign manufacture must meet U.S. codes and standards.
- D. Equipment and materials shall conform to requirements of specification and to the criteria provided in data sheets for the project.

1.03 QUALITY ASSURANCE

- A. Product Conformance Certificate and Quality Assurance Release. Submit an overall conformance certificate for electrical components signed by the person responsible for product quality. Specifically identify the purchased material or equipment by project name and location, purchase order number, supplements, and item number where applicable, including materials and services provided by others. Indicate that all requirements have been met and identify any approved deviations.
- B. Field Inspection
 - 1. Electrical work shall be inspected and approved by the local code inspector and the Engineer.
 - 2. Contractor shall give a minimum of a two day notice to the Inspector and a five day notice to the Engineer that the installation is ready for inspection.
 - 3. Concealed work shall be inspected before it is covered:

- a. Conduit with stub-ups, underground in duct banks before concrete is poured.
- b. Conduit in slabs, walls and ceilings, complete with boxes.
4. Electrical equipment and materials shall be inspected upon arrival by the Engineer for compliance with specifications.

1.04 SITE CONDITIONS

A. Take the following site conditions into consideration when fabricating, erecting, installing and wiring electrical equipment under this contract:

1. Project Location Angleton Wastewater Treatment Plant
2. Facility Elevation 50 ft MSL
3. Seismic Zone Zone 0
4. Wind Velocity 130 mph
5. Temperature, Min./Max.:

- X Coldest Month Avg. High 60 degrees F Low 41 degrees F
- X Warmest Month Avg. High 94 degrees F Low 73 degrees F
- X Lowest Expected 11 degrees F
- X Highest Expected 107 degrees F

6. Rainfall:

- X Annual - 45 inches
- X Design - 3.4 inches/hour, 8.4 inches/24 hours

7. Design Relative Humidity: 100%, condensing

8. Station Barometric Pressure:

- X Average Annual 29.5 inches Hg Absolute.

9. Utility Water Systems: Design Pressure Design Temp.

- X River Water PSI _____ degrees F
- X Well Water PSI _____ degrees F
- X City Water PSI _____ degrees F

10. Electric Power Supply Characteristics:

	Voltage	Phase	Hz	Wire	Delta or Wye
1	480/277	3	60	4	Wye
2					
3					

PART 2 PRODUCTS

2.01 COMPONENT DESIGN

- A. Components utilized in the construction of the material or equipment shall be of the latest proven design, new and in current production. Do not use obsolete components or components to be phased out of production.

2.02 FACTORY INSPECTION

- A. Provide free access with prior notice for the Engineer at all times to the shop where the material or equipment is being fabricated or tested. Provide reasonable facilities for inspection, witnessing tests, and examining records. Give 7-days notice prior to starting tests which are scheduled for factory inspection.

PART 3 EXECUTION

3.01 PREPARATION

- A. Verify dimensions and ratings of equipment and materials to ensure proper fit and performance.

3.02 INSTALLATION

- A. Install equipment and materials in accordance with the requirements of the drawings, specifications, Texas New Mexico Power's standards and manufacturer's written requirements and instructions. If field conditions necessitate changes in electrical installation obtain the approval from the Engineer. The cost of all such changes shall be included in the price bid for the Project.

3.03 DEMONSTRATION

- A. Test the electrical system to specification requirements and to demonstrate correct installation and operation of equipment.
- B. Before 7-days test, demonstrate the system to the Engineer. Show the system to be fully operational. All alarms, safeties, and communication points to central and locally must operate in both full-automatic and back-up modes.

3.04 ENTERGY ELECTRICAL SERVICE

- A. Basic revisions to the existing Entergy electrical service will be required for this project, however, there will be no change in the electrical load. There will be required revisions to the interconnections between the service, metering and utilization equipment and wiring at the facility. The cost of all coordination and construction required for these revisions shall be included in the price bid for the Project.

END OF SECTION

Section 16060

ELECTRICAL DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical demolition and related repair.

1.02 REFERENCES

- A. Temporary wiring of systems to maintain operation of facilities while undergoing modifications and demolition shall be provided in accordance with:
 - 1. American National Standards Institute/National Fire Protection Association (ANSI/NFPA), No. 70 - National Electrical Code (NEC).

1.03 SUBMITTALS

- A. Annotate existing drawings to sequence the demolition of systems, equipment removal and temporary hook-ups.
- B. Schedule with Engineer for required shut-downs to accommodate system demolition and installation of temporary facilities. The maximum allowable outage period at any one shall be one (1) hour. Multiple outages may be scheduled as required, however, they must be staggered in time to assure that the treatment process is not impaired.

1.04 QUALITY ASSURANCE

- A. Verify field measurements and circuiting arrangements as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition requirements are based on casual field observation and existing record documents. Report discrepancies to Engineer before disturbing existing installation.
- D. By beginning demolition installer accepts existing conditions and warrants that he will maintain service to equipment and items not scheduled or indicated for removal.
- E. Not all demolition activities and/or requirements are illustrated on the Drawings. In general the descriptions provided in these specifications shall supplement what is illustrated on the Drawings.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Materials and equipment for patching and extending work: As specified in individual Sections.

2.02 DESIGN AND CONSTRUCTION

- A. The temporary electrical wiring and facilities shall be designed and constructed in strict compliance with NEC.

PART 3 EXECUTION

3.01 PREPARATION

- A. As required disconnect all electrical/instrumentation/control system related equipment and materials in walls, floors, ceilings, etc.
- B. Coordinate utility service outages with Utility Company and the City of Angleton to assure a minimal impact of plant operational performance.
- C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits use personnel experienced in such operations who are equipped with all of the required safety equipment.

3.02 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Demolish all existing electrical system components at the facility that are not made a part of the proposed facilities. This includes the generator circuit breaker in the motor control center, the generator, the fuel tank, electrical supports, equipment foundations, receptacles, light fixtures, light switches, conduit and wire both above and below ground, lighting panels, lighting transformers, etc.
- B. Patch all openings created by the removal of equipment or components with like materials, paint to match, fill in all excavations, etc.

3.03 DISPOSAL AND SALVAGE

- A. All equipment and components removed as a part of this project are considered as salvageable materials by the City of Angleton. In light of this designation the City of Angleton has the first right of refusal on all such materials removed. If the City of Angleton determines that the removed materials are of no value to the City then the General Contractor shall be responsible for the disposal or salvage of all such materials at a properly licensed offsite location.

3.04 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.

END OF SECTION

Section 16111

CONDUIT, FITTINGS AND BODIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specification for conduit, fittings and bodies.

1.02 REFERENCES

A. American National Standards Institute (ANSI).

1. ANSI C80.1: Rigid Steel Conduit - Zinc Coated.
2. ANSI C80.4: Fittings for Rigid Metal Conduit.
3. ANSI C80.5: Rigid Aluminum Conduit

B. Federal Specifications.

1. W-C-58C: Conduit Outlet Boxes, Bodies Aluminum and Malleable Iron.
2. W-C-1094: Conduit and Conduit Fittings Plastic, Rigid.
3. WW-C-566C: Flexible Metal Conduit.
4. WW-C-581D: Coatings on Steel Conduit.

C. National Electrical Manufacturers Association (NEMA).

1. NEMA RN1: Polyvinyl-Chloride Externally Coated Galvanized Rigid Steel Conduit and Electrical Metallic Tubing.
2. NEMA TC2: Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).
3. NEMA TC3: PVC Fittings for Use with Rigid PVC Conduit and Tubing.

D. National Fire Protection Association (NFPA), ANSI/NFPA 70 - National Electrical Code (NEC).

E. Underwriters' Laboratories (UL).

1. UL 1: Flexible Metal Electrical Conduit.
2. UL 6: Rigid Metal Electrical Conduit.
3. UL 514B: Fittings for Conduit and Outlet Boxes.
4. UL 651: Schedule 40 and 80 Rigid PVC Conduit.
5. UL 651A: Type EB and A Rigid PVC Conduit and HDPE Conduit.
6. UL 886: Electrical Outlet Boxes and Fittings for Use in Hazardous Locations.

1.03 SUBMITTALS

A. Submit the following under the provisions of Section 01330 - Submittal Procedures:

1. Manufacturer's cut sheets, catalog data, with selected products clearly marked.
2. Installation, terminating and splicing procedure.

3. Instruction for handling and storage.
4. Dimensions and weight.

1.04 QUALITY ASSURANCE

A. Tests.

1. Rigid steel conduit shall pass the bending, ductility, and thickness of zinc coating tests described by ANSI C80.1.
2. Flexible conduit shall pass the tension, flexibility, impact, and zinc coating test described by UL 1.
3. Nonmetallic conduit and fittings shall pass the test requirements of NEMA TC2, UL 651 and 651A and Federal Specification W-C-1094A.

1.05 DELIVERY STORAGE AND HANDLING

- A. Package conduit in 10-foot bundles maximum with conduit and coupling thread protectors suitable for indoor and outdoor storage. Package fittings in manufacturer's standard quantities and packaging suitable for indoor storage. Package plastic-coated rigid conduit, fittings, and bodies in such a manner as to protect the coating from damage during shipment and storage.
- B. Store conduit above ground on racks to prevent corrosion and entrance of debris.
- C. Protect plastic conduit from sunlight.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Rigid Steel Conduit.

1. Allied Tube and Conduit
2. Triangle Wire and Cable, Inc.
3. Wheatland Tube Company

B. PVC Coated Steel Conduit.

1. Occidental Coating Company (O-Cal Blue)
2. Robroy Industries, Inc. (Rob-Roy Red)

C. PVC Rigid Conduit.

1. Cantex
2. Carlon Industries, Inc.
3. Robroy Industries, Inc.

D. Conduit Fittings and Bodies.

1. Appleton Electric
2. Crouse-Hinds

3. Killark Electric Manufacturing Company
4. O-Z/Gedney

E. Liquidtight Flexible Conduit.

1. Anamet, Inc.
2. Electriflex Company
3. Triangle Wire and Cable, Inc.

2.02 MATERIALS AND EQUIPMENT

A. Design Conditions. Use electrical conduit, fittings, and bodies designed for service in areas as specified in Section 16010 - Basic Electrical Requirements and this section to form a continuous support system for power, control, and instrument cables.

B. Conduit and Fittings

1. Rigid Steel Conduit and Fittings.

- a. Rigid steel conduit, rigid steel conduit bends, nipples, and bodies shall be hot-dipped galvanized and shall comply with the latest ANSI C80.1, UL 6, Federal Specification WW-C-581D, and NEC Article 346-15.
- b. Mild steel tubing shall be used for conduit, nipples, and couplings, and shall be free of defects on both the inner and outer surfaces.
- c. Fittings, bodies, and covers for rigid steel conduit shall be steel or cast-iron and shall comply with ANSI C80.4, UL 514B, and Federal Specification W-C-58C. All conduit bodies shall be minimum Form 8.

2. PVC-Coated Rigid Steel Conduit and Fittings.

- a. PVC-coated conduit, fittings, bodies, and covers shall conform to NEMA RN1 (Type A) and shall pass ETL testing criteria. Rigid steel galvanized conduit and fittings before coating shall conform to Federal Specification WW-C-581D, ANSI C80.1, and UL 6. Conduit bodies shall conform to UL 514B and Federal Specification W-C-58C. Provide sufficient coating for touch up after installation.
- b. PVC-coated couplings shall be of the ribbed type.
- c. Condulet covers shall have encapsulated stainless steel thumb screws.
- d. Condulets and covers shall be of malleable iron or ferrous material before coating. All conduit bodies shall be minimum Form 8.
- e. A minimum of 2 mil thickness of urethane shall be applied on the interior of the conduit and the interior of all fittings, condulets, covers and bodies.

3. Flexible and Liquidtight Flexible Metal Conduit and Fittings.
 - a. Use liquidtight flexible metal conduit manufactured in accordance with UL 1 and Federal Specification WW-C-566C.
 - b. Fittings used with liquidtight flexible metal conduit shall be the PVC- coated type and of such design as to thoroughly ground the conduit to the fittings, and through it to the box or enclosure to which it is attached. Such connections require Myers or approved equal grounding hubs with auxiliary grounding lugs.
 - c. Flexible couplings and fittings for use in hazardous areas shall comply with UL 886, NEC Article 501-4 (a&b), and Federal Specification W-C-586C.
4. PVC Conduit and Fittings. Use PVC conduit, bends, and fittings, which comply with NEMA TC2, W-C-A, and NEC Article 347-17 only for the straight horizontal runs of conduit in underground and red concrete encased conduit banks. Conduit shall be Schedule 80.
5. Rigid Aluminum Conduit. Use RAC conduit, bends, and fittings which comply with ANSI C80.5.

PART 3 EXECUTION

3.01 PREPARATION

- A. Confirm submittal of shop drawing with conduit and conduit fitting, sizes, types and routing shown.
- B. Ensure that the conduit system to be installed is sized properly for the cable and wire requirements.
- C. Verify the actual physical conduit route from the conduit plan drawings and prepare the conduit support system.
- D. Verify the equipment locations to which the conduit will be connected and determine detail requirements for connections.

3.02 INSTALLATION

- A. Utilize rigid galvanized steel (RGS) conduit and fittings in all above grade locations except as noted otherwise.
- B. Use PVC coated rigid galvanized steel for all conduit penetrations through finished grade, all vertical penetrations through concrete slabs, all conduits exiting concrete encased conduit banks, all underground conduit bank bends greater than 30 degrees, for all conduit risers coming vertical from underground conduit banks and for all spare conduit extensions.
- C. Install PVC conduits only in the horizontal runs of underground and steel reinforced red concrete encased conduit banks.

- D. Run exposed conduit parallel or perpendicular to walls, ceilings or main structural members. Group multiple conduits together where possible. Do not install conduit where it interferes with the use of passageways, doorways, overhead cranes, monorails, equipment removal areas or working areas. In no case shall conduit routing present a safety hazard or interfere with normal plant operating and maintenance procedures. Maintain a minimum overhead clearance of 8'-0" in passageways.
- E. Installation and support of conduit shall be from steel or concrete structures in accordance with the standard detail drawings and these specifications. Furnish necessary conduit straps, clamps, fittings, support, etc. for all conduit in accordance with the standard details and these specifications.
- F. Identify all conduit at termination points such as at motor control centers, light fixtures, control panels, receptacles, instruments, lighting panels, pull/terminal/junction boxes, motors, etc. through the use of stamped stainless steel tags (minimum one square inch) attached with stainless steel straps.
- G. Not more than 3 equivalent 90 degree bends will be permitted between outlets. Provide bonded expansion fittings at building expansion joints.
- H. Install conduit runs so that they are mechanically secure, mechanically protected from physical harm, electrically continuous, and neat in appearance. The interiors of conduit shall provide clean, smooth raceways through which conductors may be drawn without damage to the insulation. Make threaded connections wrench tight.
- I. Cut conduit square with a power saw or a rotary type conduit cutter designed to leave a flat face. Do not use plumbing pipe cutters for cutting conduit. Ream the cut ends of conduit with a reamer, designed for the purpose to eliminate rough edges and burrs. Cut threads with standard conduit dies providing 3/4-inch taper per foot, allowing the proper length so that joints and terminals may be made up tight and the ends of the conduit not deformed. Keep dies sharp and use a good quality threading oil continuously during the threading operation. Remove metal cuttings and oil from the conduit ends after the threads are cut and paint threads before connections are made. Use zinc rich, brush-on compound on the threads of steel conduit before connections are made. Use only tools specifically made for bending and installing PVC-coated or PVC conduit when installing these materials.
- J. Use strap wrenches only to tighten joints in PVC coated rigid steel conduit. Replace all conduit and fittings with damage to the plastic coating, such as cuts, nicks and threader chuck jaw marks.
- K. Make up changes in direction of conduit using elbows or fittings. Do not use pull boxes to make direction changes unless specifically designated otherwise.
- L. Field fabricated bends shall be free of indentations or elliptical sections. The radius of the bend shall not be less than 6 times the smallest diameter of the raceway.
- M. Protect all conduit terminations from mechanical injury. Prevent the entry of moisture and foreign mater into the conduit system by properly capping terminations.
- N. Avoid trapped runs of conduit, if possible. When they are necessary, provide drainage using a "tee" conduit equipped with a drain. Conduit is likely to pass through areas with a

- temperature differential of 20 degrees F or more. Seal penetrations with a proper seal fitting at the wall or barrier between such areas. For conduit passing through walls separating pressurized areas from non-pressurized areas, install sealing fittings at the wall on the non-pressurized side.
- O. Fit conduit crossing building or structure expansion joints with approved expansion fittings, except that fittings will not be required when conduit crossing an expansion joint is supported on trapeze hangers in such a way that at no time will the conduit be under stress due to expansion. Install bonding jumpers around expansion joint fittings.
 - P. Where conduits terminate in metal enclosures provide threaded, grounding hubs with grounding lug. Restrict side penetrations to the lower one third of the enclosure.
 - Q. Provide flexible, liquid tight, metallic conduit where necessary to allow for movement or to localize sound or vibration, at transformers, at motors and any other rotating equipment unless shown otherwise on Drawings. The maximum length of such flexible and liquid tight metallic conduit shall be 15 times the inside diameter of the flexible conduit.
 - R. Seal openings or holes where conduits pass through walls or floors. When conduits are passing through a firewall or fire-rated floor into different rooms, cabinets, or enclosures, use a fire-rated seal as shown in the typical detail included in the Drawings. Certain walls, as indicated on the Drawings, require environmental (air-tight) seals; seal as shown.
 - S. Install explosion-proof seals in all conduit runs crossing or entering a hazardous classified area and as shown on the Drawings. Install type CSBE removable sealing fittings to seal all cables in the wet well, at the first terminal/junction/pull boxes outside the wet well, and as shown on the Drawings.
 - T. Unless otherwise indicated on the Drawings, install expansion fittings every 300 feet within a straight conduit run and where conduit crosses building expansion joints, using bonding straps to ensure ground continuity.
 - U. Parallel runs of conduit shall be supported by structural steel racks. When two or more racks are arranged one above the other, provide vertical separation of not less than 12 inches between racks, unless otherwise indicated on the Drawings. Space conduits on the racks at least enough to provide 3/4-inch clearance between hubs on adjacent conduits at terminations and to allow room for fittings.
 - V. Fill conduit racks no more than 75 percent of their capacity, providing usable space for future conduit. To ensure this, conduits leaving the rack horizontally shall be offset up or down so that future conduits may be installed in the space remaining. Construct conduit racks to permit access for wire or cable pulling at all pull points, even when future conduits are added to fill the racks.
 - W. Where conduit racks are supported on rods from beam clamps or by some other non-rigid suspension system, install rigid supports at no more than 50-foot intervals to give lateral stability to the rack.
 - X. Conduit racks or hangers must in no way interfere with machinery (or its operation), piping, structural members, process equipment, or access to anticipated future equipment. Refer to architectural, structural, equipment layout and piping drawings to ensure that this requirement is met. Label high voltage conduit with the circuit phase-to-phase voltage by

means of a firmly attached tag or label of approved design at each conduit termination, on each side of walls or barriers pierced and at intervals not exceeding 200 feet along the entire length of the conduit.

- Y. Support conduit sizes 2 inches and larger at spacings not exceeding 10 feet and conduit sizes 1-1/2 inches and smaller at spacings not exceeding 8 feet.
- Z. The means of fastening conduit to support structures shall be as follows:
 - 1. by one hole galvanized malleable iron conduit straps - PVC coated if the conduit is so coated
 - 2. by stainless steel wood screws to wood
 - 3. by stainless steel bolts with epoxy set expansion anchors to concrete or masonry
 - 4. by "Korn" clamps or U-bolts to other surfaces
 - 5. use "clamp backs" when strapping conduits to walls, column faces, or other such surfaces.
- AA. Support, mount, and attach all conduit runs with 316 stainless steel components throughout unless otherwise noted. This includes all conduit clamps, hangers, straps, bolts, nuts, washers, all-thread, metal framing channel, etc. Conduits of 1-1/2 inch size or less may be supported by one-hole conduit straps on concrete, tile or steel work. For larger size conduit use 2-hole straps.
- BB. Install conduits supported from building walls with at least 1/4-inch clearance from the wall to prevent the accumulation of dirt and moisture behind conduit.
- CC. At a minimum size and space embedded conduits in structural slabs in accordance with the Uniform Building Code. Conduits should occupy no more than one-third the thickness of the slab and should not be closer than 3 times the largest conduit diameter on center without additional reinforcement.
- DD. Provide all conduit penetrations through slabs on grade, finished grade, etc. with a minimum 6 inch high extension of the underground conduit bank.

END OF SECTION

Section 16122

600 VOLT POWER AND CONTROL CABLE

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Scope: Contractor shall furnish all labor, materials, installation, and testing required to provide 600 volt power and control cable as shown and specified to form a complete electrical system.
- B. Codes and Standards: 600 volt power and control cable shall conform to the applicable standards as referenced in Section 16010.

1.02 SERVICE CONDITIONS

- A. The wire and cable will be installed indoors or outdoors subject to the climatic conditions described in Section 16010. Definitions for locations of installation are per Section 100 of ANSI-C1, the National Electrical Code. Temperature limitations for the use of wire and cable covered herein are per Section 310.10 of ANSI-C1.

1.03 RATINGS

- A. The wire and cable shall be stranded copper and shall be rated not less than 600 volts AC, for use on a 60 hertz system.
- B. Wire and cable shall, as a minimum, meet the requirements of NEMA standard WC-70 and shall be capable and rated for continuous operation at a copper temperature of 90°C in both wet and dry locations.
- C. Ampacities will be calculated based upon the design ambient given in Section 16010 and the tables given in ANSI-C1.

PART 2 - PRODUCTS

2.01 CONSTRUCTION DETAILS

- A. General:
 - 1. Single conductor wire shall be color coded.
 - 2. For multiconductor cables, the individual wires shall be color coded in accordance with NEMA WC-70.
- B. Power Cable, Single Conductor Wire:

1. Single conductor power wire shall be minimum No. 12 AWG, NEMA Class B stranded annealed copper. The wire shall have moisture and heat resistant thermoplastic insulation, type THHW/THWN or XHHW where installed in conduit only. Type TC cable shall be utilized throughout the entire run where any of the involved wiring is installed in cable tray.
- C. Power Cable, Multi-conductor:
1. Power cables shall have four (4) conductors. The individual conductor jackets shall be color coded black, red, blue, and green (for ground wire). The ground wire shall be sized per NEMA Standard WC-70, but not be smaller than indicated in table 250.94 of ANSI-CI.
 2. The multi-conductor power cable assembly shall be covered by a PVC jacket, having a thickness of not less than 0.08 inches.
 3. Individual wire conductors and insulation shall be the same as in Section B, above. Type TC cable shall be utilized throughout the entire run where any of the involved wiring is installed in cable tray.
 4. Fillers of suitable material shall be used in the interstices of the cable where necessary to give the completed cable a substantially circular cross section.
- D. Control Cable, Single Conductor Wire:
1. Single conductor control wire shall be the same as in Section B above, except that it shall be a minimum of No. 14 AWG. Type TC cable shall be utilized throughout the entire run where any of the involved wiring is installed in cable tray.
- E. Control Cable, Multi-conductor:
1. Individual wire conductors shall be the same as in Section D, above.
 2. Individual conductors shall be color coded in accordance with NEMA Standard WC-70, method I-colored compounds with tracers.
 3. Fillers of suitable material shall be used in the interstices of the cable where necessary to give the completed cable a substantially circular cross section.
 4. The assembly of insulated conductors shall be wrapped with tape to isolate them from the overall jacket. The tape shall be the supplier's standard.
 5. The multi-conductor assembly shall be covered with PVC jacket per Section C.2 above. Type TC cable shall be utilized throughout the entire run where any of the involved wiring is installed in cable tray.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All wire and cable installations shall be in accordance with the requirements of Section 16100.
- B. All wires over twelve (12) inches in length shall be provided with a printed wire marker, not handwritten, covered with a clear heat shrink encapsulated cover, at each end. Use wire marker and encapsulation materials as manufactured by Brady. Color coding by itself is not acceptable.

3.02 TESTING

- A. Testing of wire and cable shall be in accordance with the requirements on NEMA Standard WC-5 and Section 16010. All 600 volt wiring shall be megger tested regardless of whether it is for power, control, or instrumentation purposes. All such testing shall be approved by the Engineer. All results shall be formally recorded in an organized format and submitted to the Engineer for approval. The Engineer shall be provided with no less than one week prior written notice as to when this testing is to be completed. All testing and reporting shall occur prior to any wiring being terminated and energized.

END OF SECTION

Section 16131

DEVICE, PULL AND JUNCTION BOXES AND WIREWAYS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Specifications for device, pull, terminal, and junction boxes as well as wireways and wiring gutters.

1.02 REFERENCES

- A. American National Standards Institute/National Electrical Manufacturers Association (ANSI/NEMA).
 - 1. FB1 - Fittings and Support for Conduits and Cable Assemblies
 - 2. 250 - Enclosures for Electrical Equipment (1000 volts maximum)
- B. American National Standards Institute/National Fire Protection Association (ANSI/NFPA), NFPA70 - National Electrical Code (NEC) - Article 370 - Outlet Device, Pull and Junction Boxes, Conduit Bodies and Fittings.
- C. Underwriters Laboratories (UL):
 - 1. 50 - Safety Cabinets and Boxes
 - 2. 508 - Safety Industrial Control Equipment
 - 3. 514B - Safety Fittings for Conduit and Outlet Boxes
 - 4. 886 - Safety Outlet Boxes and Fittings for Use in Hazardous Areas

1.03 SUBMITTALS

- A. Submit the following under provisions of Section 01330 - Submittal Procedures:
 - 1. Manufacturer's cut sheets, catalog data
 - 2. Instruction for handling and storage
 - 3. Installation instructions
 - 4. Dimensions and weights

1.04 DELIVERY, STORAGE AND HANDLING

- A. Pack and crate boxes to permit ease of handling and to provide protection from damage during shipping, handling and storage.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Sheet Metal Boxes
 - 1. Hoffman
 - 2. Or Approved Equal
- B. Cast Device Boxes
 - 1. Appleton Electric Company
 - 2. Crouse-Hinds, Division of Cooper Industries
 - 3. Killark Electric Manufacturing Company

2.02 MATERIALS AND EQUIPMENT

- A. Sheet Metal Boxes
 - 1. Provide UL-approved boxes manufactured from 316 stainless steel sheet metal and meeting requirements of NEMA 4X for all areas. Enclosures shall have fully welded seams ground smooth throughout. Enclosures utilizing sealant of any nature shall not be accepted.
 - 2. Provide boxes with a stainless steel continuous hinge, spring loaded closure hasps and all-stainless steel hardware.
 - 3. Furnish the door with neoprene gasket and padlocking hasp.
- B. Device Boxes
 - 1. Provide UL-approved boxes designed and manufactured to house electrical devices like receptacles and switches, and in conformance with NEMA FB1 and NEC Article 370.
 - 2. Supply boxes that are hot-dip galvanized on cast iron suitable for corrosive and wet atmosphere.
- C. Hardware
 - 1. Mounting Hardware: 316 stainless steel
 - 2. Conduit Connectors: Watertight as manufactured by grounding type Myers hubs with grounding lugs, or approved equal.

PART 3 EXECUTION

3.01 PREPARATION

- A. Review the drawings and determine how many boxes of each kind are required and check if supplied quantity is sufficient.

3.02 INSTALLATION

- A. Boxes described in this specification shall be used both in dry and wet, corrosive areas, both inside and outside locations.
- B. At a minimum install boxes in accordance with NEC in locations indicated on the Drawings.
- C. Install junction and pull boxes in readily accessible places to facilitate wire pulls, maintenance and repair.
- D. Plug unused conduit openings.
- E. Make conduit connections to sheet metal boxes with watertight hub type conduit connectors that are equipped with an auxiliary grounding lug.

END OF SECTION

Section 16160

CABINETS AND ENCLOSURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Specifications for cabinets and enclosures for housing of individual circuit breakers, motor controls, lighting contactors, etc.

1.02 REFERENCES

- A. National Electrical Manufacturers Association (NEMA).
 - 1. 250 - Enclosures for Electrical Equipment (1000 volts maximum).
 - a. NEMA 4X - Enclosures for indoor and outdoor use primarily to provide a degree of protection against corrosion, dust, moisture, etc.
- B. American National Standards Institute/National Fire Protection Association (ANSI/NFPA), NFPA 70 - National Electrical Code (NEC).
- C. Underwriters Laboratories (UL), UL 50 - Safety for Cabinets and Boxes.

1.03 SUBMITTALS

- A. Submit the following under provisions of Section 01330 - Submittal Procedures:
 - 1. Manufacturer's cut sheets and catalog data
 - 2. Instruction for handling and storage
 - 3. Installation instructions
 - 4. Dimensions and weights

1.04 DELIVERY, STORAGE AND HANDLING

- A. Have cabinets and enclosures packed and crated to permit ease of handling and to provide protection from damage during shipping, handling and storage.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Hoffman
- B. Or Approved Equal

2.02 MATERIALS AND EQUIPMENT

- A. Cabinets and Enclosures

1. Provide enclosures manufactured in accordance with NEMA 250 and NEC Article 373. Fabricate NEMA 4X from 14 gauge, 316 stainless steel.
2. Minimum dimensions and special features as required for the application.
3. Construct enclosures with continuously welded seams ground smooth throughout. Sealants of any nature shall not be permitted.
4. Additional material thickness and bracing requirements shall be determined by the manufacturer to provide the strength required by the standard listed. The bracing shall be provided in such a way as to minimize the protrusion into the wiring and the equipment spaces.
5. Install the door with a stainless steel continuous hinge, stainless steel padlock handle with gasket and stainless steel hardware.
6. Furnish the door with oil-resistant neoprene gasket attached with oil-resistant adhesive and held in place with aluminum retaining strips.
7. Use a single, 3/4-inch minimum, door handle that provides a 3-point latching through latch rods with rollers. Provide rollers with at least 3/4-inch diameter.
8. Gasketed overlapping doors may be used instead of a center post.
9. Provide heavy duty lifting eyes of suitable material.
10. Fabricate the enclosure with a stud-mounted panel inside. Make panels from 12-gauge steel painted with white enamel finish.
11. Weld mounting feet to the enclosure if floor mounted.
12. Include a high impact plastic data pocket in the enclosure.
13. Provide ground connections on the enclosures to enable grounding of the enclosure with a No. 2 AWG conductor.
14. Equip free-standing outdoor cabinets with inner and outer door restraint bars to prevent door swing during windy conditions.
15. Supply indoor enclosures with filtered passive air intake and exhaust openings, 4-inch square in the side near the top and near the bottom of the adjacent side panel.

B. Hardware

1. Mounting Hardware: Stainless steel
2. Conduit Connectors: Watertight hubs with grounding lugs as manufactured by Myers, or equal.

2.03 TESTING

- A.** Test cabinets and enclosures in accordance with UL 50 so unit qualifies for a UL label.

PART 3 EXECUTION

3.01 PREPARATION

- A.** Review Drawings and determine how many enclosures of each kind are required and check if supplied quantity is sufficient.
- B.** Check the mounting pads or foundations for proper mounting dimensions and features, including grounding conductor stub-up.

3.02 INSTALLATION

- A.** Install enclosures in accordance with NEC in locations as indicated on the Drawings.

- B. Install enclosures in readily accessible locations to facilitate general operations, wire pulls, maintenance and repair.
- C. Plug unused conduit openings.
- D. Make conduit connections to the enclosures with watertight conduit hubs with grounding lugs, such as manufactured by Myers.

END OF SECTION

Section 16170

GROUNDING AND BONDING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Grounding electrodes and conductors
- B. Equipment grounding conductors
- C. Bonding
- D. Power system grounding
- E. Communication system grounding
- F. Electrical equipment and raceway grounding and bonding
- G. Control equipment grounding

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM B3: Soft or Annealed Copper Wires
 - 2. ASTM B8: Concentric-Lay-Stranded Copper Conductors, Hard, Medium Hard, Soft
 - 3. ASTM B33: Tinned Soft or Annealed Copper Wire for Electrical Purposes
- B. Institute of Electrical and Electronics Engineers (IEEE)
 - 1. IEEE 142-82: Recommended Practice for Grounding of Industrial and Commercial Power Systems
 - 2. IEEE 383-2.5: IEEE Standard for Type Test of Class IE Electric Cables, Field Splices, and Connections for Nuclear Power Generating Stations.
- C. Underwriters' Laboratories (UL)
 - 1. UL 83: Thermoplastic Insulated Wire and Cables
 - 2. UL 467: Grounding and Bonding Equipment
- D. National Fire Protection Association (NFPA), NFPA No. 70 - National Electrical Code (NEC), Article No. 250 - Grounding.

1.03 SUBMITTALS

- A. Submit the following under the provisions of Section 01330 - Submittal Procedures:
 - 1. Manufacturer's cut sheets and catalog data

2. Installation, terminating and splicing procedure
3. Instruction for handling and storage
4. Dimensions and weight

1.04 QUALITY ASSURANCE

A. Tests

1. Use insulated cable conforming to requirements of the vertical tray flame test as described in IEEE 383-2.5.
2. Test grounding system in the field in accordance with procedures outlined in Part 3 - Execution.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Ship grounding cable on manufacturer's standard reel sizes unless otherwise specified. Where cut lengths are specified, mark reel footage accordingly. Each reel shall contain one continuous length of cable. Provide impact protection by wood lagging or suitable barrier across the traverse of the reel. Pack and crate other materials specified to withstand normal abuse during shipping, handling and storage.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Cable

1. Cablec Continental Cables Company
2. General Cable Company
3. Okonite Company
4. Pirelli Cable Corporation
5. Rome Cable Corporation
6. Triangle Wire and Cable, Inc.

B. Ground Rods and Connectors:

1. Blackburn
2. Copperweld
3. Thomas & Betts

C. Exothermic Connections:

1. Burndy Corporation (Therm-O-Weld)
2. Erico Products (Cadweld)

D. Grounding Connectors:

1. Burndy Corporation
2. O.Z. Gedney
3. Thomas & Betts

2.02 MATERIALS AND EQUIPMENT

- A. Design. Provide grounding cable and materials with the following characteristics:
1. Use a grounding system designed at a minimum in accordance with NEC Article No. 250 - Grounding, and the IEEE 142-82 - Recommended Practice for Grounding of Industrial and Commercial Power Systems. It is emphasized that the grounding system required by these plans and specifications require a grounding system of significantly greater degree of coverage than the referenced documents and standards require.
- B. Materials
1. Use grounding conductors, bare or insulated, which are manufactured and tested in accordance with applicable standards ASTM B3, ASTM B8 and ASTM B33.
 2. Provide a main ground loop of No. 4/0 AWG, Class C stranded, bare copper cable. Small groups of isolated equipment may be grounded by a No. 2 AWG minimum insulated conductor connected to the main loop. Generally, taps shall be sized as follows:

a.	Main ground loop or grid	#4/0 minimum
b.	Switchgear, motor control centers and power transformers	#4/0
c.	Motors 200 hp and above	#4/0
d.	Power panels - AC and DC	#2/0
e.	Control panels and consoles	#2
f.	Building columns	#4/0
g.	Fencing posts	#2/0
 3. Where single conductor insulated grounding conductors are called for, use 600-volt insulation. Use ground conductors identified with green insulation or green tape marking.
 4. Supply identifying ribbon which is PVC tape, 3 inches wide, red color, permanently imprinted with "CAUTION BURIED ELECTRIC LINE BELOW" in black letters as specified in Section 16195, Electrical Identification.
 5. Utilize flexible copper braid across hinged chain link or fence gates to bond the movable portion to the grounded fence post.

PART 3 EXECUTION

3.01 PREPARATION

- A. Complete site preparation and soil compaction before trenching and driving ground rods for the underground grid.
- B. Verify from Drawings the exact location of stub-up points for grounding of equipment, fences and building or steel structures.

3.02 CONSTRUCTION CRITERIA

- A. Install the main ground loop at a depth of at least 24 inches below earth surface. Connect the ground loop to ground rods and to tap connections to form a complete system as indicated on the electrical Drawings. The Contractor shall give special attention to the grounding of service equipment, structures and fences to comply with the NEC, local authorities and the serving utility company.
- B. Electrical equipment, buildings, tanks, and other structures and equipment shall be grounded as indicated on the Drawings. Where ground rods are required, the rods shall be 10 feet long, 3/4 inch diameter, copper-clad steel ground rods. Rods shall be driven vertically, and the top of the rods shall be a minimum of 18 inches below finished grade, or as specified on the Drawings.
- C. Local pushbutton and selector switch stations, two-wire control devices, disconnect switches, lighting transformers, panelboards, operator panels, benchboards, and the enclosures of other electrical apparatus shall also be grounded through an equipment grounding conductor run with the power supply or control circuit conductors or shall be grounded as shown on the Drawings.
- D. Ground medium voltage motors, in addition to the grounding conductors in the motor feeder cable, with a separate No. 4/0 AWG cable to motor frame.
- E. Motors having power supplied by multiconductor cable shall be grounded by a separate grounding conductor in the cable and where supplied by single conductor cable in conduit by a grounding conductor pulled in the conduit. Connect ground conductors to the ground bus in the motor control center and to the ground terminal provided in the motor conduit box.
- F. Do not ground the insulated bearing pedestals of large motors.
- G. Connect ladder-type cable trays to the grounding electrode system.
- H. Install a warning ribbon approximately 12 inches below finished grade directly above the ground grid.
- I. Connect fence posts of chain link and metal fences to the main ground loop at least every 50 feet.

3.03 INSTALLATION

- A. Equipment Grounding
 - 1. Make grounding connections to surfaces which are dry and cleaned of paint, rust, oxides, scales, grease and dirt to ensure good conductivity. Clean copper and galvanized steel to remove oxide before making welds or connections.
 - 2. Use the exothermic welding process for all connections, except at ground rods and at terminal equipment/components.

3. Make grounding tap connections to all electrical equipment, vessels, electrically driven mechanical equipment, structural steel, handrails, etc.
 4. Ground tanks and vessels by making connections to integral structural supports or to existing grounding lugs or pads, and not to the body of the tank or vessel.
 5. Leave ground connections to equipment visible for inspection. Protect all grounding taps with PVC non-metallic conduit.
 6. Make connections to motor frames and ground buses with lugs attached to the equipment by means of bolts. Do not use motor anchor bolts or equipment housing for fastening lugs of grounding cable.
 7. Where the wiring for lighting systems consists of single conductor cables in conduit, provide each conduit with an equipment grounding conductor. Use a grounding conductor with green colored insulation and ground equipment in the lighting system.
- B. Raceway and Support Systems Grounding
1. Install raceway, cable rack or tray and conduit so that it is bonded together and permanently grounded to the equipment ground bus. Connection to conduit shall be through grounding bushing or ground clamp.
 2. Install raceway at low voltage motor control centers or other low voltage control equipment so that it is bonded and grounded, except that any conduit which is effectively grounded to the sheet metal enclosure by bonding bushing or hubs need not be otherwise bonded.
 3. Where a grounding conductor is run in or on a cable tray bond the grounding conductor to each section of cable tray with a cable tray ground clamp.
 4. Where only grounding conductor is installed in a metal conduit, bond both ends of the conduit to the grounding conductor.
 5. Provide flexible "jumpers" around raceway expansion joints. Use copper bonding straps for steel conduit. Install jumpers across cable tray joints which have been parted to allow for expansion and any hinged cable tray connections.
- C. Power System Grounding
1. Solidly ground the secondary neutral of the main power supply transformer either to the ground grid or through an impedance. See Drawings for details.
 2. Solidly ground the neutral of lighting, instrument and control transformers.
- D. Cable Armor and Shields
1. For shielded control cable, terminate and ground the shield at one end only, preferably at the control panel end for instrument and communication cable and at the supply end for electronic power cables. Maintain shield continuity by jumpering the ground shield across connection point where it is broken at junction boxes, or other splice points. Insulate these points from ground.
 2. Connect the ground wire in power cable assemblies at each terminal point to a ground bus, if available, or to the equipment enclosure. Do not carry

these ground wires through a "doughnut" current transformer (CT) used for ground fault relaying; do carry ground leads from stress cones through CTs. Ground power cable armor and shield at each terminal point.

E. Test Wells

1. Provide access (test wells) for testing at each of the ground rod locations. Make test wells of a pipe surrounding the rod and connections with a cover placed on top at grade level. See Drawings for details.
2. Install ground rod/test wells at the service entrance pole to serve as the service entrance grounding electrode. Install additional ground rods/test wells as indicated on the Drawings.

F. Test

1. Test after all underground installations are complete.
2. Make a test at each grounding tap using a "fall of potential" test method. Each grounding tap shall not exceed a maximum resistance of 5 ohms. Where measured values exceed this figure, install additional ground rods as required to reduce the resistance to the specified limit. Testing shall occur at each grounding tap location.
3. All grounding system testing shall be fully completed, formally organized and submitted, and accepted prior to any equipment being energized.

G. Inspection. Inspection of the grounding system by the City Engineer and the local Code Inspector must take place before the grid trenches are backfilled.

END OF SECTION

Section 16195

ELECTRICAL IDENTIFICATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Specification for electrical identification including:

1. Nameplates and labels
2. Wire and cable markers
3. Conduit markers
4. Cable tray markers
5. Underground warning tape
6. Warning labels

1.02 REFERENCES

A. American National Standards Institute/National Fire Protection Association (ANSI/NFPA)

1. No. 70 - National Electrical Code (NEC)
 - a. Article 110 - Requirements for Electrical Installation
 - b. Article 430 - Transformers and Transformer Vaults

B. Madison County Building Code

C. Other applicable Codes and Standards as referenced in other Sections.

D. Underwriters Laboratories. U.L. Standards No. 224 - Extruded Insulated Tubing

1.03 SUBMITTALS

A. Submit the following under the provisions of Section 01330 - Submittal Procedures:

1. Manufacturer's cut sheets and catalog data
2. Description of materials used
3. Label or nameplate dimensions
4. Engraving or imprint legends
5. Instruction for handling and storage
6. Installation instructions

1.04 DELIVERY, STORAGE AND HANDLING

A. Pack materials to permit ease of handling and to provide protection from damage during shipping, handling and storage.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Almetek Industries Incorporated
- B. Brady U.S.A. Incorporated
- C. Ideal Electric Company
- D. Raychem Corporation
- E. 3M Electrical Products Division
- F. Thomas & Betts
- G. Tyton Corporation

2.02 MATERIALS AND EQUIPMENT

A. Nameplates and Labels

1. Provide an identification tag for each item of electrical equipment showing its item number and service or application. Use the description shown on the electrical Drawings.
2. For nameplates, use 3-ply phenolic material engraved to show black lettering on a white background. Size the nameplates approximately 1 inch wide and 3 inches long for 3 lines of 3/16 inch - 16 letters with a 0.8 condensed factor.
3. Generally, provide large pieces of equipment with engraved nameplates; provide additional nameplates at pushbuttons and other local devices; as detailed. Provide identification for all other electrical equipment, device or enclosure not furnished with readily noticeable tag, nameplates or other means of identification.
4. Install nameplates on the front cover of transformers stating the transformer service location number or identification number, the panelboard or device served, and main breaker feeding the transformer (MCC No. and compartment), and the drawing number on which the transformer schematic is shown.
5. Furnish equipment, such as motor starters, safety switches, welding receptacles and circuit breakers, with 1" x 3" plastic nameplates stating description of item served.
6. Provide nameplates for motors giving the driven equipment description, the service location number, and the MCC number with compartment number when applicable. Nameplates will normally be mounted adjacent to the motor at the motor pushbutton when one is furnished.
7. Install nameplates on the outside and inside of doors to circuit breaker panelboards (i.e., lighting, instrument or receptacle panels). State the panelboard name, the drawing number on which the panelboard schedule shows, and the main breaker feeding the panel (MCC No. and compartment).
8. Type panelboard directories and insert them inside the panelboard doors.

9. Place a large nameplate approximately 3"x5" on control panels, relay panels, junction boxes or enclosures with electrical devices mounted inside or on the outside of the enclosure indicating the purpose of the cabinet.
 10. Provide a nameplate on MCC motor starter doors duplicating motor nameplate data.
- B. Wire and Cable Markers
1. Use pre-printed tubular heat-shrink type wire and cable markers.
 2. Select markers manufactured so that the heat-shrink process makes the imprint permanent and solvent-resistant.
 3. Use markers that are self-extinguishing, conforming to U.L. Standard No. 224 for print performance, heat shock and flammability.
 4. Provide marker material that is flexible, radiation cross-linked polyolefin with 3 to 1 shrink ratio, rated 600 volts, and white in color.
- C. Conduit Markers
1. Provide conduit markers made of stainless steel tags approximately 2 inches x 1 inch x 19 gauge.
 2. Stamp the caption on the tag and have it black filled.
 3. Punch tags for tie fasteners. Fasten tags to the conduits with stainless steel braided wire.
- D. Cable Tray Markers
1. For high visibility and contrast, use cable tray markers that are yellow with black legend.
 2. Use markers made of vinyl impregnated cloth, suitable for exposure to corrosive, wet and abrasive environment.
 3. Make markers of pre-cut individual letters or numbers with pressure sensitive adhesive backing.
 4. Size legend characters to 4 inches high on a total marker height of approximately 5 inches, suitable for applying to 6-inch side rails of a cable tray.
- E. Underground Warning Tape
1. Provide warning tape made of 4 mil thick polyolefin film, 3 inches wide, suitable for direct burial and resistant to alkalis, acids and other common soil substances.
 2. Use red tape with black legend printed in permanent ink.
- F. Warning Labels
1. Place OSHA safety labels on enclosures and boxes 100 cubic inches or more containing electrical equipment or terminations.
 2. Provide OSHA color codes for the labels. Use labels made from 4 mil vinyl with pressure sensitive adhesive backing.
 3. The warning label caption is DANGER - 480 VOLTS or as indicated on the Drawings.
 4. Size labels either 5 inches x 3-1/2 inches or 10 inches x 7 inches, as indicated on the Drawings.

PART 3 EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces where adhesive labels will be applied.
- B. Drill holes for nameplates to be fastened with stainless screws.
- C. Prepare the cable ends for termination and conductor markings.
- D. Identify conduits at terminating points and select tags accordingly.

3.02 INSTALLATION

- A. Install nameplates and labels in accordance with the manufacturer's instructions and the Drawings.
- B. Apply wire and cable markers in accordance with manufacturer's instructions using a heat gun with properly sized nozzle for the application. Tag the wires at both ends with the same notation.
- C. Tag conduits at junction boxes, pull boxes and at other termination points.
- D. Identify cable trays at the time of installation with the alphanumeric number shown on the Drawings. Label cable trays on the outside rail. Place the tray identifier at each point where the tray designation changes and at 200 foot intervals in between, but not less than two per run.
- E. Identify underground conduits, cables or duct banks using the underground warning tape. The underground grounding grid, including the laterals. Also use underground warning tape. Install one tape per trench at 12 inches below grade or as indicated on the Drawings. For wide trenches or duct banks, install one warning tape per 24 inch width.
- F. Apply the 5 inches by 3-1/2 inches warning labels to disconnect switches, panelboards, terminal boxes, and similar devices in accordance with manufacturer's instruction and the Drawings. Apply the 10 inches x 7 inches warning labels to larger control panel enclosures, motor control centers and to entrance doors to buildings containing electrical power and control equipment.

END OF SECTION

Section 16402

UNDERGROUND CONDUIT BANKS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Underground electrical duct (conduit) banks consisting of one or more conduits. All such underground runs of conduit shall be installed in a steel reinforced, red concrete encasement.

1.02 REFERENCES

- A. National Fire Protection Association (NFPA): No. 70 - National Electrical Code (NEC) Appendix B.

1.03 SUBMITTALS

- A. Catalog cut sheets of the ducts and spacers.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Have duct spacers and associated hardware packed and crated to avoid damage during shipment and handling.
- B. Clearly mark packages or crates stating that the material is for electrical duct banks only.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Thomas and Betts.
- B. Underground Devices Inc.
- C. Walker Division, Butler Manufacturing Company.

2.02 MATERIALS AND EQUIPMENT

- A. Conduit. Construct underground conduit banks using principally Schedule 80 rigid PVC conduit with associated sections of PVC coated, rigid, galvanized steel conduit. Refer to Section 16111 - Conduit, Fittings and Bodies.
- B. Spacers. Secure conduit with non-magnetic, universal, interlocking-type spacers for both horizontal and vertical duct arrangements or with #5 steel reinforcing bars interconnected to form a support lattice. In all cases maintain the required minimum spacing between conduits.
- C. Concrete. Use steel reinforced, red concrete for conduit encasement. Refer to Section 03315 - Concrete for Utility Construction.

PART 3 EXECUTION

3.01 PREPARATION

- A. Verify from Drawings and field survey that the location of conduit banks does not interfere with any existing or new underground facilities.
- B. Verify that materials are on site in proper condition and that sufficient quantity is on hand for the work.
- C. Verify that trenches are in the correct places and prepared with sufficient depth and width to accommodate the conduit banks, reinforcing rod, and concrete.
- D. Be prepared for inspection of the duct banks before reinforcing rod is installed.
- E. Before pouring concrete, verify that the ducts are free of debris and properly installed in the support and spacer systems and that the ducts are properly fitted together and firmly held in place by the hold down hardware.
- F. Provide 24-hour notice to City Engineer and the Local Code Inspector for cover-up inspection before pouring electrical conduit banks.

3.02 INSTALLATION

- A. Use the size and types of conduit as indicated on the Drawings for the various duct banks required for the project.
- B. Make conduit bank installations and penetrations through foundation walls watertight.
- C. Assemble duct banks using ties to the reinforcing steel or non-magnetic saddles, spacers and separators. Position conduits to provide 4-inch minimum concrete separation between the outer surfaces of the conduits.
- D. Provide a three (3) inch minimum concrete covering on both the sides, top and bottom of concrete envelopes around conduits and/or reinforcing steel. Add red dye to the concrete in the delivery truck at the rate of 10 pounds per cubic yard used for envelopes for easy identification during subsequent excavation.
- E. Firmly fix ducts in place during pouring of concrete. Carefully spade and vibrate the concrete to ensure filling of spaces between ducts.
- F. Make bends with sweeps of radius not less than 6 times the smallest diameter of the raceway.
- G. Make a transition from non-metallic to PVC coated rigid metallic galvanized conduit where required with specific emphasis where conduit banks or individual conduits in underground conduit banks change direction, exit underground conduit banks, pass through slabs on grade, enter structures, or turn vertically for continuation above grade.
- H. Reinforce duct banks throughout, where indicated on the Drawings.

1. Unless otherwise noted on the Drawings, reinforce with No. 5 longitudinal steel bars placed at each corner and along each face at a maximum parallel spacing of 12 inches on centers, and No. 5 tie-bars transversely placed at 36-inch maximum longitudinal intervals.
 2. Maintain a maximum clearance of 4 inches from bars to the edge of the concrete encasement.
- I. Where ducts enter structures such as handholes, manholes, pullboxes, or buildings, terminate the ducts in suitable end bells, insulated L-bushings, Meyers hubs or couplings on steel conduits. Tag conduit entering pull boxes with stamped, stainless steel tags. Identify as designated in cable and conduit schedule.
 - J. Do not backfill with material containing large rock, paving materials, cinders, large or sharply angular substances, corrosive material, or other materials which can damage or contribute to corrosion of ducts or prevent adequate compaction of fill.
 - K. Install a bare stranded copper duct bank ground in each duct bank envelope. Make ground electrically continuous throughout the entire duct bank system. Connect ground to switchgear and MCC ground buses and to steel conduit extensions of the underground duct system.
 - L. After completion of the duct bank and prior to pulling cable, pull a mandrel, not less than 12 inches long and with a cross section approximately one-fourth inch less than the inside cross section of the duct, through each duct. Then pull a rag swab or sponge through to remove any particles of earth, sand or gravel that may have been left in the duct. Repull the rag or sponge swab until the swab emerges clean.
 - M. Use hemp rope to pull conductors into PVC conduit. Do not use nylon or wire cable for this purpose.
 - N. Install a warning ribbon approximately 12 inches below finished grade over underground duct banks. Refer to Section 16195 - Electrical Identification.
 - O. For manholes and pull boxes below grade, install wire racks to support cables properly around the perimeter and keep them dry.
 - P. For manholes and pull boxes below grade, construct a french drain, or other drainage as detailed on the Drawings.
 - Q. All joints between conduit pours shall be fully reinforced. All terminal points of duct banks to underground handholes/manholes or lift station structures shall be fully doweled. All such dowels for connection to other concrete structures shall be installed through drilling and doweling with epoxy being used to secure all such doweling in place.

END OF SECTION

ITEM 16930

480 VOLT AUTOMATIC TRANSFER SWITCH

PART 1 GENERAL

1.01 DESCRIPTION

- A. Scope: Contractor shall furnish all labor, materials, equipment and incidentals required for a service entrance rated, delayed / open transition automatic transfer switch as indicated on the drawings.

1.02 QUALITY ASSURANCE

- A. Reference Standards: Comply with applicable provisions and recommendations of the following except where otherwise shown or specified:
 - 1. UL Standard 1008
 - 2. NEMA ICS2-447
 - 3. National Electrical Code

1.03 SUBMITTALS

- A. Submittal Information: Submit for review and approval a complete set of manufacturer's technical information for the proposed automatic transfer switch as a part of the submittal on the motor control center. Submittal shall include the following:
 - 1. Dimensional outline and installation drawings including both interior and exterior views.
 - 2. Unit elementary wiring diagrams showing numbered terminal points and interconnections to other units.
 - 3. Complete technical description of the proposed automatic transfer switch.
 - 4. A full listing, with address and telephone numbers, of the local Galveston based service and parts source for the ATS unit proposed.
 - 5. Two (2) copies of a complete installation, operation and maintenance manuals with specific delineation of the information pertinent to the unit proposed.

PART 2 PRODUCTS

2.01 MATERIALS

- A. The automatic transfer switch (ATS) shall be rated for service entrance duty. The main circuit breaker shall be of the fixed type. The ATS shall consist of a power transfer module and a control module, interconnected to provide complete automatic operation. The automatic transfer switch shall be mechanically held, and electrically operated by dual

solenoid mechanisms energized from the source to which the load is to be transferred. The switch shall be rated for continuous duty and be inherently double-throw. The switch shall be mechanically interlocked to ensure only one of two possible energized positions - normal or emergency. The automatic transfer switch shall be suitable for use with emergency sources such as a diesel engine powered generator. The switch shall provide for a time adjustable pause in a neutral, disconnected, position in both directions of travel.

- B. All main contacts shall be silver composition, protected by arching contacts, of the blow-on configuration, and of segmented construction. The operating transfer time in either direction shall not exceed one-sixth (1/6) of a second.
- C. The control module shall be supplied with a protective cover and be mounted separately from the transfer switch for ease of maintenance. The interconnecting wiring harness shall include a disconnect plug to disconnect all wires including both sources of control power for routine maintenance. Sensing and control logic shall be solid-state and mounted on plug-in printed circuit boards. Printed circuit boards shall be keyed to prevent incorrect installation. Interfacing relays shall be industrial control grade plug-in type with dust covers.
- D. Inspection of all contacts (movable and stationary) shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. A manual operating handle shall be provided for maintenance purposes. The handle shall permit the operator to stop the contacts at any point throughout the entire travel to properly inspect and service the contacts when required.
- E. Automatic transfer switches utilizing components of molded-case circuit breakers, contactors, or parts thereof which have not been intended for continuous duty or repetitive load transfer switching are not acceptable.
- F. At a minimum the automatic transfer switch shall conform to the requirements of the NEMA and UL standards noted above.
 - 1. The ATS shall be rated in amperes for total system transfer including control of motors, electric-discharge lamps, electric-heating and tungsten-filament lamp loads as referred to in paragraph 30.9 of UL 1008.
- G. The ATS units shall be 480 volt, 3 phase rated with a continuous duty as indicated on the Drawings. The ATS shall have a symmetrical short circuit current withstand rating of 22,000 amperes rms. The main breaker shall be 100% rated. The enclosure shall be rated NEMA 1.
- H. Provide a complete set of terminal lugs for connection of power cables the normal, emergency and common sides.
- I. The ATS unit shall provide for an intermediate pause during transfer in a neutral (non-connected) position. This adjustable time delay intermediate pause shall be available during both paths of transfer.

2.02 TESTS

- A. Certified laboratory test data on a switch of the same design and rating shall be provided to confirm the following switching abilities:
1. Overload and endurance at 480 volts AC per Tables 21.2, 23.1, and 23.2 of UL 1008.
 2. Temperature rise tests after the overload and endurance tests to confirm the ability of the ATS to carry their rated current within the allowable temperature limits of the insulation in contact with current-carrying parts.
 3. Withstand current tests. No welding of contacts. Transfer switch shall be operable to alternate source after the withstand current tests.
 4. Dielectric tests at 1960 volts, rms, minimum after the with stand current test.
- B. All production units shall be subjected to the following factory tests:
1. The complete ATS shall be tested as to ensure proper operation of the individual components and correct overall sequence of operation and to ensure that the operating transfer time voltage, frequency and time delay settings are in compliance with the specification requirements.
 2. The switch shall be subjected to a dielectric strength test per NEMA Standard ICS 1-109.21.
 3. The control panel shall meet or exceed the voltage surge withstand capability in accordance with the latest version of IEEE Standard 472 (ANSI C37.90a) and the impulse withstand voltage test in accordance with NEMA Standard ICS 1-109.

2.03 OPERATION

- A. The ATS control panels shall utilize solid state sensing on normal and emergency for automatic, positive operation. The following shall be provided:
1. All phases of the normal source shall be monitored line-to line. Close differential voltage sensing shall be provided on all phases. The pickup voltage shall be adjustable from 85% to 100% of nominal and the dropout voltage shall be adjustable from 75% to 98% of the pickup value. The transfer to emergency will be initiated upon reduction of normal source to 85% of nominal voltage and retransfer to normal shall occur when normal source restores to 90% of nominal.
 2. Extended time delay to override momentary normal source outages and to delay all transfer switch and engine starting signals. The time delay shall be field adjustable from 0 to 5 minutes and factory set at 5 minutes.
 3. A time delay on retransfer to normal source. The time delay shall be automatically bypassed if the emergency source fails and normal source is available. The time delay shall be field adjustable from 0 to 30 minutes and factory set at 15 minutes.
 4. An unloaded running time delay for emergency generator cool down. The time delay shall be field adjustable from 0 to 5 minutes and factory set at 5 minutes.
 5. A time delay on transfer to emergency. Initially set at zero but field adjustable up to 1 minute for controlled timing of load transfer to emergency.

6. Independent phase voltage and frequency sensing of the emergency source. The pickup voltage shall be adjustable from 85% to 100% of nominal. Pickup frequency shall be adjustable from 90% to 100% of nominal. Transfer to emergency upon normal source failure when emergency source voltage is 90% or more of nominal and frequency is 95% or more of nominal.
7. A contact that closes when normal source fails for initiating engine starting, rated 10 amperes, 32 VDC. Contacts shall be gold plated.
8. A contact that opens when normal source fails for initiating engine starting, rated 10 amperes, 32 VDC. Contacts shall be gold plated.
9. A green signal light to indicate when the automatic transfer switch is connected to the normal source. A red signal light shall indicate when the automatic transfer switch is connected to the emergency source.
10. One auxiliary contact that is closed when ATS is connected to normal and one auxiliary contact that is closed when ATS is connected to emergency. Rated 10 amps, 480 volts, 60 Hz AC.
11. A test switch to momentarily stimulate normal source failure.
12. Reset switch to manually bypass time delay on retransfer to normal. Gold plated low voltage contacts.
13. The transfer switch controls shall provide for a programmable pause in the neutral position.
14. The transfer switch shall be provided with a full function power manager to facilitate monitoring of all operational functions of the ATS unit along with operational parameters such as three phase voltage, amperage, KW, PF, KVAR, KWh, etc.

2.04 APPROVED MANUFACTURERS

- A. Products and Manufacturers: Provide an automatic transfer switch complying with these specifications as manufactured by one of the following:
 1. ASCO, Series 7000 ADTS
 2. Or Approved Equal

PART 3 EXECUTION

- A. The automatic transfer switches shall be provided as standalone units mounted as indicated on the drawings.

END OF ITEM

Section 16950

EMERGENCY ENGINE/GENERATOR SET

PART 1 GENERAL

1.01 DESCRIPTION

- A. This specification covers the requirements for providing two new factory built, prototype proven, production tested, field proven, complete and operable emergency engine/generator set, including all devices and accessory equipment specified herein and as required for the services specified herein. All materials and equipment on the engine/generator units shall be new and by the current manufacturer.

The General Contractor shall furnish the highest quality equipment that meets or exceeds the requirements of this specification and industry standards. It is not the Owner's intent to specify all detailed technical requirements that are adequately covered by applicable codes and standards. The engine/generator set shall be designed and manufactured in accordance with the codes and standards governing such equipment, which shall include but not be limited to the following:

NFPA 30 - Flammable And Combustible Code
NFPA 31 - Installation Of Oil Burning Equipment
NFPA 37 - Stationary Combustion Engines And Gas Turbines

- C. The General Contractor shall provide all equipment, tools, labor, supervision, accessories, testing and services required through the point in time where the engine/generator unit is delivered to the project site, installed, and tested to the satisfaction of the Engineer.
- D. The overall system shall provide compliance with NFPA 110 relative to the requirements of a Class 24, Level 2 and Type 10 system. The engine/generator set shall provide compliance with TCEQ / EPA Tier 3 requirements.

PART 2 TECHNICAL REQUIREMENTS

- A. The General Contractor for this new engine/generator set shall provide a formal submittal that speaks to the requirements of PART 2 - TECHNICAL REQUIREMENTS and the requirements set forth below. These submittals shall be formally prepared, indexed, and organized in three ring binders with all pages clearly numbered in the upper right hand corner. All information that is not pertinent or applicable to the equipment being proposed shall be clearly marked out or crossed out of the information provided. No information shall be highlighted.

- B. The General Contractors shall furnish all data and documents required by these specifications and the Special Items for the project for the Engineer's review and/or information.

- C. The General Contractor shall submit drawings showing outline and overall dimensions, clearance dimensions, connection details, weights, sectional views showing functional parts, part lists and materials. These drawings shall include general assembly drawings of the engine/generator, control panels, and accessory skid. Each such drawing shall provide at least the following information:
 - 1. Overall dimensions of each assembly and shipping section
 - 2. Dimensioned location and size of each interface with field assembled equipment, such as pipe flanges, conduit entrances, foundation bolts, etc.
 - 3. Shipping, installation and service weights of each assembly and shipping section.
 - 4. Identification of all components by name and by functional number which appears on flow diagrams, one line diagrams, elementary diagrams, piping drawings, and wiring connection drawings.
 - 5. Installation or erection drawings and details including welding and bolting specifications, insulation and/or lagging, clearances, tolerances, and other pertinent data required for installation.
 - 6. Foundation requirements, loads, fastening details.
 - 7. List of loose instruments, instrument panels, piping, tubing and accessories.
 - 8. Erection procedures.
 - 9. Flow diagrams for each fuel and electrical system
 - 10. Wiring diagrams for each electrical system
 - 11. One line diagram for generator and exciter.
 - 12. Internal wiring diagrams for each assembly.
 - 13. External connection diagrams for all interconnecting wiring.

- D. The General Contractor shall provide to the Owner as a part of the technical submittal three (3) complete sets of installation, operation and maintenance manuals for the proposed generator.

2.01 TECHNICAL REQUIREMENTS

- A. The new engine/generator units covered by this specification shall be furnished within an outdoor, weatherproof and sound attenuating enclosure. The engine/generator shall be sized to supply standby electric power to the essential equipment noted in these specifications. Fast starting and quick load pickup capabilities are mandatory characteristics of this equipment.

- B. The new emergency engine/generator unit shall consist of a single diesel fueled engine driven electric generating unit which is pre-wired, pre-piped, assembled and aligned on a single skid base, complete, delivered, installed, and tested.

- C. The engine/generator set, including accessories, shall be furnished by a single supplier who has been regularly engaged in the production of similar engine/generator sets for a minimum of ten (10) years. The three (3) acceptable generator manufacturers for this project are Cummins, Stewart & Stevenson and Caterpillar. All components shall be manufacturer's factory built, factory tested, and furnished by the single supplier to ensure one source of supply and responsibility for warranty, parts and service. There shall be a local Houston factory authorized representative of the engine/generator manufacturer who can provide factory trained service personnel, required inventory of replacement parts, and technical assistance.
- D. The responsibility for the overall performance of the engine/generator set relative to the requirements of these specifications shall not be divided among individual suppliers of components of the systems but shall be assumed solely by the manufacturer of the engine generator unit.
- E. All controls shall be the standard of the manufacturer who is engaged in the manufacture of engines and generators, and has such controls available for purchase on the open market. Control parts shall be identified by part numbers of the manufacturer and shall have a second source listing where applicable. Control systems supplied by a sub-vendor or sub-contractor of the manufacturer and not incorporated in the documentation data of the engine or generator manufacturer are not acceptable.
- F. The equipment described herein conforms to that of recognized manufacturers of diesel engines, electric generators and accessory equipment. All equipment furnished shall conform to that specified herein regarding quality, operation, and function. Where shown, named manufacturers are included to establish a level of quality and experience, and are not to be construed as a sole source of supply unless specifically stated.
- G. A network based annunciator shall be installed as indicated on the Plans.

2.02 DESIGN REQUIREMENTS

- A. The emergency engine/generator sets shall have as a minimum the continuous standby power ratings indicated on the drawings while operating under the environmental conditions and using the fuel specified herein.
- B. The General Contractor shall state the longest period of full-load operation permissible before shut down for maintenance is recommended.
- C. The engine/generator set shall be mounted on a common structural steel base complete with an outdoor, aluminum, weatherproof and sound attenuating enclosure. A UL 2085 rated fuel tank shall be furnished and installed beneath the skid. The fuel tank shall extend in each direction to fill the entire area as indicated on the Plans. The enclosure shall be mounted on top of the generator skid. The height of the fuel tank

shall not be greater than three (3) feet. A portable set of stairs shall be provided for both sides of each generator. These stairs and the associated handrails attached to the stairs shall be constructed of aluminum. These stairs shall provide safe and OSHA compliant access to both sides of the enclosure. An associated fuel cleaning system shall be furnished and installed inside the generator enclosure. All interconnecting fuel piping and valves shall be black iron. Hose sections with stainless steel mesh exterior protection shall be utilized for connection of all lines to the engine for vibration isolation. All supply and return piping shall be equipped with a full spectrum of isolation valves and unions to assure that all piping can be installed and maintained in a manner that will create the least amount of hazard from tripping. The piping shall be sized to assure that the associated head loss is within the tolerance limits of the associated generator fuel system. The engine/generator set shall be provided with adjustable spring vibration isolators complete with side movement snubbers. Provide the number, size and weight capacity of the isolators required for the engine/generator set, similar to Korfund LKE, or approved equal.

- D. The engine/generator unit shall be capable of operation at any speed at no load, and at any load at full speed, without excessive vibration or dangerous stresses. The complete unit shall be capable of 25% over speed without failure of any component.
- E. Provide a battery operated starting system for the engine. Provide battery racks as recommended by the supplier. Battery sets shall be 24 volt DC, and consist of a minimum of two (2) 12 volt, heavy duty, lead acid batteries each rated at a minimum of 225 ampere hours at SAE Group 8D rate. All necessary inter-cell connecting wiring and battery cables shall be provided. Batteries shall be furnished dry-charge and electrolyte added shortly before startup.
- F. Provide fully automatic battery charging system with high and low rate charging and equalizing charging by manual operation. The charger shall have a minimum 15 amp, 24 volt DC output with a 115 volt, 60 Hz input, and be capable of fully charging the batteries within a period not to exceed 8 hours. Chargers are to be similar to LaMarch Model A46-30-120V or approved equal.
- G. Prime mover engine requirements are as follows:
 - 1. The engine shall be stationary, liquid cooled, turbo-charged, and inter-cooled where required by manufacturer, for use with No. 2 diesel fuel. The engine shall be certified by the manufacturer as capable of developing sufficient brake horsepower (BHP) at a maximum of 1800 rpm to drive electric generators yielding the minimum required rating on a continuous basis during the interruption of normal power source at ambient conditions of 104°F, 29.31 inches Hg barometric pressure at sea level. Fuel injectors and valves shall not require adjustment while in service.
 - 2. The engine and speed shall be suitable for direct connection to an alternating current generator without exceeding engine manufacturer's published curves, with a speed not to exceed 1800 rpm.

3. Provide engine mounted thermostatically controlled water jacket heaters on the engine to keep the units in a condition for quick starting. Water jacket heaters shall be rated at a minimum as indicated on the electrical drawings. These heaters shall operate at 240 volts and they shall be installed complete with all contacts and controls. Circuit breakers shall be coordinated, provided, and installed as required for this heater.
4. The engine shall be radiator cooled by an engine mounted air cooled radiator system having sufficient capacity for cooling the engine when delivering the full rated horsepower at an ambient temperature of 104°F. The systems shall include belt driven pusher type fan, cooler pump, and thermostatic temperature control. Radiators shall be provided with a duct adapter flange permitting the attachment of air discharge duct directing the discharge of radiator air through the enclosure wall. Coolant shall be 50% ethylene glycol antifreeze - water solution.
5. Provide remote two-wire starting, 24 volt DC, solenoid shift, electric starters in accordance with manufacturer's requirements. Two independent systems shall be provided to disconnect the starting circuit upon engine starting.
6. The fuel system for the unit shall consist of the following elements:
 - a. Provide engine driven self priming fuel pump suitable for unassisted supply of fuel to the engine from a remotely mounted fuel tank.
 - b. Provide dual full flow replaceable element fuel filters.
 - c. Provide flexible fuel connection lines between fuel supply piping and engine.
 - d. Provide a fuel cleaning system as specified with all associated fuel lines, valves, controls, etc.
7. Provide positive displacement type blower for fresh air for combustion. Engines shall be equipped with turbochargers and bypass relief valves. Provide a heavy duty, replaceable element, dry type air cleaner.
8. Provide an engine speed solid state electronic governor system to automatically control the alternator frequency within 1 percent of rated frequency from no load to full load output.
9. Provide over-speed trip device(s) acting independently of the governor, to shutdown the engine when speed exceeds the rated rpm by more than 15 percent.
10. Provide a positive displacement engine driven full pressure lubrication oil pump, oil cooler, full flow replaceable dual oil filters, dipstick oil level indicator and oil pressure gauge.
11. The exhaust system of the unit shall consist of the following elements:
 - a. Critical type engine exhaust muffler(s) that shall not result in excessive back pressure and yet reduce sound to an acceptable noise level when exhaust gases are discharged through the system piping.

- b. The muffler(s) shall be mounted firmly in a horizontal orientation inside the enclosure and shall discharge out of the radiator end wall of the enclosure.
 - c. Provide exhaust piping, to be sized by the manufacturer of the unit, including 90° bends with drain connections as required and corrugated expansion joints, including flanges and joints as needed. Provide wall thimbles for passage of exhaust piping through the enclosure wall, complete with all necessary connection fittings.
 - d. All exhaust system components from the engine manifold through the gravity operated flap valve at the end of the exhaust pipe shall be carbon steel.
12. The following primary sensing elements/alarms/ shutdowns and protective features shall be provided on the engine:
- a. Coolant temperature gauge.
 - b. High coolant temperature alarm/shutdown.
 - c. Lubricating oil pressure gauge.
 - d. Low lubricating oil level alarm/shutdown.
 - e. Low coolant level alarm.
 - f. Over speed alarm/shutdown
 - g. Over crank lockout
- H. The generator requirements are as follows:
1. The generator shall be direct coupled to the engine driver and be of the permanent magnet type, complete with a low noise centrifugal blower for proper cooling, and a temperature compensated solid state voltage regulator.
 2. At a minimum the generators shall be continuously rated at the KW, power factor, voltage, frequency, etc. as required by the Bid Documents.
 3. The voltage regulator shall be solid-state design and shall function by controlling the exciter magnetic field between stator and motor to provide no load to full load regulation of rated voltage within +/- 2 percent during steady-state conditions. The generator set and regulator shall sustain at least 90 percent of no load voltage for ten (10) seconds with 250 percent of rated load at near zero power factor connected to its terminals. The voltage regulator shall be of asynchronous pulse width modulated design type or equal that is insensitive to severe load induced wave shape distortion from SCR or thyristor circuits such as those used in battery charging (UPS) and motor speed control equipment loads. All other performance criteria shall be equal to the specified equipment. A rheostat shall provide a minimum of +/- 5 percent voltage adjustment from rated value.
 4. The alternator, exciter, and voltage regulator shall be designed and furnished by the generator set supplier so that the characteristics shall be matched to the torque curve of the prime mover. This design allows the prime mover to utilize its fullest power producing capacity (without exceeding it or over

compensating) at speeds lower than rated, to provide the fastest possible system recovery from transient speed dips. A system that routinely selects a linear-type constant volts/hertz characteristic, without regard for the engine power and torque characteristics, shall not meet this specifications. These characteristics shall be demonstrable as follows:

- a. With generator set operating at rated speed, voltage and load, reduce engine speed to half by manually overriding the engine speed governor control. The generator set must recover to full speed with the rated load connected when the engine speed governor control is returned to its normal mode.
5. Calculations must demonstrate that the exciter and voltage regulator shall permit utilization of at least 80 percent of maximum available prime mover torque with rated unity power factor load connected to its terminals and shall provide fast response and positive recovery from transient disturbances.
6. Exciter shall be three phase, full-wave, rectified, with heavy-duty silicon diodes mounted on the common rotor shaft and sized for maximum motor starting loads. Systems using three-wire solid state control elements (such as transistors or SCRs) rotating on the motor shall not be acceptable.
7. Generator design shall be of the self-protecting type, as demonstrated by a prototype short-circuit test as described under "Testing" herein. All other generator performance criteria shall be equal to that of the specified equipment. The generator shall have permanent magnet exciters.
8. Insulation on both stator and rotor shall be Class H with a maximum allowable temperature rise of 80°C above a 40°C ambient at rated capacity.
9. Generator line terminals shall be suitable for connection to feeder cables, which shall be terminated in compression type lugs. A stator terminal box with sufficient room for terminations shall be provided. A generator space heater for 120 volt operation shall be provided. A control panel space heater or heaters for 120 volt operation shall also be provided.
10. Two nonferrous ground studs (3/8" - 16 minimum) shall be provided at opposite corners of the unit base.
12. The generator shall be direct connected to the engine driver through a semi-flexible coupling to ensure permanent alignment. The generator mountings shall include jacking screws, jacking pads and mounting holes.
13. The generator shall have a shaft mounted fan for forced air through the generator, with the exhaust at the drive end.
14. The generator bearings shall be greased anti-friction grease lubricated type. The grease fitting shall be extended to permit greasing without disassembly, and automatic relief valve provided to prevent over greasing.
15. The generator telephone influence factor shall not exceed a balanced value of 150 and a residual value of 100.
16. The generator unit shall be provided with a full listing of spare parts and special tools.

- a. The General Contractor shall provide a list of recommended spare parts, identifying each one and the specific subassembly to which it applies.
 - b. The General Contractor shall indicate the expected life of the parts requiring replacement and the minimum recommended inventory of spare parts for installation, start-up, continuous operation and maintenance. General Contractor shall state whether the recommended spare part is a stock item or a special item, and shall furnish name and location of the nearest supplier, and approximate lead time required for delivery.
 - c. The General Contractor shall furnish all special tools unique to this equipment necessary for start-up, operation, maintenance and adjustment of the equipment and accessories.
 - d. The General Contractor shall provide a list of all of the special tools furnished, identifying the function of each tool and the specific item(s) or which it is used, and indicate whether the tool is required for start-up, operation, maintenance or adjustment.
17. The generators shall be equipped with a 100 percent rated, thermal magnetic circuit breaker as indicated on the Drawings.

2.03 FUEL TANK

- A. The supplier of the generator system shall provide as a part of the overall package a sub base mounted fuel storage tank complete with all associated fuel supply and return piping. This fuel storage tank shall be a rectangular shaped, double wall insulated tank that provides secondary containment. The tank shall have a capacity that is adequate to provide no less than forty-eight (48) hours of continuous operation at rated capacity. The tank shall be designed for flammable and combustible liquids, of the protected type and be projectile resistant, vehicle impact protected and shall be tested to and listed for the following:
 1. UL-2085, two hour furnace fire test and two hour simulated pool fire test for insulated and protected tank
 2. UL-2085 and Uniform Fire Code (UFC) Test Standard Appendix #A-11-F-1, for both vehicle impact protection and projectile resistance.
 3. UL-2085, Insulated aboveground tanks for flammable and combustible liquids, protected type.
 4. UL-2085, Non-metallic secondary containment protected tanks for flammable and combustible liquids with secondary containment Emergency Venting by AForm of Construction”.
- B. The primary steel tank shall be rectangular in shape and have continuous welds on all exterior seams, and manufactured in accordance with UL 2085 and be coated with a rust resistant primer.

- C. The primary steel tank shall be pressure tested at 5 psig for 24 hours.
- D. The primary steel tank(s) shall have emergency vent system(s) as pre NFPA 30 Code requirements.
- E. The protected and insulated tank shall have a through tank leak detector tube, with lockable cap, to allow for the physical checkup and monitoring capability between the primary and the secondary containment.
- F. The primary steel tank shall be pressurized at 5 psig during concrete placement.
- G. The outer surface of the primary steel tank shall be covered by a minimum of 1/4" thick styrofoam insulation panels or equally acceptable thermal insulation.
- H. The secondary containment shall consist of a 30 mil thick polyethylene membrane, or equally acceptable material, enclosing the steel tank and insulation material.
- I. The primary steel tank and the secondary containment shall be encased in six inches of monolithic, steel reinforced concrete, with a minimum compressive strength of 4000 psi at 28 days. Admixtures to promote long term durability shall be utilized as a part of the concrete mix design.
- J. All openings shall be from the top only.
- K. All exposed metal must be powder coated to inhibit corrosion.
- L. The protected and insulated tank system shall be warranted against leakage for a period of 30 years from the date of final acceptance of the project.
- M. The protected and insulated tank system shall have two (2) lugs for connecting grounding conductors for lightning protection in accordance with NFPA 78.
- N. The following items shall be included with the tank:
 - 1. Fill limiter to allow tank to be filled to only 95% capacity.
 - 2. 4" product fill tube
 - 3. 4" brass fill cap with Camlock adapter
 - 4. 2" atmospheric vent (primary) with vent cap
 - 5. Tank charts and gauge stick
 - 6. A top mounted fuel gauge calibrated in feet and inches
 - 7. Appropriate decals and/or placards as per UFC.
 - 8. All required interconnecting piping between the AST and the generator fuel tank.
 - 9. An electrically powered fuel cleaning system mounted in a NEMA 3R enclosure as manufactured by Acoustical Control Systems, Inc. This unit

shall be mounted on a structural steel rack that is hot dip galvanized after fabrication.

- O. Fuel for all testing shall be provided by the General Contractor. At the time of substantial completion the General Contractor shall fill the proposed fuel tank to capacity.

2.04 ENCLOSURE

- A. The generator unit shall be provided in a sound attenuating, weather-proof enclosure suitable for mounting on a concrete slab. The enclosure shall be constructed of aluminum and designed to withstand a sustained wind velocity of 130 mph and three second wind gusts of 150 mph without visible damage. The enclosure shall be provided with padlockable side access doorways. The enclosure shall be designed to attach directly to the generator skid. The arrangement of the engine and alternator in the enclosure shall maximize the available space behind and beside the engine and alternator to permit facility operation and maintenance to readily access without safety concerns the interior components with particular emphasis on the battery charger, control panel and main circuit breaker. The enclosure shall provide attenuation so that the sound pressure at twenty feet from the enclosure in any direction shall be no greater than 80 dBA. Certified testing shall be conducted in the field to substantiate compliance with this required sound pressure value. Certified calculations shall be provided as a part of the equipment submittal to substantiate the proposed compliance with these criteria.

2.05 QUALITY ASSURANCE

- A. The General Contractor shall have methods to assure that items and services, including subcontracted items and services, comply with this specification.
- B. All testing and inspection operations affecting the equipment or material may be subject to surveillance by the Owner or Owner's representative.
- C. Prior to field testing the General Contractor shall submit a listing of the tests to be performed, for use in determining inspection points which the Owner may desire to witness. The Owner shall notify the General Contractor which of those tests and inspection points the Owner desires to witness.
- D. The General Contractor shall give the Owner adequate notice, five working days as a minimum, before those inspection steps and/or tests that the Owner may desire to witness, take place.
- E. The General Contractor shall furnish the following documents or Owner's records:

1. A Certificate of Compliance stating the following "All work provided by the General Contractor(s) under this specification complies with all of the requirements of this specification and accepted deviations."
2. Documents identifying deviations and their formal acceptance by the Owner or his representative.
3. All performance test results.
4. All electrical test results.

PART 3 EXECUTION

A. TESTS

1. The General Contractor shall be responsible for the following spectrum of factory and installed field tests. The factory test shall be conducted prior to the unit being shipped to the field. This test will not be witnessed. Compliance with these testing responsibilities will be the final determination of acceptance of this equipment and the basis for payment. Failure to completely comply with all criteria shall be a basis for the Owner to require that the engine/generator units be removed from the project site and replaced with a fully compliant generator system at no obligation whatsoever to the Owner for additional compensation or extension of the schedule.
 - a. The generator unit shall be fully run through a standardized factory full load test prior to being shipped. This test shall be run for a period of no less than four (4) hours. The generator shall be run through a staged period of increased loading during the first hour (25, 50 and 75% load and then run at 100% load for three hours. Electronic records shall be maintained throughout this period to record at a minimum water temperature, oil pressure, ambient air temperature, voltage, current, frequency, kilowatts, and power factor. The above data shall be recorded at no more than one (1) minute intervals throughout the test. Two printed copies and one electronic copy shall be provided to the Engineer as a submittal. This analysis shall include a statistical analysis of all data collected to define average, maximum and minimum values of each parameter during each of the respective load cycles.
 - b. The completed field installation shall be initially started and checked out for operational compliance by factory trained representatives of the engine/generator set. The General Contractor shall furnish the engine lubrication oil and antifreeze coolant as recommended by the manufacturer as a part of the initial unit delivery. The fuel for installed field testing shall also be provided by the General Contractor.
 - c. Upon completion of initial start-up and system check-out, the General Contractor shall perform a field test, with the Engineer notified no less

than two weeks in advance, to demonstrate unit compliance performance.

- d. The engine/generator set shall be run for four hours continuously while connected to a full rated capacity resistive power bank connected to the generator output. The same spectrum of testing information shall be provided. The same spectrum of submittal information shall be provided. There shall be a 10 minute unloaded run at the conclusion of the test to allow engine and generator cool before shutdown. Three printed copies and one electronic copy of the field test data shall be furnished to the Engineer. The General Contractor shall provide all necessary equipment and tools and shall make all necessary connections to accomplish field tests.
- e. In general, the overall engine/generator set efficiency testing shall be conducted in accordance with the latest edition of Diesel Engine Manufacturer's Association (NEMA) Standard Practices for Low and Medium Speed Stationary Diesel and Gas Engines.
- f. Perform certified noise measurements at no less eight locations around the facility perimeter and adjacent to the generator itself to substantiate compliance with the noise criteria. All such measurements shall be taken with a formally calibrated noise meter. Measurements shall be taken during the full load condition. Two sets of measurements shall be taken during the full load operating period.
- g. After all field testing has been satisfactorily completed the fuel tank shall be completely filled.
- H. The General Contractor shall be completely responsible for preparing and filing all documentation required to obtain all wind storm certifications from the State of Texas.

B. Insurance Certifications

- 1. All certifications relating to wind insurance shall be developed and provided for this Project by the General Contractor. All such documentation shall be provided to the Engineer and the Owner. The cost for all such certifications shall be included in the Contractor's bid price.

PART 4 TECHNICAL DATA

- A. The General Contractor shall furnish a complete diesel engine driven emergency generator system.
- B. All equipment shall comply with all codes and standards, including all respective addenda, in effect at the time of contract award.
- C. The site conditions involved for this project are as follows:

Elevation: 50 feet

Outdoor Ambient Temperature: 10 to 104 °
Outdoor Relative Humidity: 50 to 100 percent

- D. The engine generator units shall be provided with a minimum rating as noted on the drawings. The voltage supplied shall be 480 volts, 3 phase, 4 wire, 60 hertz, with a power factor of 0.8 minimum. Under a block loading the maximum voltage drop shall not exceed 40 percent and the maximum frequency drop shall not exceed 8 percent.

- E. The generator set performance and overall minimum efficiencies shall be as follows:
 - 1. Maximum allowable time from start to full load - 10 seconds
 - 2. Capability of starting not only the largest motor load but also all of the proposed loads as indicated in other parts of the Bid Documents.
 - 3. The minimum efficiencies at 100%, 75% and 50% of full load shall be 95.5, 95, and 94.5 respectively.

END OF SECTION

GEOTECHNICAL ENGINEERING STUDY

Bolivar SUD Generators
Galveston County, Texas

Reported to:
Dannenbaum Engineering Corporation
Houston, Texas

Prepared by:
QC Laboratories, Inc.
10810 Northwest Freeway
Houston, Texas 77092
(713) 695-1133

PROJECT NO.: 13G10439
January 2014



LABORATORIES, INC.
Engineering and Testing Services

January 7, 2014

Dannenbaum Engineering Corporation
3100 West Alabama Street
Houston, Texas 77098

Attn: Mr. Larry S. Marr, P.E.

Re: Geotechnical Engineering Study
Bolivar SUD Generators
Galveston County, Texas
QCL No. 13G10439

Dear Mr. Marr:

We are pleased to submit our geotechnical engineering report for the above referenced project. This study was performed at the request and authorization to proceed in general accordance with QCL Proposal No. 39209, dated October 21, 2013.

We appreciate the opportunity to be of service to you on this phase of the project. If we may be of additional assistance, please call us.

Sincerely,

QC LABORATORIES, INC.

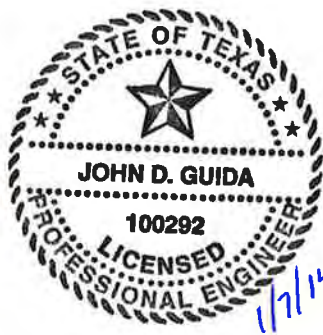
(Texas Registered Engineering Firm F-3601)



Mario Tagavilla, E.I.T.
Project Manager



John D. Guida, P.E.
Vice President of Engineering



Copies Submitted: Addressee - (1) Electronic

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1.0 INTRODUCTION

1.1 Project Description and Scope of Services

We understand the project consists of the proposed construction of elevated generator platforms at the following Galveston County water plant locations:

- North Plant – 1957 Guidry Road, High Island, Texas;
- Singing Sand Plant – 3597 Highway 87, Bolivar Peninsula, Texas; and
- Main Plant – 4339 Highway 87, Bolivar Peninsula, Texas

A vicinity map showing the location of each of the water plants is provided on Plate 1 in the Appendix.

Based on information provided, we understand the proposed generator platforms will be elevated approximately 10 feet above existing grade and supported on driven precast/prestressed (PC/PS) concrete piles. For structural loading conditions, we anticipate maximum loads of 10 kips per pile.

Our scope of services included evaluating the subsurface conditions by drilling and sampling soil borings, laboratory tests of selected soil samples, engineering analysis, and preparing a geotechnical engineering report for this project. Our report addresses the design and construction of the proposed foundations for the proposed elevated platform structures.

2.0 INVESTIGATION TECHNIQUES

2.1 Field Exploration

The subsurface conditions at this site were evaluated by drilling and sampling one soil boring at each plant to a depth of about 30 feet. The boring locations are shown on the Plan of Borings, Plates 2A through 2C, in the Appendix.

The soil sample intervals are shown on the boring logs. Soil samples were generally obtained using a split-spoon sampler by means of the Standard Penetration Test (SPT). The SPT test consists of measuring the number of blows required for a 140-pound hammer (falling 30 inches) to drive the split spoon sampler 12 inches into the subsurface soils, after being seated 6 inches. This blow count is used to evaluate the stratum.

Selected cohesive samples were obtained using a 3-inch diameter tube sampler. Pocket penetrometer tests were performed on the soil samples in the field to serve as a general measure of consistency.

Each sample was removed from the sampler in the field, examined and classified by an experienced technician. At the completion of drilling the boreholes were backfilled with soil cuttings and the samples were transported to our laboratory in Houston.

2.2 Laboratory Tests

In the laboratory, each sample was observed and classified by a qualified engineer. Laboratory tests were performed on selected soil samples to evaluate the physical properties of the soils. The geotechnical engineering properties of the soils were evaluated by performing the following tests:

- Moisture Content (ASTM D2216);
- Atterberg Limits (ASTM D4318 - Method B);
- Unconfined Compression (ASTM D2166); and
- Percent Finer than No. 200 Sieve (ASTM D 1140).

Detailed soil descriptions and results of the tests are presented on the boring logs, Plates 3 through 5, in the Appendix.

3.0 SUBSURFACE CONDITIONS

Based on our field and laboratory test results, the subsurface conditions for each site can be generalized as follows:

North Plant (B-1) - Approximately 2 feet of crushed stone material was observed at the ground surface at boring B-1. The crushed stone material was underlain by loose silty sand fill soils that extended to a depth of about 5 feet below existing grade (grade existing at the time of our field program). Firm to stiff native lean clay soils were observed below the fill and extended to a depth of about 9 feet. These soils were underlain by medium dense silty sand soils that extended to a depth of about 18 feet and very soft to soft fat clay soils that extended to the termination depth of the boring, approximately 30 feet.

Singing Sand Plant (B-2) - The subsurface soils observed at boring B-2 consisted of loose to medium dense silty sand soils at the ground surface and extended to a depth of about 10 feet below existing grade (grade existing at the time of our field program). These soils were underlain by very soft lean clay soils that extended to a depth of about 17 feet. Medium dense sand with silt soils were observed below the lean clay soils and extended to a depth of about 23 feet. These soils were underlain by soft fat clay soils that extended to the termination depth of the boring, approximately 30 feet.

Main Plant (B-3) - The subsurface soils observed at boring B-3 consisted of loose silty sand fill soils from the ground surface to a depth of about 4 feet below existing grade (grade existing at the time of our field program). Loose to dense native silty/sandy soils were generally observed below the fill soils and extended to a depth of about 27 feet. These soils were underlain by very soft lean clay soils that extended to the termination depth of the boring, approximately 30 feet.

Based on our field and laboratory programs, the subsurface soils for borings B-1 through B-3 can be summarized as follows:

Subsurface Soil Conditions (Borings B-1 through B-3)					
Description	Plasticity Index (%)	Natural Moisture Content (%)	Percent Passing the No. 200 Sieve	SPT N-Values (blows/foot)	Undrained Shear Strength ¹ (psf)
Fill: Silty Sand (SM)	Non Plastic	14 – 16	15	5 – 8	---
Lean Clay (CL)	11 – 29	21 – 49	82	WOH ² – 2	500 – 1,300
Silty Sand (SM) and Sand w/Silt (SP-SM)	Non Plastic	18 – 26	6 – 42	8 – 31	---
Fat Clay (CH)	35 – 51	47 – 68	---	WOH ² – 2	300
¹ . From unconfined compressive strength tests. ² . WOH = Penetration of at least 12 inches from the weight of the hammer only.					

A key to the terms and symbols used to aid in soil classifications on the boring logs are provided on Plate 6 in the Appendix.

4.0 WATER-LEVEL MEASUREMENTS

The borings at this site were drilled using both dry drilling and wet rotary drilling techniques. Dry drilling was generally used to the depth of groundwater. Upon reaching groundwater, drilling was suspended to facilitate observation of groundwater levels prior to switching to wet rotary. Outlined in the table below are the water level observations for the borings drilled at each water plant.

Boring No.	Location	Boring Depth ¹ (feet)	Dry Drilling Depth ¹ (feet)	Water Level Observations (feet)	
				During Drilling	Wet Cave-In
B-1	North Plant	30	4	4	3
B-2	Singing Sand Plant	30	8	6	2½
B-3	Main Plant	30	8	6	3

1. Depth below existing grade.
2. Depth at which the borehole caved in prior to subsequent water level readings.

Fluctuations in the groundwater levels may occur due to variations in the tides, rainfall, and surface water run-off.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The conclusions and recommendations contained in this report are prepared based on conditions encountered in the borings drilled at the North Plant, Singing Sand Plant, and Main Plant, our field and laboratory test results, and our past experience with geotechnical conditions similar to those at this site. In the event that any changes in the nature, design or location of the structures are made from those originally described to us, the conclusions and recommendations contained in this report shall not be considered valid until the changes are reviewed and the conclusions are verified in writing.

5.1 Geotechnical Considerations (Scour)

The foundations for the proposed elevated generator structures will be susceptible to scour and should be sized to account for potential soil loss associated with scour action over the anticipated life-span of the structures. The anticipated scour depth was not available to us at the time of this report. In addition, detailed recommendations regarding scour protection were beyond the scope of this report.

5.2 Design of Driven Piles

As mentioned previously, we understand that driven PC/PS piles are planned to be utilized to support the proposed elevated platform structures. Outlined in the tables below are the recommended allowable capacities for the driven pile foundations for each site.

Allowable Unit Skin Friction and End Bearing for Driven Piles North Plant (Boring B-1)				
Depth Below Existing Grade¹ (feet)	Submerged Unit Weight (pcf)	Net Allowable End Bearing Pressure (psf)	Allowable Side Friction (psf)	Allowable Passive Pressure (psf)
0 - 5	40	Disregard		
5 - 9	65	Disregard	375	750
9 - 14	40	Disregard	85	900
14 - 18	40	2,500		
18 - 30	50	1,200	200	400
¹ . Grade existing at the time of our field program.				

Allowable Unit Skin Friction and End Bearing for Driven Piles Singing Sand Plant (Boring B-2)				
Depth Below Existing Grade¹ (feet)	Submerged Unit Weight (pcf)	Net Allowable End Bearing Pressure (psf)	Allowable Side Friction (psf)	Allowable Passive Pressure (psf)
0 - 5	40	Disregard		
5 - 10	40	Disregard	35	400
10 - 17	55	Disregard		
17 - 23	40	3,000	140	1,400
23 - 30	60	1,000	150	300
¹ . Grade existing at the time of our field program.				

Allowable Unit Skin Friction and End Bearing for Driven Piles Main Plant (Boring B-3)				
Depth Below Existing Grade¹ (feet)	Submerged Unit Weight (pcf)	Net Allowable End Bearing Pressure (psf)	Allowable Side Friction (psf)	Allowable Passive Pressure (psf)
0 - 5	40	Disregard		
5 - 13	40	Disregard	50	500
13 - 18	50	5,000	100	1,000
18 - 27	40	3,000	135	1,400
27 - 30	50	Disregard		
¹ . Grade existing at the time of our field program.				

Lateral resistance of driven piles is primarily developed by passive resistance of the soil against the side of the pile. We recommend that the lateral resistance within the upper 5 feet be neglected due to fill soils, surface effects, and the potential for scour. A detailed lateral load analysis of the proposed piles was beyond the scope of this study. If requested, a lateral capacity analysis of the proposed driven piles can be provided for this project.

Design of piles should also include an evaluation of the structural capacity of the pile, which may limit the allowable capacity.

Pile groups subjected to axial loads can be affected by numerous factors which may include pile type, size and length, pile spacing, overall group size, loading conditions, installation procedures and soil type and strength. With a center-to-center spacing of at least 3 pile widths, the group effect will be insignificant on the bearing capacity of the piles. Therefore, the group capacity for axial load may be taken as the sum of the individual pile capacities in the group.

Post construction settlements of single, isolated piles will depend on the elastic properties of the pile, the applied load and the interaction of the soil and pile. Settlement is anticipated to be primarily elastic and will occur relatively rapidly as load is applied. Significant consolidation settlement due to applied load is not anticipated at this site for the pile capacities given. Our experience indicates that single, isolated piles loaded to about one-half of their ultimate capacity should experience settlement of less than one inch.

Post construction settlements of groups of piles are generally greater than single isolated piles for the same load per pile. Based on the previously recommended spacing, we anticipate that settlement of the pile group should be one inch or less under working loads. In general, differential settlements should be on the order of one-half to two-thirds of the total settlement.

5.3 Installation of Driven Piles

The installation of driven piles should preferably be accomplished by driving alone. The effects and methods of pile installation should be given proper consideration when choosing and designing pile foundation systems. In most situations, the greatest stress a driven pile will experience is during installation. Pile and soil properties, embedment length requirements and driving equipment are only a few of the many variables to consider in determining the most efficient method of pile installation.

Piles should be driven to a predetermined depth with blow count as a secondary consideration. Because set-up during interruption can produce increased resistance to driving, a pile should be driven to its design depth without any delays, if possible.

Also, if a pile exhibits a resistance lower than the terminal resistance values given by driving formulas at an appreciable depth below the predetermined depth, the pile may be re-tapped after a suitable elapsed time and after the installation of other nearby piles. The re-tap should be performed at the contractor's discretion to prove the acceptability of the pile. Should, in the Geotechnical Engineer's judgment, the re-tap not indicate adequate capacity, additional piles may need to be installed to provide capacity.

In addition, we recommend the use of a "Pile Driving Analyzer (PDA)" during pile installation. The PDA can monitor driving stresses and hammer energy during pile installation, and also provides a continuous record of the pile installation.

The performance of the driven pile foundation system will be highly dependent upon the quality of construction. Thus, we recommend that pile installation be closely monitored by a qualified technician experienced in pile installation techniques. At a minimum, the technician should record blows, note any unusual installation occurrences, monitor hammer operation and generally evaluate if pile installation is being performed in accordance with the specifications.

6.0 BASIS FOR RECOMMENDATIONS

The recommendations provided in this report are based on project information provided to us and only apply to the specific project and site discussed in this report. If the project information in this report contains incorrect information or if additional information is available, we should be contacted to review and/or revise our recommendations.

Regardless of the thoroughness of a geotechnical exploration, there is always a possibility that subsurface conditions across the site will be different from those at specific boring locations and that conditions will not be as anticipated by the designers or contractors. In addition, the construction process may itself alter soil conditions. Therefore, experienced QC geotechnical personnel should observe and document the construction procedures used and the conditions encountered. Unanticipated conditions and inadequate procedures should be reported to the design team in a timely manner in order to solve the problems created.

7.0 OBSERVATION DURING CONSTRUCTION

The recommendations are based on the subsoil data in the field exploration and laboratory testing. Due to the geological deposition of the soils in the area, variances may occur at each

site. Therefore, the excavations should be observed under the supervision of a QCL geotechnical engineer to confirm that the bearing soils are similar to those observed during our field exploration and that the footing areas have been properly prepared.

The QCL geotechnical engineer should be immediately notified should any subsoil conditions be uncovered that will alter the conclusions and recommendations contained in this report. Further investigation and supplemental recommendations may be required if such a condition is encountered.

7.1 Construction Materials Testing

The recommendations provided in this geotechnical report were based on the assumption that QCL would be employed to monitor the installation of the foundations for the proposed elevated structures. It may be occasionally required that QCL provide addendums to the original geotechnical report based on the CMT observations or test results which uncover site conditions that were not known when the geotechnical report as originally issued. New or changed site information, which is not properly communicated to the Geotechnical Engineer of Record, may result in a foundation that does not perform as originally intended.

8.0 DISCLAIMER

The recommendations provided in this report are based on the site-specific field and laboratory test data, our engineering analysis, information provided to us by our client and the design team, and our previous experience on similar projects in the locality. Interaction of the soil with the foundation system termed as soil-structure interaction most likely will affect the performance of the foundation system and the superstructure they support.

Recommendations presented in this report are collectively intended for use in the design and construction of the structures at this site. If the recommendations presented in this report are not followed properly, then it is very likely for foundation elements to move in excess of the acceptable service-state limits. If our recommendations are not clear or if the designers and contractors need more clarification(s), they are encouraged to contact us during the design and construction process.

QCL has developed the recommendations contained in this report based on an understanding that QCL personnel will be retained to review construction specifications and drawings for compliance with our geotechnical recommendations. Therefore, it is recommended that QCL be retained to review the construction specifications for foundations and related structural elements to identify areas of conflict, if any, between the geotechnical recommendations and the final foundation design and construction

specifications. These services will be invoiced separately from this report of our geotechnical engineering service.

During the course of using the recommendations in our report, person or the entity, who has ordered services for self, agent of others or builder for third party beneficiary from QCL acknowledges that the terms and conditions of services of QCL have been agreed, negotiated and explained to owner and/or the ultimate beneficiary of the work performed or ordered. Terms and conditions of QCL services are published in our website www.qclabs.com or contact us at (713) 695-1133, and a copy will be faxed to our client and the design team.

Appendix



VICINITY MAP

PROJECT: Bolivar SUD Generators
Galveston County, Texas

PROJECT NO.: 13G10439



PLAN OF BORING

PROJECT: Bolivar SUD Generators – North Plant
1957 Guidry Road
High Island, Texas

PROJECT NO.: 13G10439



PLAN OF BORING

PROJECT: Bolivar SUD Generators – Singing Sand Plant
3597 Highway 87
Bolivar Peninsula, Texas

PROJECT NO.: 13G10439



PLAN OF BORING

PROJECT: Bolivar SUD Generators – Main Plant
4339 Highway 87
Bolivar Peninsula, Texas

PROJECT NO.: 13G10439

LOG OF BORING NO. **B-1**

Sheet 1 of 1



PROJECT: Bolivar SUD Generators - North Plant
1957 Guidry Road
High Island, Texas

QCL NO.: 13G10439

DATE DRILLED: 12-4-14

ELEVATION, ft.	DEPTH, ft.	SYMBOL	DESCRIPTION	SAMPLES	HAND PENETROMETER (tsf)	SPT N-VALUE (blows)	DRY UNIT WEIGHT (pcf)	NATURAL MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			PERCENT PASSING NO. 200 SIEVE	UNCONFINED COMPRESSION (tsf)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (psi)	OTHER TESTS
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX					
	0		SURFACE ELEVATION: Existing Grade													
	0 - 2.4		CRUSHED STONE MATERIAL Approximately 24 inches													
	2.4 - 4.5		FILL: SILTY SAND (SM) brown, with shell			8		14			15					
	4.5 - 5.5		LEAN CLAY w/ SAND (CL) firm to stiff, dark brown and dark gray, with shell, and interbedded sand seams			2		21								
	5.5 - 6.5		SILTY SAND (SM) medium dense, dark brown			1.25	105	22	42	13	29	82	1.3	11	0	
	6.5 - 7.5		SILTY SAND (SM) medium dense, dark brown			1.5	110	19					0.5	4	0	
	7.5 - 13.0		- gray and brown below 13 feet			24		18				42				
	13.0 - 15.5		- gray and brown below 13 feet			16										
	15.5 - 20.0		FAT CLAY (CH) very soft to soft, dark gray			WOH		13	53	17	36					
	20.0 - 23.0		- dark gray and dark brown below 23 feet			0.25	64	68					0.4	4	0	
	23.0 - 30.0		- dark gray and dark brown below 23 feet			WOH		67	72	21	51					
	30.0		Boring Terminated at 30 feet													

WATER OBSERVATIONS:	
	4' While Drilling
	3' Wet Cave-In

NOTES:
Dry augered 0 to 4 feet; wet rotary thereafter. WOH=Weight of Hammer

LOG OF BORING NO. **B-2**

Sheet 1 of 1



PROJECT: Bolivar SUD Generators - Singing Sand Plant
3597 Highway 87
Bolivar Peninsula, Texas

QCL NO.: 13G10439

DATE DRILLED: 12-4-14

ELEVATION, ft.	DEPTH, ft.	SYMBOL	DESCRIPTION	SAMPLES	HAND PENETROMETER (tsf)	SPT N-VALUE (blows)	DRY UNIT WEIGHT (pcf)	NATURAL MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			PERCENT PASSING NO. 200 SIEVE	UNCONFINED COMPRESSION (tsf)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (psi)	OTHER TESTS
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX					
	0		SURFACE ELEVATION: Existing Grade													
	0		SILTY SAND (SM) loose to medium dense, dark brown	X		7		18				22				
	2.5			X		6		20								
	5			X		11		20								
	8		- brown and gray, with clay pockets below 8 feet	X		8		22				22				
	10		LEAN CLAY (CL) very soft, dark gray, with interbedded sand seams	X		WOH		49	30	19	11					
	15			X		WOH										
	20		SAND w/ SILT (SP-SM) medium dense, brown	X		25		23				9				
	25		FAT CLAY (CH) soft, dark gray, with shell	X		2										
	30			X		0.25		80	47	50	15	35	0.3	14	0	
	30		Boring Terminated at 30 feet													

WATER OBSERVATIONS:	
6' While Drilling	
2.5' Wet Cave-In	

NOTES:
Dry augered 0 to 8 feet; wet rotary thereafter.
WOH=Weight of Hammer

LOG OF BORING NO. **B-3**

Sheet 1 of 1



PROJECT: Bolivar SUD Generators - Main Plant
4339 Highway 87
Bolivar Peninsula, Texas

QCL NO.: 13G10439

DATE DRILLED: 12-4-14

ELEVATION, ft.	DEPTH, ft.	SYMBOL	DESCRIPTION	SAMPLES	HAND PENETROMETER (tsf)	SPT N-VALUE (pcf)	DRY UNIT WEIGHT (pcf)	NATURAL MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			PERCENT PASSING NO. 200 SIEVE	UNCONFINED COMPRESSION (tsf)	STRAIN AT FAILURE (%)	CONFINING PRESSURE (psi)	OTHER TESTS
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX					
	0		SURFACE ELEVATION: Existing Grade													
	0		FILL: SILTY SAND (SM) dark brown and brown, with gravel and shell	X		5		16			15					
	1			X		5		19								
	5		SILTY SAND (SM) loose to medium dense, dark brown	X		8		23								
	6			X		10		22			29					
	10		- dark brown and gray, with shell below 10 feet	X		10		26								
	11			X		9										
	15		SAND w/ SILT (SP-SM) medium dense to dense, brown	X		31		23			6					
	18		- dark brown 18 to 23 feet - with shell below 18 feet	X		17										
	23		- dark gray below 23 feet	X		23		26			8					
	28		LEAN CLAY (CL) very soft, gray, with sand pockets	X		WOH		47	44	15	29					
	30		Boring Terminated at 30 feet													

WATER OBSERVATIONS:	
6' While Drilling	
3' Wet Cave-In	

NOTES:
Dry augered 0 to 8 feet; wet rotary thereafter.
WOH=Weight of Hammer

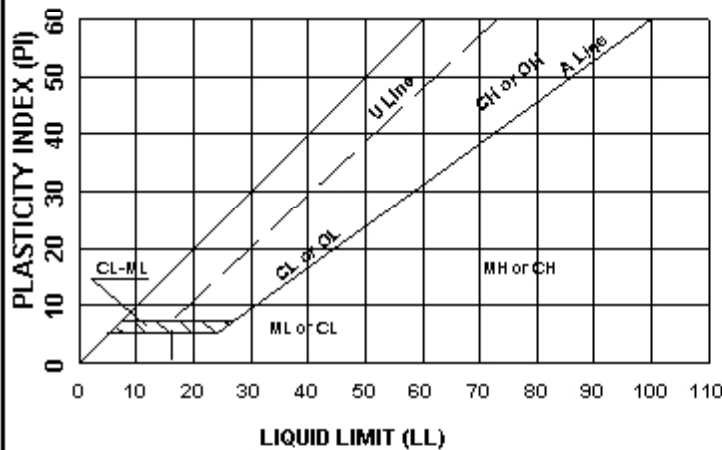
CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES

ASTM Designation D-2487

MAJOR DIVISIONS		GROUP SYMBOLS	TYPICAL NAMES	
COARSE-GRAINED SOILS (Less than 50% passing No. 200 sieve)	GRAVELS (Less than 50% of coarse fraction passing No. 4 sieve)	CLEAN GRAVELS (Less than 5% passing No. 200 sieve)		
		GW	WELL-GRADED GRAVEL, WELL-GRADED GRAVEL WITH SAND	
		GP	POORLY-GRADED GRAVEL, POORLY-GRADED GRAVEL WITH SAND	
		GRAVELS WITH FINES More than 12% passing No. 200 sieve Limits plot below "A" line & hatched zone on plasticity chart		
	GRAVELS WITH FINES More than 12% passing No. 200 sieve Limits plot above "A" line & hatched zone on plasticity chart		GM	SILTY GRAVEL, SILTY GRAVEL WITH SAND
	GRAVELS WITH FINES More than 12% passing No. 200 sieve Limits plot above "A" line & hatched zone on plasticity chart		GC	CLAYEY GRAVEL, CLAYEY GRAVEL WITH SAND
	SANDS (50% or more of coarse fraction passing No. 4 sieve)	CLEAN SANDS (Less than 5% passing No. 200 sieve)		
		SW	WELL-GRADED SAND, WELL-GRADED SAND WITH GRAVEL	
SP		POORLY-GRADED SAND, POORLY-GRADED SAND WITH GRAVEL		
SANDS WITH FINES Limits plot below "A" line & hatched zone on plasticity chart				
SANDS WITH FINES More than 12% passing No. 200 sieve Limits plot above "A" line & hatched zone on plasticity chart		SM	SILTY SAND, SILTY SAND WITH GRAVEL	
SANDS WITH FINES More than 12% passing No. 200 sieve Limits plot above "A" line & hatched zone on plasticity chart		SC	CLAYEY SAND, CLAYEY SAND WITH GRAVEL	
FINE-GRAINED SOILS (50% or more passing No. 200 sieve)	SILTS AND CLAYS (Liquid Limit Less than 60%)			
	ML	SILT, SILT WITH SAND, SILT WITH GRAVEL SANDY SILT, GRAVELLY SILT		
	CL	LEAN CLAY, LEAN CLAY WITH SAND, LEAN CLAY WITH GRAVEL, SANDY LEAN CLAY, GRAVELLY LEAN CLAY		
	OL	ORGANIC CLAY, ORGANIC CLAY WITH SAND, SANDY ORGANIC CLAY, ORGANIC SILT, SANDY ORGANIC SILT		
	SILTS AND CLAYS (Liquid Limit 60% or More)			
	MH	ELASTIC SILT, ELASTIC SILT WITH SAND, SANDY ELASTIC SILT, GRAVELLY ELASTIC SILT		
CH	FAT CLAY, FAT CLAY WITH SAND, FAT CLAY WITH GRAVEL, SANDY FAT CLAY, GRAVELLY FAT CLAY			
OH	ORGANIC CLAY, ORGANIC CLAY WITH SAND, SANDY ORGANIC CLAY ORGANIC SILT, SANDY ORGANIC SILT			

NOTE: Coarse soils with between 5% & 12% passing the No. 200 sieve and fine grained soils with limits plotting in the hatched zone of the plasticity chart are to have dual symbols.

PLASTICITY CHART



Equation of A-Line: Horizontal at $PI=4$ to $LL=25.5$, $PI=0.73(LL-20)$

Equation of U-Line: Vertical at $LL=16$ to $PI=7$, then $PI=0.9(LL-8)$

DEGREE OF PLASTICITY OF COHESIVE SOILS

DEGREE OF PLASTICITY	PLASTICITY INDEX
None	0 - 4
Slight	5 - 10
Medium	11 - 20
High	21 - 40
Very High	>40

SOIL SYMBOLS

	FILL		SAND
	FAT CLAY (CH)		SILT
	LEAN CLAY (CL)		



June 1, 2015

Dannenbaum Engineering Corporation
3100 West Alabama Street
Houston, Texas 77098

Attn: Mr. Larry S. Marr, P.E.

Re: Additional Geotechnical Engineering Recommendations
Straight-Shaft Foundations - Bolivar SUD Generators
Galveston County, Texas
QCL No. 13G10439.Addendum1

Dear Mr. Marr:

Based on recent information provided, we understand that supplemental geotechnical engineering recommendations have been requested for the Bolivar SUD Generator project in Galveston County, Texas. In our original report, recommendations were provided for driven precast/prestressed concrete piles. We understand that drilled, straight-shaft foundations are now being considered to support the proposed generator structures. This letter should be considered as a supplement to our original Geotechnical Engineering Study, QCL Project No. 13G10439, dated January 7, 2014.

Design Considerations – Drilled Straight-Shaft Foundations

Allowable unit skin friction and end bearing values for drilled straight-shafts are presented below. These design parameters were computed based on the engineering properties of the subsurface soils observed at the borings. Design of the shafts should also include an evaluation of the structural capacity of the foundation element, which may limit the allowable axial load capacity.

North Plant (Boring B-1)		
Depth ¹ (feet)	Net Allowable End Bearing (psf)	Allowable Skin Friction (psf)
0 - 5	Disregard	
5 - 9	Disregard	275

North Plant (Boring B-1)		
Depth¹ (feet)	Net Allowable End Bearing (psf)	Allowable Skin Friction (psf)
<i>Continued from Page 1</i>		
9 – 18	Disregard	100
18 – 30	1,200	125
^{1.} Depth below existing grade (grade existing at the time of our field program).		

Singing Sand Plant (Boring B-2)		
Depth¹ (feet)	Net Allowable End Bearing (psf)	Allowable Skin Friction (psf)
0 - 5	Disregard	
5 – 10	Disregard	40
10 – 17	Disregard	Disregard
17 – 23	3,000	150
23 – 30	1,000	100
^{1.} Depth below existing grade (grade existing at the time of our field program).		

Main Plant (Boring B-3)		
Depth¹ (feet)	Net Allowable End Bearing (psf)	Allowable Skin Friction (psf)
0 - 5	Disregard	
5 – 13	Disregard	50
13 – 18	Disregard	110
18 – 27	3,000	140
27 – 30	Disregard	Disregard
^{1.} Depth below existing grade (grade existing at the time of our field program).		

Drilled straight-shafts should extend at least 2 feet or half the shaft diameter; whichever is greater, into the desired bearing strata in order to use the recommended allowable end bearing pressures. A minimum of 4 feet of the bearing stratum should be also beneath the foundation tip.

We recommend a minimum center-to-center foundation spacing of three shaft diameters placed in groups beneath square or rectangular caps. Closer spacing than three diameters in groups could result in increased group settlement and a reduction of load-carrying capacity of individual foundation elements.

Settlement of single, isolated shafts will depend on the elastic properties of the foundation, the applied load, and the interaction of the soil and foundation. Settlement is anticipated to be primarily elastic and will occur relatively soon after load application. Significant consolidation settlement due to applied load is not anticipated. Our experience indicates that single, isolated shafts loaded to about one-half of their ultimate capacity will result in settlements of less than one inch. Groups generally undergo more settlement than single isolated shafts for the same applied load. Based on the above recommended spacing, we anticipate that settlement of a group will be on the order of one inch under working loads with differential settlement between foundation elements of one-half inch or less.

Lateral resistance of drilled, straight-sided shafts is based on the applied loading conditions, subsurface conditions, shaft diameter, the amount of steel reinforcement, and the engineering properties of the shaft materials. Typically, a computer program such as L-Pile would be used to determine the minimum shaft diameter through an iterative process based on design tolerances. If needed, we can provide those parameters based on the soil conditions observed and our experience. In any case, we recommend the lateral resistance within the upper 5 feet (as a minimum) be neglected due to fill soils, surface effects, and the potential for scour.

A drilled straight-shaft will provide resistance to structural uplift loads through the mobilization of the skin friction acting at the interface of the shaft and adjacent soils. Uplift resistance for the shafts may be taken as the allowable skin friction values provided in the table above.

Foundation Installation – Drilled Straight-Shaft Foundations

Installation considerations for drilled, straight shaft foundations include provisions for subsurface soil and water conditions, reinforcing steel and concrete placement, and monitoring. Each of these topics is discussed in the following paragraphs.

As mentioned previously, silty/sandy soils and groundwater were observed at shallow depths at each plant site. Thus, based on the soil and groundwater conditions observed, successful completion of the drilled, straight-shafts will require the use of the slurry displacement method of construction.

During the slurry displacement method of construction, the foundation excavation is filled with a slurry mixture. The slurry must be maintained in the foundation excavation until the design termination depth is achieved and should be removed only as concreting proceeds.

The properties of the slurry including the density, viscosity, and pH must be carefully controlled and should be in accordance with Item 416 of Texas Department of Transportation (TXDOT) Standard Specifications for Construction of Highways, Streets, and Bridges.

The following procedures and equipment are recommended for installation of drilled shafts:

1. The bottom of the drilled straight-shaft should be cleaned as well as practical just prior to concreting to remove cuttings.
2. The concrete should be placed by means of a tremie. The tremie should extend to the bottom of the excavation to allow displacement of the slurry during concrete placement.
3. During concrete placement, the end of the tremie should remain several feet within the concrete mass to reduce the entrapment of slurry. A tremie embedment of 5 to 10 feet is generally considered acceptable.
4. The concrete should be relatively fluid to reduce the entrapment of slurry. We recommend that concrete with a slump of 6 to 8 inches be used.
5. The upper few feet of concrete should be removed from the shaft excavation if found to be contaminated with slurry or soil.

Reinforcing steel should be clean and free of any bond-inhibiting coating or mud. Reinforcing steel should be properly positioned and supported to assure the design cover around the reinforcing steel is achieved.

We trust that the information contained herein meets your project needs at this time. Any items not specifically discussed above should be addressed as indicated in our original report. If you have any questions regarding this letter, please do not hesitate to contact us.

Sincerely,

QC LABORATORIES, INC.

(Texas Registered Engineering Firm F-3601)



Constance Lin, E.I.T.
Project Manager



John D. Guida, P.E.
Director of Geotechnical Engineering Services



6/1/2015

Copies Submitted: Addressee - (1) Electronic

BID #
OPEN DATE
TIME

SECTION VI
Project Drawings