

**PROJECT MANUAL
FOR
THE CONSTRUCTION OF**

***Walker Branch Interceptor Improvements
Segment 1 and 2***

Bid 19-011 – Bids Due: Thursday, February 7, 2019 2:00 PM

Issued for Bid

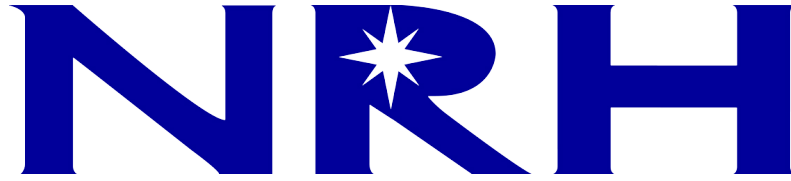
Caroline Waggoner, PE
City Engineer
City of North Richland Hills

**Prepared for
City of North Richland Hills**

January 2019

PREPARED BY:
FREESE AND NICHOLS, INC.
4055 INTERNATIONAL PLAZA SUITE 200
FORT WORTH, TEXAS 76109





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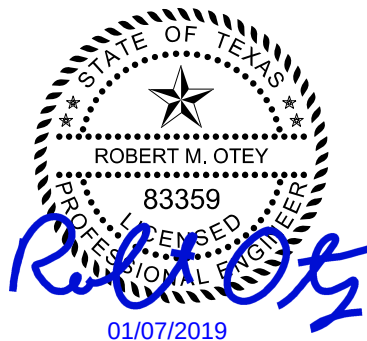
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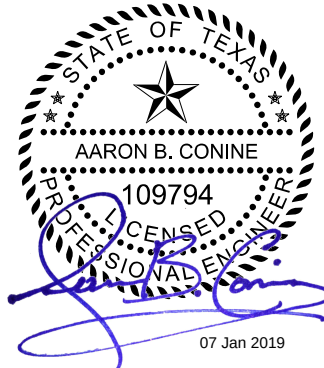
Issued for Bid

Caroline Waggoner, PE
Public Works Director
City of North Richland Hills

**Prepared for
City of North Richland Hills**



FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144



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PROCUREMENT AND CONTRACTING REQUIREMENTS

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Division / Section	Title
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END SECTION

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END OF SECTION



**PURCHASING DEPARTMENT
REQUEST FOR PROPOSAL**

19-011

**WALKER BRANCH
INTERCEPTOR – SEGMENTS 1 & 2**

BIDS DUE THURSDAY, FEBRUARY 7, 2019

BY 2:00 P.M.

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INVITATION TO BID

The City of North Richland Hills is accepting sealed bids from all interested parties for:

- Bid Number: 19-011
- Bid Type: REQUEST FOR PROPOSAL
- Bid Name: Walker Branch Interceptor Project
- Bid Due Date: Thursday, February 07, 2019
- Bid Due Time: 2:00 P.M. Central Standard Time
- Pre-Bid Conference: 10:00 A.M. (CST) Thursday January 24, 2019
4301 City Point Drive, North Richland Hills, TX 76180
- Deadline for questions:
Date: Thursday, January 31, 2019
Time: 12:00 P.M. Central Standard Time

DOCUMENTS MAY BE SUBMITTED ELECTRONICALLY VIA:

www.publicpurchase.com

DOCUMENTS MAY BE DELIVERED TO:

City of North Richland Hills
Purchasing, Attn: 18-000 DESCRIPTION
4301 City Point Drive
North Richland Hills, TX 76180

If delivering a bid packet please include **One (1) hard copy and One (1) soft copy on Flash drive.** Submit documents in a sealed envelope with the following information marked plainly on the front:

**ATTN: PURCHASING DEPARTMENT
19-011 Walker Branch Interceptor Project**

No oral explanation in regard to the meaning of the specifications will be made, and no oral instructions will be given after the pre-bid meeting and before the award of the contract. Requests from interested vendors for additional information or interpretation of the information included in the specifications should be directed in writing as a question related to this bid on Public Purchase and the question will be answered on Public Purchase. All addendums will also be posted to Public Purchase. It will be the vendor's responsibility to check all information related to this bid on Public Purchase before submitting a response.

The City of North Richland Hills reserves the right to reject in part or in whole all bids submitted, and to waive any technicalities for the best interest of the City of North Richland Hills.

GENERAL CONDITIONS

In submitting this bid, the Bidder understands and agrees to be bound by the following terms and conditions. These terms and conditions shall become a part of the purchase order or contract and will consist of the invitation to bid, specifications, the responsive bid and the contract with attachments, together with any additional documents identified in the contract and any written change orders approved and signed by a city official with authority to do so. All shall have equal weight and be deemed a part of the entire contract. If there is a conflict between contract documents, the provision more favorable to the City shall prevail.

1. **BID TIME**

It shall be the responsibility of each Bidder to ensure his/her bid is turned in to the City of North Richland Hills on or before **2:00 P.M. Thursday, February 07, 2019**. The official time shall be determined by the clock located at the switchboard in the North Richland Hills City Hall lobby. Bids received after the time stated above will be considered ineligible and returned unopened.

All attached bid documents are to be returned completely filled out, totaled, and signed. Envelopes containing bids must be **sealed**. The City of North Richland Hills will not accept any bid documents other than the attached.

2. **WITHDRAWING BIDS/PROPOSALS/QUOTES**

Bids may be withdrawn at any time prior to the official opening; request for non-consideration of bids must be made in writing to the Purchasing Manager and received prior to the time set for opening bids. The bidder warrants and guarantees that his/her bid has been carefully reviewed and checked and that it is in all things true and accurate and free of mistakes. Bidder agrees that a bid price may not be withdrawn or canceled by the bidder for a period of ninety (90) days following the date designated for the receipt of bids.

3. **IRREGULAR BIDS/PROPOSALS/QUOTES**

Bids will be considered irregular if they show any omissions, alterations of form, additions, or conditions not called for, unauthorized alternate bids, or irregularities of any kind. However, the City of North Richland Hills reserves the right to waive any irregularities and to make the award in the best interest of the City.

4. **REJECTION/DISQUALIFICATION**

Bidders will be disqualified and/or their bids rejected, among other reasons, for any of the specific reasons listed below:

- a) Bid received after the time set for receiving bids as stated in the advertisement;
- b) Reason for believing collusion exists among the Bidders;
- c) Bid containing unbalanced value of any item; bid offering used or reconditioned equipment;
- d) Where the bidder, sub-contractor or supplier is in litigation with the City of North Richland Hills or where such litigation is contemplated or imminent;
- e) Uncompleted work which in the judgment of the City will prevent or hinder the prompt completion of additional work, or having defaulted on a previous contract;
- f) Lack of competency as revealed by reference checks, financial statement, experience and equipment, questionnaires, or qualification statement;
- g) Bid containing special conditions, clauses, alterations, items not called for or irregularities of any kind, which in the Owner's opinion may disqualify the Bidder.

However, the City of North Richland Hills reserves the right to waive any irregularities and to make the award in the best interest of the City of North Richland Hills.

5. BID EVALUATION

Award of bid, if it be awarded, will be made to the lowest responsible bidder or may be awarded to the bidder that offers the goods and/or services at the *best value* for the City (Texas Local Government Code, 252.043). In determining the best value the City will consider the following:

- a) The purchase price; terms and discounts; delivery schedule;
- b) The reputation of the bidder and of the bidder's goods or services;
- c) The quality of the bidders' goods or services;
- d) The extent to which the bidder's goods or services meet the City specifications and needs;
- e) The bidder's past relationship with the City;
- f) Total long term cost to the city to acquire the bidder's goods or services;
- g) Any relevant criteria specifically listed in the specifications;
- h) Compliance with all State and local laws, general conditions and Specifications;
- i) Results of testing, if required;
- j) Warranty and/or guarantee, maintenance requirements and performance data of the product requested;
- k) City's evaluation of the bidder's ability to perform to specifications.

6. AWARD OF BID

No award will be made until after investigations are made as to the responsibilities of the best bidder.

The City of North Richland Hills reserves the right to award bids whole or in part when deemed to be in the best interest of the City. Bidder shall state on bid form if their bid is "all or none", otherwise it shall be considered as agreeing to this section.

Information contained in submitted bid documents shall not be available for inspection until after the award has been made by the City Council. Requests for this information must be submitted in writing.

7. ASSIGNMENT

The successful bidder may not assign his/her rights and duties under an award without the written consent of the North Richland Hills City Manager. Such consent shall not relieve the assignor of liability in the event of default by his assignee.

8. SUBSTITUTIONS/EXCEPTIONS

Exceptions/variations from the specifications may be acceptable provided such variations, in each instance, is noted and fully explained in writing and submitted with bid. NO substitutions or changes in the specifications shall be permitted after award of bid without prior written approval by the Purchasing Manager.

9. DELIVERY/ACCEPTANCE

The delivery date is an important factor of this bid and shall be considered during the evaluation process. The City considers delivery time the period elapsing from the time the order is placed until the City receives the order at the specified delivery location.

All material shall be delivered F.O.B. City of North Richland Hills to the address specified at the time of order. Acceptance by the City of North Richland Hills of any delivery shall not relieve the Contractor of any guarantee or warranty, expressed or implied, nor shall it be considered an acceptance of material not in accordance with the specifications thereby waiving the City of North

Richland Hills right to request replacement of defective material or material not meeting specifications.

10. NOTICE OF DELAYS

Whenever the contractor encounters any difficulty which is delaying or threatens to delay timely performance, written notice shall immediately be given to the Purchasing Manager, stating all relevant information. Such notice shall not in any way be construed as a waiver by the City of any rights or remedies to which it is entitled by law. Delays in performance and/or completion may result in cancellation of agreement.

11. SALES TAX

The City of North Richland Hills is exempt from Federal Excise and State sales tax; therefore tax must not be added to bid.

12. TIE BIDS

In the event of a tie bid, State Law provides the bid or contract shall be awarded to the local bidder. In cases where a local bidder is not involved, tie bids shall be awarded by drawing lots at the City Council meeting, or as otherwise directed by the Mayor.

13. BRAND NAME OR EQUAL

If items are identified by a "brand name" description, such identification is intended to be descriptive, not restrictive, and is to indicate the quality and characteristics of products that will be satisfactory. As used in this clause, the term "brand name" includes identification of products by make and model.

Such products must be clearly identified in the bid as an equal product and published specifications of the equal products offered must be included with the bid reply.

Bids offering equal products will be considered for award if determined by the Purchasing Manager and the user department to be equal in all material respects to the brand name products referenced. The decision of acceptable "equal" items or variations in the specifications will solely be the City of North Richland Hills. Unless the bidder clearly indicates in his/her bid that he is offering an "equal" product, his bid shall be considered as offering the brand name product referenced in the invitation for bids.

14. REFERENCES

A minimum of three (3) references, preferably located within the Dallas/Fort Worth Metroplex, must be submitted with each bid. Company name, contact and phone number must be included with each reference.

15. PROHIBITION AGAINST PERSONAL FINANCIAL INTEREST IN CONTRACTS

No employee of the City of North Richland Hills shall have a direct or indirect financial interest in any proposed or existing contract, purchase, work, sale or service to or by the City (CMA-074, Standards of Conduct, Section IV).

16. TERMINATION/NON PERFORMANCE

Continuing non-performance of the vendor in terms of Specifications shall be a basis for the termination of the contract by the City. The City of North Richland Hills reserves the right to enforce the performance of this contract in any manner prescribed by law or deemed to be in the best interest

of the City in the event of breach or default of this contract. The City reserves the right to terminate the contract immediately in the event the successful bidder fails to 1.) Meet delivery schedules or, 2.) Otherwise not perform in accordance with these specifications.

Breach of contract or default authorizes the City to award to another bidder, and/or purchase elsewhere and charge the full increase in cost and handling to the defaulting successful bidder.

The contract may be terminated by either party upon written thirty (30) days' notice prior to cancellation without cause.

17. ATTORNEYS FEES

Neither party to this contract shall be entitled to attorney fees for any matter arising under this contract, whether for additional work, breach of contract, or other claim for goods, services, or compensation. All claims for attorney's fees are hereby WAIVED.

18. INDEMNITY

City shall not be liable or responsible for, and shall be saved and held harmless by Contractor from and against any and all suits, actions, losses, damages, claims, or liability of any character, type, or description, including claims for copyright and patent infringement, and including all expenses of litigation, court costs, and attorney's fees for injury or death to any person, or injury to any property, received or sustained by any person or persons or property, arising out of, or occasioned by, directly or indirectly, the performance of Contractor under this agreement, including claims and damages arising in part from the negligence of City, without; however, waiving any governmental immunity available to the CITY under Texas law and without waiving any defenses of the parties under Texas law. The provisions of this indemnification are solely for the benefit of the parties hereto and not intended to create or grant any rights, contractual or otherwise, to any other person or entity.

It is the expressed intent of the parties to this Agreement that the indemnity provided for in this section is an indemnity extended by Contractor to indemnify and protect City from the consequences of City's own negligence, provided, however, that the indemnity provided for in this section shall apply only when the negligent act of City is a contributory cause of the resultant injury, death, or damage, and shall have no application when the negligent act of City is the sole cause of the resultant injury, death, or damage, unmixed with the legal fault of another person or entity. Contractor further agrees to defend, at its own expense, and on behalf of City and in the name of City, any claim or litigation brought in connection with any such injury, death, or damage.

The Contractor will secure and maintain Contractual Liability insurance to cover this indemnification agreement that will be primary and noncontributory as to any insurance maintained by the City for its own benefit, including self-insurance.

19. PERFORMANCE AND PAYMENT BONDS

In the event the total contract amount exceeds \$100,000, the Contractor shall be required to execute a performance bond in the amount of one hundred (100) percent of the total contract price; if the total contract amount exceeds \$50,000 the contractor shall be required to execute a payment bond in the amount of one hundred (100) percent of the total contract price, each in standard forms for this purpose, guaranteeing faithful performance of work and guaranteeing payment to all persons supply labor and materials or furnishing any equipment in the execution of the contract. It is agreed that this contract shall not be in effect until such performance and payment bonds are furnished and approved by the City of North Richland Hills. No exceptions to this provision allowed.

Unless otherwise approved in writing by the City of North Richland Hills, the surety company underwriting the bonds shall be acceptable according to the latest list of companies holding certificates of authority from the Secretary of the Treasury of the United States.

Attorneys-in-fact who sign bid bonds or contract bonds must file with each bond a certified and current copy of their power of attorney.

20. ELECTRONIC PROCUREMENT

The City of North Richland Hills has adopted policies and procedures complying with Local Government Code Section 252.0415, Section 271.906 and Section 2155.062. The City of North Richland Hills may receive submittals in electronic form in response to procurement requests. However, a bid that is submitted non-electronically by the due date and time will be accepted and then entered electronically by Purchasing after the bid opening.

21. COMPLIANCE WITH SB 89:

Vendor agrees per HB 89 of the 85th Texas Legislative Session, and in accordance with Chapter 2270 of the Texas Government Code, vendor has not and shall not boycott Israel at any time while providing products or services to the City of North Richland Hills.

☒ Yes, we agree

☐ No, we do not agree

22. COMPLIANCE WITH SB 252:

Vendor agrees per SB 252 of the 85th Texas Legislative Session, and in accordance with Chapter 2252 of the Texas Government Code, vendor shall not do business with Iran, Sudan or a foreign terrorist organization while providing products or services to the City of North Richland Hills.

☒ Yes, we agree

☐ No, we do not agree *

* By selecting no, vendor certifies that it is affirmatively excluded from the federal sanctions regime by the United States government and is not subject to the contract prohibition under Section 2252.154 of the Texas Government Code. Vendor shall provide sufficient documentation to the City of such exclusion prior to award of any contract for goods or services.

23. ETHICS AND COMPLIANCE POLICY

The City's Ethics and Compliance Policy can be found at The City of North Richland Hills Purchasing Division webpage - Or you may request a copy from the Purchasing Division.

Acknowledgment - The City of North Richland Hills' Internal Ethics and Compliance Policy has been made available to me. I understand the expectations of ethical behavior and compliance with the law, and agree to adhere to the City's ethics policies.

☒ I agree

☐ I do not agree

24. DEPARTMENT OF TRANSPORTATION (TXDOT) RELATED BIDS

"The City of North Richland Hills, in accordance with the provisions of Title VI of the Civil Rights Act of 1964 (78 Stat. 252, 42 U.S.C. §§ 2000d to 2000d-4) and the Regulations, hereby notifies all bidders that it will affirmatively ensure that any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full and fair opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award."

Due care and diligence has been used in preparation of this information, and it is believed to be substantially correct. However, the responsibility for determining the full extent of the exposure and the verification of all information presented herein shall rest solely with the bidder. The City of North Richland Hills and its representatives will not be responsible for any errors or omissions in these specifications, nor for the failure on the part of the proposer to determine the full extent of the exposures.

INSURANCE REQUIREMENTS

Contractors performing work on City property or public right-of-way for the City of North Richland Hills shall provide the City a certificate of insurance evidencing the coverages and coverage provisions identified herein. Contractors shall provide the City evidence that all subcontractors performing work on the project have the same types and amounts of coverages as required herein or that the subcontractors are included under the contractor's policy. The City, at its own discretion, may require a certified copy of the policy.

All insurance companies and coverages must be authorized by the Texas Department of Insurance to transact business in the State of Texas and must be acceptable to the City of North Richland Hills.

Listed below are the types and amounts of insurance generally required. The City reserves the right to amend the insurance requirements or require additional types and amounts of coverages or provisions depending on the nature of the work or services to be performed.

Type of Insurance	Amount of Insurance	Provision
1. Commercial General Liability to include coverage for: a) Premises/Operations b) Products/Completed Operations c) Independent Contractors d) Personal Injury e) Contractual Liability f) Personal/Advertising Injury g) Medial Expense h) Fire Legal Liability i) Underground Hazard j) Explosion/Collapse Hazard k) Patent Infringement l) Copyright Law Violations	\$1,000,000 each occurrence, \$1,000,000 general aggregate; Or \$1,000,000 combined single limits	City to be listed as additional insured and provided 30 day-notice of cancellation or material change in coverage City prefers that insurer be rated B+V1 or higher by A. M. Best or A or higher by Standard & Poors
2. Consultants, architects, engineers, Landscape design specialist, other professional services	\$500,000 Professional Liability with proof that aggregate is still available.	
3. Workers' Compensation & Employers' Liability	Statutory Limits \$500,000 each accident	Alternate employer endorsement required
4. Comprehensive Automobile Liability Insurance, including coverage for loading and unloading hazards, for a) Owned/Leased Vehicles b) Non-Owned Vehicles c) Hired Vehicles	\$500,000 Combined single limit for bodily injury and property damage	

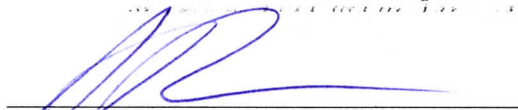
A PURCHASE ORDER WILL NOT BE ISSUED WITHOUT EVIDENCE OF INSURANCE.

NON-COLLUSION AFFIDAVIT OF BIDDER

State of Texas County of Denton

Adam Darrach verifies that:
(Name)

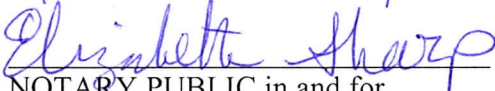
- (1) He/She is owner, partner, officer, representative, or agent of
ANA Site Construction, LLC, has submitted the attached
bid: (Company Name)
- (2) He/She is fully informed in respect to the preparation, contents and circumstances in
regard to attached bid;
- (3) Neither said bidder nor any of its officers, partners, agents or employees has
in any way colluded, conspired or agreed, directly or indirectly with any other
bidder, firm or person to submit a collusive or sham bid in connection
with attached bid and the price or prices quoted herein are fair and proper.


SIGNATURE

Adam Darrach
PRINTED NAME

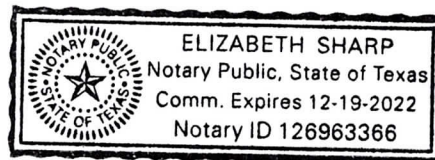
Subscribed and sworn to before me this

7th Day of February 2019.


NOTARY PUBLIC in and for

Denton County, Texas.

My commission expires: 12-19-22



THIS FORM MUST BE COMPLETED, NOTARIZED AND SUBMITTED WITH BID

BID CERTIFICATION

The Undersigned, in submitting this bid, represents and certifies:

- a. He/she is fully informed regarding the preparation, contents and circumstances of the attached bid;
- b. He/she proposes to furnish all equipment/service at the prices quoted herein and bid is in strict accordance with the conditions and specifications stated herein;
- c. There will be at no time a misunderstanding as to the intent of the specifications or conditions to be overcome or pleaded after the bids are opened;
- d. He/she is an equal opportunity employer, and will not discriminate with regard to race, color, national origin, age or sex in the performance of this contract.
- e. The undersigned hereby certifies that he/she has read, understands and agrees that acceptance by the City of North Richland Hills of the bidder's offer by issuance of a purchase order will create a binding contract. Further, he/she agrees to fully comply with documentary forms herewith made a part of this specific procurement.

COMPANY:	ANA Site Construction, LLC
ADDRESS:	10100 Horseshoe Nail Rd
CITY, STATE & ZIP:	Pilot Point, Texas 76258
TELEPHONE:	817-751-4975
FAX:	
EMAIL:	Adam@ANAsitellc.com
SIGNATURE:	<i>Adam Darrach</i>
PRINTED NAME:	Adam Darrach
DATE:	02/05/2019

COMPLIANCE WITH HOUSE BILL 1295

In 2015, the Texas Legislature adopted [House Bill 1295](#), which added section 2252.908 of the Government Code. The law states that a governmental entity may not enter into certain contracts with a business entity unless the business entity submits a disclosure of interested parties to the governmental entity at the time the business entity submits the signed contract to the governmental entity.

The law applies only to a contract of a governmental entity that either (1) requires an action or vote by the governing body of the entity or agency before the contract may be signed or (2) has a value of at least \$1 million. The disclosure requirement applies to a contract entered into on or after January 1, 2016.

The Texas Ethics Commission has adopted rules necessary to implement the law, prescribed the disclosure of interested parties form, and posted a copy of the form on the commission's website.

Filing Process:

The commission has made available on its website a new filing application that must be used to file Form 1295. A business entity must:

- 1) Use the application to enter the required information on Form 1295,
- 2) Print a copy of the completed form, which will include a certification of filing that will contain a unique certification number.
- 3) Sign the printed copy of the form (an authorized agent of the business entity must sign),
- 4) Have the form notarized,
- 5) File the completed Form 1295 with the certification of filing with the governmental body with which the business entity is entering into the contract.

The governmental entity must notify the commission, using the commission's filing application, of the receipt of the filed Form 1295 with the certification of filing not later than the 30th day after the date the contract binds all parties to the contract. The commission will post the completed Form 1295 to its website within seven business days after receiving notice from the governmental entity.

Information regarding how to use the filing application may be found at https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm.

FOR DISADVANTAGED BUSINESS ENTERPRISES ONLY

Disadvantaged Business Enterprises (DBE) are encouraged to participate in the City of North Richland Hills bid process. Representatives from DBE Companies should identify themselves as such and submit a copy of their Certification.

The City of North Richland Hills recognizes the certifications of both the State of Texas Building and Procurement Commission HUB Program and the North Central Texas Regional Certification Agency. All companies seeking information concerning DBE certification are urged to contact:

**Texas Building and Procurement Commission
Statewide HUB Program
1711 San Jacinto Blvd., Austin TX 78701-1416
P O Box 13186, Austin, TX 78711-3186
(512) 463-5872**

<http://www.window.state.tx.us/procurement/prog/hub/hub-certification/>

**North Central Texas
Regional Certification Agency
624 Six Flags Drive, Suite 216
Arlington, Texas 76011
(817) 640-0606
<http://www.nctrca.org/certification.html>**

If your company is already certified, attach a copy of your certification to this form and return as part of your packet.

Company Names: _____ N/A

Representative: _____

Address: _____

City, State, Zip: _____

Telephone No. _____ **Fax No.** _____

Email address: _____

INDICATE ALL THAT APPLY:

_____ **Minority-Owned Business Enterprise**
_____ **Women-Owned Business Enterprise**
_____ **Disadvantaged Business Enterprise**

CONFLICT OF INTEREST QUESTIONNAIRE

Pursuant to Chapter 176 of the Texas Local Government Code, a person, or agent of a person, who contracts or seeks to contract for the sale or purchase of property, goods, or services with the City of North Richland Hills must file a completed conflict of interest questionnaire. The conflict of interest questionnaire must be filed with the City Secretary of the City of North Richland Hills no later than the seventh business day after the person or agent begins contract discussions or negotiations with the City of North Richland Hills or submits to the City of North Richland Hills an application, response to a request for proposal or bid, correspondence, or another writing

related to a potential agreement with the City of North Richland Hills. An updated conflict of interest questionnaire must be filed in accordance with Chapter 176 of the Local Government Code. An offense under Chapter 176 is a Class C misdemeanor.

The Conflict of Interest Questionnaire is included as part of this document and can be found at:

<https://www.ethics.state.tx.us/forms/CIQ.pdf>

CONFLICT OF INTEREST QUESTIONNAIRE

For vendor doing business with local governmental entity

FORM CIQ

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor 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 vendor becomes aware of facts that require the statement to be filed. See Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

OFFICE USE ONLY

Date Received

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

N/A

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 on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 Name of local government officer about whom the information is being disclosed.

Name of Officer

4 Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?

☐ Yes ☐ No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

5 Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.

6 ☐ Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

7

Adam Darrach
Signature of vendor doing business with the governmental entity

02/21/2019

Date

CONFLICT OF INTEREST QUESTIONNAIRE

For vendor doing business with local governmental entity

A complete copy of Chapter 176 of the Local Government Code may be found at <http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.176.htm>. For easy reference, below are some of the sections cited on this form.

Local Government Code § 176.001(1-a): "Business relationship" means a connection between two or more parties based on commercial activity of one of the parties. The term does not include a connection based on:

- (A) a transaction that is subject to rate or fee regulation by a federal, state, or local governmental entity or an agency of a federal, state, or local governmental entity;
- (B) a transaction conducted at a price and subject to terms available to the public; or
- (C) a purchase or lease of goods or services from a person that is chartered by a state or federal agency and that is subject to regular examination by, and reporting to, that agency.

Local Government Code § 176.003(a)(2)(A) and (B):

- (a) A local government officer shall file a conflicts disclosure statement with respect to a vendor if:

- (2) the vendor:

(A) has an employment or other business relationship with the local government officer or a family member of the officer that results in the officer or family member receiving taxable income, other than investment income, that exceeds \$2,500 during the 12-month period preceding the date that the officer becomes aware that

(i) a contract between the local governmental entity and vendor has been executed;
or

(ii) the local governmental entity is considering entering into a contract with the vendor;

(B) has given to the local government officer or a family member of the officer one or more gifts that have an aggregate value of more than \$100 in the 12-month period preceding the date the officer becomes aware that:

- (i) a contract between the local governmental entity and vendor has been executed; or
- (ii) the local governmental entity is considering entering into a contract with the vendor.

Local Government Code § 176.006(a) and (a-1)

- (a) A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with a local governmental entity and:

(1) has an employment or other business relationship with a local government officer of that local governmental entity, or a family member of the officer, described by Section 176.003(a)(2)(A);

(2) has given a local government officer of that local governmental entity, or a family member of the officer, one or more gifts with the aggregate value specified by Section 176.003(a)(2)(B), excluding any gift described by Section 176.003(a-1); or

(3) has a family relationship with a local government officer of that local governmental entity.

- (a-1) The completed conflict of interest questionnaire must be filed with the appropriate records administrator not later than the seventh business day after the later of:

- (1) the date that the vendor:

(A) begins discussions or negotiations to enter into a contract with the local governmental entity; or

(B) submits to the local governmental entity an application, response to a request for proposals or bids, correspondence, or another writing related to a potential contract with the local governmental entity; or

- (2) the date the vendor becomes aware:

(A) of an employment or other business relationship with a local government officer, or a family member of the officer, described by Subsection (a);

(B) that the vendor has given one or more gifts described by Subsection (a); or

(C) of a family relationship with a local government officer.

00 42 23 BID FORM

ARTICLE 1: BID RECIPIENT

1.01 This Bid is submitted to:

City of North Richland Hills
4301 City Point Drive
North Richland Hills, TX 16180
Attention: Caroline Waggoner, P.E., City Engineer

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2: BIDDER'S ACKNOWLEDGMENTS

2.01 Bidder accepts all of the terms and conditions of the Invitation for Bids and Instructions to Bidders, including, without limitation, those dealing with the disposition of bid security. The Bid will remain subject to acceptance for 60 days after the bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

2.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of its failure to complete Work in accordance with the schedule set forth in the Agreement.

ARTICLE 3: BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents, as set forth in the Agreement, that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of all of which is hereby acknowledged.

Addendum No.	Addendum Date	Signature Acknowledging Receipt
1	01/24/2019	<i>Adam Darrach</i>
2	01/25/2019	<i>Adam Darrach</i>
3	02/04/2019	<i>Adam Darrach</i>
4	02/05/2019	<i>Adam Darrach</i>
5	02/07/2019	<i>Adam Darrach</i>

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and the furnishing of Goods and Special Services.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except

Underground Facilities) which have been identified in SC-4.02, and (2) reports and drawings of Hazardous Environmental Conditions that have been identified in SC-4.06.

- E. Bidder has obtained and carefully studied all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions including surface, subsurface and Underground Facilities at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto or accepts the consequences for not doing so.
- F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the prices bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.
- G. Bidder is aware of the general nature of Work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.
- I. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.
- J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.
- K. Bidder will submit written evidence of its authority to do business in the state where the Project is located not later than the date of its execution of the Agreement.
- L. Bidder further represents that this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any individual or entity to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

ARTICLE 4: BASIS OF BID

- 4.01 Bidder will complete the Work in accordance with the Contract Documents for the prices shown in the attached Section 00 42 23.01 "Bid Form Exhibit A."
- 4.02 Extended amounts have been computed in accordance with Paragraph 11.03 of the General Conditions

- 4.03 Bidder acknowledges that the estimated quantities are not guaranteed, and final payment for all Unit Price Bid items will be based on actual quantities provided, measured as provided in the Contract Documents
- 4.04 Unit Price and figures column will be used to compute the actual bid price.

ARTICLE 5: TIME OF COMPLETION

- 5.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

ARTICLE 6: ATTACHMENTS TO THIS BID

- 6.01 The following documents are attached to and made a condition of this Bid:
- A. Section 00 42 23.01 "Bid Form Exhibit A."
 - B. Required Bid Security.
 - C. Section 00 42 23.02 "Contractor Compliance to State Law Certificate."
 - D. Section 00 42 23.03 "Contractor Compliance to Texas Sales Tax Code."
 - E. Conflict of Interest Questionnaire Form CIQ.
 - F. Required Bidder Qualification Statement with Supporting Data.

ARTICLE 7: DEFINED TERMS

- 7.01 The terms used in this Bid have the meanings indicated in the General Conditions and the Supplementary Conditions. The significance of terms with initial capital letters is described in the General Conditions.

ARTICLE 8: STATEMENT OF MATERIALS AND OTHER CHARGES

- 8.01 Provide the following information with this Bid:

Statement of Materials and Other Charges	
Materials Incorporated into the Project	\$ 979,586.00
All Other Charges	\$ 2,234,327.00
Total Contract Amount	\$3,213,913.00

ARTICLE 9: VENUE

- 9.01 Bidder agrees that venue shall lie exclusively in Tarrant County, Texas for any legal action.

ARTICLE 10: BID SUBMITTAL

- 10.01 This Bid submitted by:

If Bidder is an Individual

Name: _____
(typed or printed)

By: _____
(Individual's Signature)

Doing business as: _____

Business Address: _____

Phone: _____ Email: _____

Bid submitted on the following date: _____

A Partnership

Partnership Name: _____
(typed or printed)

Name of General Partner: _____
(typed or printed)

By: _____
(signature of general partner -- attach evidence of authority to sign)

Doing business as: _____

Business Address: _____

Phone: _____ Email: _____

Bid submitted on the following date: _____

A Corporation

Corporation Name: ANA Site Construction, LLC

(typed or printed)

State of Incorporation: Texas

Type: Limited Liability

(general business, professional, service, limited liability)

Date of qualification to do business in Texas is: 12/13/2016

By: Adam Darrack

Adam Darrach

(signature -- attach evidence of authority to sign)

Name: Adam Darrach

(typed or printed)

Title: Operations Manager

Attest: Nelson Amaya

(Signature of Corporate Secretary)

Business Address: 10100 Horseshoe Nail Rd

Pilot Point, Texas 76258

Phone: 817-751-4975

Email: Adam@anasitellc.com

Bid submitted on the following date: 02/07/2019

Joint Venture

Joint Venturer Name: _____
(typed or printed)

By: _____
(signature of joint venture partner -- attach evidence of authority to sign)

Name: _____
(typed or printed)

Title: _____

Business Address: _____

Phone: _____ Email: _____

Bid submitted on the following date: _____

Joint Venturer Name: _____
(typed or printed)

By: _____
(signature of joint venture partner -- attach evidence of authority to sign)

Name: _____
(typed or printed)

Title: _____

Business Address: _____

Phone: _____ Email: _____

Bid submitted on the following date: _____

Contact for receipt of official communications

Name: _____
(typed or printed)

Business Address: _____

Phone: _____ Email: _____

Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.

END OF SECTION

00 42 23.01 "Bid Form Exhibit A"
City of North Richland Hills
Walker Branch Interceptor
NRH16432
Basis of Bid

Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Amount
Segment 1					
101	16" DIPS DR 17 Grey Pipe (By Pipe Burst Ex. 10")	965	LF	239.00	230,635.00
102	16" DIPS DR 17 Grey Pipe (By Pipe Burst Ex. 8")	1,387	LF	236.00	327,322.00
103	15" PVC SDR 26 Pipe (By Open Cut - All Depths)	1,455	LF	66.00	96,030.00
104	15" PVC SDR 26 Pipe (By Other than Open Cut)	96	LF	260.00	24,960.00
105	12" PVC SDR 35 Pipe (By Open Cut - All Depths)	740	LF	48.00	35,520.00
106	16" SS - Contractor's Option - STA 34+99.43 to 39+55.76	460	LF	157.00	72,220.00
107	15" SS SDR 35 Carrier Pipe Inside 24" Steel Casing	262	LF	300.00	78,600.00
108	14" SS HDPE SDR 21 Pipe (By Open Cut - All Depths)	91	LF	75.00	6,825.00
109	14" SS HDPE SDR 21 Pipe (By Other than Open Cut)	79	LF	244.00	19,276.00
110	14" SS HDPE SDR 21 Carrier Pipe Inside 20" Steel Casing	199	LF	49.00	9,751.00
111	8" PVC SDR 26 Pipe (By Open Cut - All Depths)	50	LF	74.00	3,700.00
112	6" PVC Service Line	80	LF	49.00	3,920.00
113	20" Steel Casing (By Other than Open Cut - for 14" Carrier Pipe)	169	LF	403.00	68,107.00
114	20" Steel Casing (By Open Cut - for 14" Carrier Pipe)	30	LF	132.00	3,960.00
115	24" Steel Casing (By Other than Open Cut - for 15" Carrier Pipe)	262	LF	448.00	117,376.00
116	Plug Existing Sanitary Sewer (<12")	5	EA	619.00	3,095.00
117	Trench Safety	2,746	LF	1.00	2,746.00
118	Sanitary Sewer Service Reconnection	20	EA	1,120.00	22,400.00
119	Remove Existing Manhole	14	EA	2,100.00	29,400.00
120	4' Diameter Manhole (0' to 5' in Depth)	7	EA	3,820.00	26,740.00
121	4' Diameter Manhole Extra Depth (Over 5' in Depth)	25	VF	385.00	9,625.00
122	4' Diameter Watertight Manhole (0' to 5' in Depth)	1	EA	5,145.00	5,145.00
123	4' Diameter Watertight Manhole Extra Depth (Over 5' in Depth)	3	VF	1,145.00	3,435.00
124	4' Diameter Drop Manhole (0' to 5' in Depth)	2	EA	5,520.00	11,040.00
125	4' Diameter Drop Manhole Extra Depth (Over 5' in Depth)	13	VF	606.00	7,878.00

Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Amount
126	5' Diameter Manhole (0' to 5' in Depth)	6	EA	5,550.00	33,300.00
127	5' Diameter Manhole Extra Depth (Over 5' in Depth)	54	VF	524.00	28,296.00
128	5' Diameter Drop Manhole (0' to 5' in Depth)	7	EA	5,895.00	41,265.00
129	5' Diameter Drop Manhole Extra Depth (Over 5' in Depth)	37	VF	570.00	21,090.00
130	5' Diameter Watertight Manhole (0' to 5' in Depth)	2	EA	6,605.00	13,210.00
131	5' Diameter Watertight Manhole Extra Depth (Over 5' in Depth)	12	VF	621.00	7,452.00
132	Remove and Replace Existing 18" RCP	109	LF	95.00	10,355.00
133	Remove and Replace Existing 24" RCP	24	LF	184.00	4,416.00
134	Remove/Replace Existing Curb and Gutter	544	LF	25.00	13,600.00
135	Asphalt Pavement Repair - Within Trench	1,047	LF	52.00	54,444.00
136	Concrete Pavement Repair - Within Trench	217	LF	60.00	13,020.00
137	Concrete Driveway Repair (Residential and Commercial) - Within Trench	94	LF	60.00	5,640.00
138	Concrete Flume Repair	5	SY	200.00	1,000.00
139	6" - 12" Waterline Adjustment	20	LF	400.00	8,000.00
140	Clay Dam	2	EA	1,500.00	3,000.00
141	Pre-Construction Video	1	LS	6,000.00	6,000.00
142	CCTV Inspection on Existing Sewer	5,784	LF	4.00	23,136.00
143	Post-Construction CCTV Inspection on Proposed Sewer	5,784	LF	2.00	11,568.00
144	Concrete Encasement	90	LF	55.00	4,950.00
145	Abandon Existing Manhole	3	EA	2,240.00	6,720.00
146	Abandonment Grout for Existing 8" SS	895	LF	9.00	8,055.00
147	Abandonment Grout for Existing 6" SS	60	LF	20.00	1,200.00
148	Concrete Sidewalk Repair (4' Wide)	105	SY	90.00	9,450.00
149	Point Repair on Existing Sanitary Sewer (≤ 12")	1	EA	4,750.00	4,750.00
150	Adjust Existing Water Meter and Service	1	LS	12,000.00	12,000.00

Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Amount
151	Pothole of Existing Williams Gas Line (STA 35+34.33) > 8' Deep	1	LS	6,000.00	6,000.00
152	Pothole of Existing Explorer Gas Line (STA 46+15.79) > 8' Deep	1	LS	6,000.00	6,000.00
153	Hydromulch and Seeding or St. Augustine Sod	9,200	SY	4.00	36,800.00
154	Traffic Control Plan	1	LS	14,580.00	14,580.00
155	Design/Implementation of SWPPP	1	LS	20,250.00	20,250.00
156	By-Pass Pumping	1	LS	32,640.00	32,640.00
157	Remove Existing Trees	1	LS	18,480.00	18,480.00
158	Landscape and Irrigation Allowance	1	LS	\$ 5,000	\$ 5,000
159	Miscellaneous Utility Fund	1	LS	\$ 25,000	\$ 25,000
160	Paving Allowance	1	LS	\$ 5,000	\$ 5,000
161	Pond Dredging	750	CY	27.00	20,250.00
162	Mobilization/Bonds/Insurance	1	LS	77,060.00	77,060.00
Segment 1 Subtotal					1,832,693.00
* Quantity to be adjusted based on actual installation method for "Contractor's Option" Bid Items. Currently, the quantity includes these options as open cut for baseline purposes.					
Segment 1 Alternates (Bid Items 120 to 131, 163) Contractor to Indicate Manhole Material and Provide Alternate Bid					
		Pre-Cast Concrete	Cast-In-Place Concrete		FRP
4' Diameter Manholes (120-125)		X			
5' Diameter Manholes (126-131)		X			
Item No.	Alternate Description	Estimated Quantity	Unit	Unit Price	Extended Amount
163	Corrosion Protection Manhole Liner (4' Diameter Manholes)	10	EA	1,225.00	12,250.00
164	Corrosion Protection Manhole Liner (4' Diameter Manholes - Extra Depth)	41	VF	205.00	8,405.00
165	Corrosion Protection Manhole Liner (5' Diameter Manholes)	15	EA	1,370.00	20,550.00
166	Corrosion Protection Manhole Liner (5' Diameter Manholes - Extra Depth)	103	VF	228.00	23,484.00

Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Amount
Segment 2					
201	30" OD DIPS (DR-17) Grey Pipe (By Pipe Burst Ex. 21")	157	LF	439.00	68,923.00
202	27" SS - Contractor's Option - STA 2+57.34 to 9+10.32	653	LF	153.00	99,909.00
203	27" PVC PS 116 Pipe (By Open Cut - All Depths)	3,357	LF	120.00	402,840.00
204	27" SS - Contractor's Option - STA 28+05 to 28+76	71	LF	325.00	23,288.00
205	27" PS 116 Carrier Pipe in 42" Steel Casing	117	LF	102.00	11,934.00
206	42" Steel Casing (By Other than Open Cut - for 27" Carrier Pipe)	117	LF	780.00	91,260.00
207	8" PVC SDR 26 Pipe (By Open Cut - All Depths)	212	LF	56.00	11,872.00
208	Trench Safety	4,293	LF	1.00	4,293.00
209	Remove Existing Manhole	8	EA	1,665.00	13,320.00
210	5' Diameter Manhole (0' to 5' in Depth)	9	EA	5,785.00	52,065.00
211	5' Diameter Manhole Extra Depth (Over 5' in Depth)	71	VF	500.00	35,500.00
212	5' Diameter Watertight Manhole (0' to 5' in Depth)	10	EA	3,755.00	37,550.00
213	5' Diameter Watertight Manhole Extra Depth (Over 5' in Depth)	116	VF	350.00	40,600.00
214	5' Diameter Watertight Manhole and Vent (0' to 5' in Depth)	4	EA	7,615.00	30,460.00
215	5' Diameter Watertight Manhole and Vent Extra Depth (Over 5' in Depth)	46	VF	507.00	23,322.00
216	5' Diameter Drop Manhole (0' to 5' in Depth)	1	EA	7,790.00	7,790.00
217	5' Diameter Drop Manhole Extra Depth (Over 5' in Depth)	11	VF	519.00	5,709.00
218	6' Diameter Drop Watertight Manhole (0' to 5' in Depth)	1	EA	8,545.00	8,545.00
219	6' Diameter Drop Watertight Manhole Extra Depth (Over 5' in Depth)	12	VF	534.00	6,408.00
220	Remove and Replace Existing 18" RCP	10	LF	338.00	3,380.00
221	Remove and Replace Existing 24" RCP	20	LF	209.00	4,180.00
222	Remove and Replace Existing 28" RCP	10	LF	380.00	3,800.00
223	Remove and Replace Existing 30" RCP	20	LF	236.00	4,720.00
224	Remove/Replace Existing Curb and Gutter	86	LF	30.00	2,580.00
225	Flowable Fill	20	LF	175.00	3,500.00
226	Concrete Sidewalk Repair (4' Wide)	864	LF	25.00	21,600.00
227	Clay Dam	5	EA	1,800.00	9,000.00
228	Plug Existing Sanitary Sewer (<12")	3	EA	2,000.00	6,000.00
229	Plug Existing Sanitary Sewer (12" to 27")	7	EA	2,575.00	18,025.00
230	24" Grouted Rip Rap	407	SY	72.00	29,304.00
231	Pre-Construction Video	1	LS	6,000.00	6,000.00
232	CCTV Inspection on Existing Sewer	4,355	LF	4.00	17,420.00
233	Post-Construction CCTV Inspection on Proposed Sewer	4,293	LF	2.00	8,586.00
234	Abandon Existing Manhole	1	EA	3,000.00	3,000.00
235	Abandonment Grout for Existing 21" SS	100	LF	70.00	7,000.00
236	Abandonment Grout for Existing 10" SS	250	LF	10.00	2,500.00
237	Point Repair on Existing 27" Sanitary Sewer	1	EA	6,000.00	6,000.00
238	Hydromulch and Seeding or St. Augustine Sod	14,296	SY	4.00	57,184.00
239	Traffic Control Plan	1	LS	21,300.00	21,300.00
240	Design/Implementation of SWPPP	1	LS	33,960.00	33,960.00

Item No.	Description	Estimated Quantity	Unit	Unit Price	Extended Amount
241	By-Pass Pumping	1	LS	31,920.00	31,920.00
242	Landscape and Irrigation Allowance	1	LS	\$ 10,000	\$ 10,000
243	Miscellaneous Utility Fund	1	LS	\$ 25,000	\$ 25,000
244	Paving Allowance	1	LS	\$ 5,000	\$ 5,000
245	Mobilization/Bonds/Insurance	1	LS	64,673.00	64,673.00
Segment 2 Subtotal					1,381,220.00
* Quantity to be adjusted based on actual installation method for "Contractor's Option" Bid Items. Currently, the quantity includes these options as open cut for baseline purposes.					
Segment 2 Alternates (Bid Items 202 to 205, 210 to 219, 246) Contractor to Indicate Manhole & Pipe Material and Provide Alternate Bid					
		PVC (PS 116)		FRP (SN 46)	
27" SS - Contractor's Option - STA 2+57.34 to 9+10.32 (202)		X			
27" SS - Contractor's Option - STA 28+05 to 28+76 (204)		X			
27" SS - Contractor's Option - STA 28+05 to 28+76 (205)		X			
27" PS 116 Carrier Pipe in 42" Steel Casing (206)		X			
		Pre-Cast Concrete	Cast-In-Place Concrete		FRP
5' Diameter Manholes (210-217)		X			
6' Diameter Manholes (218-219)		X			
Item No.	Alternate Description	Estimated Quantity	Unit	Unit Price	Extended Amount
246	Corrosion Protection Manhole Liner (5' Diameter Manholes)	24	EA	1,225.00	29,400.00
247	Corrosion Protection Manhole Liner (5' Diameter Manholes - Extra Depth)	244	VF	204.00	49,776.00
248	Corrosion Protection Manhole Liner (6' Diameter Manholes)	1	EA	1,370.00	1,370.00
249	Corrosion Protection Manhole Liner (6' Diameter Manholes - Extra Depth)	12	VF	228.00	2,736.00
A	TOTAL BASE BID AMOUNT - SEGMENT 1				1,832,693.00
B	TOTAL BASE BID AMOUNT - SEGMENT 2				1,381,220.00
C	Add (+) or Deduct (-)**				
D	TOTAL AMOUNT BID (A + B + C)				3,213,913.00

** Provision is made for Bidder to include an addition or deduction in his bid, if he wishes, to reflect any last minute adjustments in the total amount bid. Contractor to specify which bid items shall be adjusted. Adjustments will be based on a unit basis (add/deduct divided by total units).

00 42 23.02 CONTRACTOR COMPLIANCE TO STATE LAW

Chapter 2252 of the Texas Government Code applies to the award of government contract to nonresident Bidders. This law provides that:

“A governmental entity may not award a governmental contract to a nonresident bidder unless the nonresident underbids the lowest bid submitted by a responsible resident bidder by an amount that is not less than the amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in the state in which the nonresident's principal place of business is located.”

“Nonresident bidder” refers to a person who is not a resident of Texas

“Resident bidder” refers to a person whose principal place of business is in this state, including a contractor whose ultimate parent company or majority owner has its principal place of business in this state.

Check the statement that is correct for Bidder.

☐ Nonresident bidders in _____ (give state), our principal place of business, are required to be _____ percent lower than resident bidders by State law. A copy of the statute is attached.

☐ Nonresident bidders in _____ (give state), our principal place of business, are not required to underbid resident bidders.

☒ Our principal place of business or corporate offices are in the State of Texas.

Contractor Name: ANA Site Construction, LLC
(typed or printed)

By: Adam Darrach
(signature -- attach evidence of authority to sign)

Name: Adam Darrach
(typed or printed)

Title: Operations Manager
(typed or printed)

Business address: 10100 Horseshoe Nail Rd, Pilot Point, Texas 76258

Phone: 817-751-4975 Email: Adam@ANAsitelc.com

END OF SECTION

00 42 23.03 CONTRACTOR COMPLIANCE TO TEXAS SALES TAX CODE

Comply with all requirements of the Texas Sales Tax Code. The Contractor hereby certifies that the Contract Amount is divided as follows:

Material permanently incorporated into the Project and resold to the Owner as defined in Tax Code.

\$ 979,586.00

All other charges and costs

\$ 2,234,327.00

Total (Total must equal the Contract Price)

\$ 3,213,913.00

Contractor Name: ANA Site Construction, LLC

(typed or printed)

By:

Adam Darrach

(signature -- attach evidence of authority to sign)

Name: Adam Darrach

(typed or printed)

Title:

Operations Manager

(typed or printed)

Business address: 10100 Horseshoe Nail Rd, Pilot Point, Texas 76258

Phone: 817-751-4975

Email: Adam@ANAsitellc.com

Execute this form at time of execution of Contract and make a part of the Contract.

Notes:

1. The Total Amount of Bid for Materials and Services must equal the sum of the Total Amount Bid for Materials and the Total Amount Bid for Services as well as the sum of all individual bid items.
2. Materials are those items which are tax exempt and are physically incorporated into the facilities constructed for the Owner. Materials include, but are not limited to, purchased items such as pipe, embedment, concrete, manholes, asphalt, road base, machinery, and equipment, etc.
3. Services are those items which are not tax exempt and are used by the Contractor but are not physically incorporated into the Owner's facilities and/or items that are consumed by construction. Services include, but are not limited to, supplies, tools, concrete forms, scaffolding, temporary buildings, the rental of equipment, skill, and labor, etc.

END OF SECTION

00 43 43 WAGE RATES

1.00 GENERAL

1.01 PAYMENT OF PREVAILING WAGE RATES

- A. Contractor and any Subcontractors employed on this Project shall pay not less than the rates established by the Owner as required by Texas Government Code Chapter 2258.

1.02 RECORDS

- A. In accordance with Tex. Gov't Code §2258.024, the Contractor and its Subcontractors, if any, shall keep a record showing:
 - 1. The name and occupation of each worker employed by the Contractor or Subcontractor in the construction of the Work; and
 - 2. The actual per diem wages paid to each worker.
- B. The record shall be open at all reasonable hours to inspection by the officers and agents of the Owner.

1.03 LIABILITY; PENALTY; CRIMINAL OFFENSE

- A. Tex. Gov't Code §2258.003 – Liability: An officer, agent, or employee of the Owner is not liable in a civil action for any act or omission implementing or enforcing Chapter 2258 unless the action was made in bad faith.
- B. Tex. Gov't Code §2258.053(b) – Penalty: Any Contractor or Subcontractor who violates the requirements of Chapter 2258, shall pay to the Owner, on whose behalf the Contract is made, \$60 for each worker employed or each calendar day or part of the day that the worker is paid less than the wage rates stipulated in the Contract.
- C. Tex. Gov't Code §2258.058 – Criminal Offense:
 - 1. An officer, agent, or representative of the Owner commits an offense if the person willfully violates or does not comply with a provision of Chapter 2258.
 - 2. Any Contractor or Subcontractor, or an agent or representative of the Contractor or Subcontractor, commits an offense if the person violates Tex. Gov't Code §2258.024.
 - 3. An offense is punishable by:
 - a. A fine not to exceed \$500;
 - b. Confinement in jail for a term not to exceed six months; or
 - c. Both a fine and confinement.

1.04 PREVAILING WAGE RATES

- A. The minimum rates for various labor classifications as established by the Owner are as shown in Appendix A.

END OF SECTION

00 45 16 STATEMENT OF QUALIFICATIONS

1.00 GENERAL

- 1.01 The Statement of Qualifications must be submitted by the apparent low Bidder within 5 calendar days of the bid opening and include, as a minimum, the information as described in this section of the Contract Documents. Failure to submit the required information in the statement of qualifications may result in the Owner considering the Bid non-responsive and result in rejection of the Bid by the Owner. Bidders may be required to provide supplemental information if requested by the Owner to clarify, enhance or supplement the information provided in the statement of qualifications.
- 1.02 Bidders must provide the information requested in the Qualifications Statement using the forms attached to this Section. A copy of these forms may be provided in Microsoft Word to assist with the preparation of the Statement of Qualifications. Information in these forms must be provided completely and in detail. Information that cannot be totally incorporated in the form may be included in an appendix to the form. This appendix must be clearly referenced by appendix number in the form, and the appended material must include the appendix number on every sheet of the appendix. The appendix must include only the information that responds to the question or item number to which the appended information applies.
- 1.03 Bidders may provide supplemental information to the Statement of Qualifications using AIA, AGC or other industry standard statement of qualification forms and/or Bidders may submit additional information such as organizational brochures or other marketing information to help demonstrate the ability to provide best value to the Owner. This information may not be submitted as a substitute to the information specifically requested in this Section, or in the Statement of Qualifications forms. If this information is included as an appendix to the information requested in Paragraph 1.02 above, the reference must include the specific paragraph or section that applies to that question or item.

Contractor's General Information

Organization doing business as	ANA Site Construction, LLC		
Business address of principle office	10100 Horseshoe Nail Rd		
	Pilot Point, TX 76258		
Telephone numbers	817-751-4975		
Main number			
Fax number			
Website address			
Form of business (check one)	☒ A corporation	☐ A partnership	☐ An individual
If a corporation			
Date of incorporation	12/13/2016		
State of incorporation	Texas		
Chief Executive Manager's name	Adam Darrach		
President's name	Adam Darrach		
Vice President's name(s)			
Secretary's name			
Treasurer's name			
If a Partnership			
Date of organization			
State whether partnership is general or limited			
If an Individual			
Name			
Business address			
Identify all individuals not previously named which exert a significant amount of business control over the organization			
Indicators of organization size			
Average number of current full time employees	19	Average estimate of revenue for the current year	\$9,000,000

Contractor's Organizational Experience

Organization doing business as	ANA Site Construction, LLC		
Business address of regional office	10100 Horseshoe Nail Rd		
	Pilot Point, Texas 76258		
Name of regional office manager	Adam Darrach		
Telephone numbers	817-751-4975		
Main number			
Fax number			
Website address			
Organization History			
List of names that this organization currently, has or anticipates operating under over the history of the organization, including the names of related companies presently doing business:			
Names of organization		From date	To date
N/A			
List of companies, firms or organizations that own any part of the organization.			
Name of companies, firms or organization.			Percent ownership
Construction Experience			
Years experience in projects similar to the proposed project:			
As a general contractor	3	As a joint venture partner	
Has this or a predecessor organization ever defaulted on a project or failed to complete any work awarded to it?			NO
If yes provide full details in a separate attachment. See attachment No.			
Has this or a predecessor organization been released from a bid or proposal in the past ten years?			NO
If yes provide full details in a separate attachment. See attachment No.			
Has this or a predecessor organization ever been disqualification as a bidder or proposer by any local, state, or federal agency within the last 5 years?			NO
If yes provide full details in a separate attachment. See attachment No.			
Is this organization or your proposed surety currently in any litigation or contemplating litigation?			NO
If yes provide full details in a separate attachment. See attachment No.			
Has this or a predecessor organization ever refused to construct or refused to provide materials defined in the contract documents?			NO
If yes provide full details in a separate attachment. See attachment No.			

Contractor's Proposed Key Personnel

Organization doing business as:	ANA Site Construction, LLC	
Proposed project organization		
Provide a brief description of the managerial structure of the organization and illustrate with an organizational chart. Include the title and names of key personnel. Include this chart as an attachment to this description. See attachment No.		
Operations Manager - Adam Darrach Field Operations Manager - Nelson Amaya General Superintendent - Cristian Rodriguez Superintendents - Armando Velasquez, Melquicedet Membreno, Jacinto Olvera		
Provide a brief description of the managerial structure proposed for this project and illustrate with an organizational chart. Include the title and names of proposed key personnel and alternates. Include this chart as an attachment to this description. See attachment No.		
Project Manager - Adam Darrach Superintendent - Nelson Amaya Site Superintendent - Cristian Rodriguez		
Experience of Key Personnel		
Provide information on the key personnel proposed for this project that will provide the following key functions. Provide information for candidates for each of these positions on the pages for each of these key personnel. Also provide biographical information for each primary and alternate candidate as an attachment. The biographical information must include the following as a minimum: technical experience, managerial experience, education and formal training, work history which describes project experience, including the roles and responsibilities for each assignment, and primary language. Additional information highlighting experience which makes them the best candidate for the assignment should also be included.		
Role	Primary candidate	Alternate candidate
Project manager	Adam Darrach	Adam Darrach
Project superintendent	Nelson Amaya	Cristian Rodriguez
Project safety manager	Adam Darrach	
Quality control manager	Adam Darrach	
If key personnel are to fulfill more than one of the roles listed above, provide a written narrative describing how much time will be devoted to each function, their qualifications to fulfill each role and the percentage of their time that will be devoted to each role. If the individual is not to be devoted solely to this project, indicate how time it to be divided between this project and their other assignments.		

Proposed Project Managers

Organization doing business as		ANA Site Construction, LLC	
Primary candidate			
Name of individual		Adam Darrach	
Years of experience as project manager		8	
Years of experience with this organization		3	
Number of similar projects as project manager		20	
Number of similar projects in other positions		45	
Current project assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Bakers Branch Interceptor Ph II		20	June, 2019
Gravity Sewer Main		10	March, 2019
Reference contact information (listing names indicates approval to contacting the named individuals as a reference)			
Name	Justin Naylor	Name	Chad Marbut
Title/ position	P.E., CFM	Title/ position	P.E.
Organization	City of North Richland Hills	Organization	City of Weatherford
Telephone	817-427-6405	Telephone	817-598-4006
Email	JNaylor@nrhtx.com	Email	Cmarbut@weatherfordtx.gov
Project	Utility Relocations	Project	Upper Holland Regional
Candidate role on project	Engineer / Project Manager	Candidates role on project	Engineer / Project Manager
Alternate candidate			
Name of individual		N/A	
Years of experience as project manager			
Years of experience with this organization			
Number of similar projects as project manager			
Number of similar projects in other positions			
Current project assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference contact information (listing names indicates approval to contacting the named individuals as a reference)			
Name		Name	
Title/ position		Title/ position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate role on project		Candidate role on project	

Proposed Project Superintendent

Organization doing business as		ANA Site Construction	
Primary candidate			
Name of individual		Nelson Amaya	
Years of experience as project superintendent		20	
Years of experience with this organization		3	
Number of similar projects as superintendent		Over 100	
Number of similar projects in other positions		Over 100	
Current project assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Bakers Branch Interceptor PH II		10	June, 2019
Gravity Sewer Main		5	March, 2019
Reference contact information (listing names indicates approval to contacting the named individuals as a reference)			
Name	Jeff McClelland	Name	Bruce Bannister
Title/ position	Inspector	Title/ position	Inspector
Organization	City of Celina	Organization	Town of Little Elm
Telephone		Telephone	
Email	JMcClelland@celina-tx.gov	Email	Bbannister@littleelm.org
Project	Water Systems Improvements	Project	McCord Park Phase 2
Candidate role on project	Inspector	Candidate role on project	Inspector
Alternate candidate			
Name of individual		Cristian Amaya	
Years of experience as project superintendent		4	
Years of experience with this organization		3	
Number of similar projects as superintendent		6	
Number of similar projects in other positions		8	
Current project assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Gravity Sewer Main		100	March, 2019
Reference contact information (listing names indicates approval to contacting the named individuals as a reference)			
Name	Same as Primary	Name	Same as Primary
Title/ position		Title/ position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate role on project		Candidate role on project	

Proposed Project Safety Officer

Organization doing business as		ANA Site Construction, LLC	
Primary candidate			
Name of individual		Adam Darrach	
Years of experience as project safety manager		5	
Years of experience with this organization		3	
Number of similar projects as safety manager		20	
Number of similar projects in other positions		45	
Current project assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Same as Proposed Project Manager			
Reference contact information (listing names indicates approval to contacting the named individuals as a reference)			
Name		Name	
Title/ position		Title/position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate role on project		Candidate role on project	
Alternate candidate			
Name of individual			
Years of experience as project safety manager			
Years of experience with this organization			
Number of similar projects as safety manager			
Number of similar projects in other positions			
Current project assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference contact information (listing names indicates approval to contacting the named individuals as a reference)			
Name		Name	
Title/ position		Title/ position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate role on project		Candidate role on project	

Proposed Project Quality Control Manager

Organization doing business as		ANA Site Construction, LLC	
Primary candidate			
Name of individual		Adam Darrach	
Years of experience as quality control manager		3	
Years of experience with this organization		3	
Number of similar projects as quality manager		20	
Number of similar projects in other positions		45	
Current project assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Same as Proposed Project Manager			
Reference contact information (listing names indicates approval to contacting the named individuals as a reference)			
Name		Name	
Title/ position		Title/ position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate role on project		Candidate role on project	
Alternate candidate			
Name of individual			
Years of experience as quality control manager			
Years of experience with this organization			
Number of similar projects as quality manager			
Number of similar projects in other positions			
Current project assignments			
Name of assignment		Percent of time used for this project	Estimated project completion date
Reference contact information (listing names indicates approval to contacting the named individuals as a reference)			
Name		Name	
Title/ Position		Title/ Position	
Organization		Organization	
Telephone		Telephone	
Email		Email	
Project		Project	
Candidate role on Project		Candidate role on Project	

Contractor's Project Experience and Resources

Organization doing business as:	ANA Site Construction, LLC			
Projects				
Provide a list of major projects that are currently underway, or have been completed within the last ten years on Attachment A.				
Provide a completed Project Information form (Attachment B) for projects that have been completed in the last five years which specifically illustrate the organizations capability to provide best value to the Owner for this project.				
Include a completed Project Information form (Attachment B) for projects which illustrate the experience of the proposed key personnel.				
Provide a description of your organizations approach to completing this project to provide best value for the Owner, including a description of your approach in the following areas:				
1. Contract administration 2. Management of subcontractor and suppliers 3. Time management 4. Cost control 5. Quality management 6. Project site safety 7. Managing changes to the project 8. Managing equipment 9. Meeting HUB / MWBE Participation Goal				
Equipment				
Provide a list of major equipment proposed for use on this project. Attach additional information if necessary				
Equipment item	Primary use on project	Own	Will buy	Lease
Case 621	Wheel Loader	X		
Takeuchi TB290	Excavator			X
Takeuchi TB290	Excavator			X
Division of work between organization and subcontractor				
What work will the organization complete using its own resources?				
Pipe Installation, Manhole Installation, Trench Safety, Pavement removal				
What work does the organization propose to subcontract on this project?				
Bores, Pavement Replacement				

Contractor's Subcontractors and Suppliers

Organization doing business as:		ANA Site Construction, LLC		
Project subcontractors				
Provide a list of subcontractors that will provide more than 10 percent of the work (based on contract amounts)				
Name	Work to be provided	Est. percent of contract	HUB/MWBE firm	
Outlaw Directional	Bore	8		
No-Digtec	Pipe Bursting	9		
Provide information on the proposed key personnel, project experience and a description of past relationship and work experience for each subcontractor listed above using the Project Information forms.				
Suppliers				
Provide a list of major equipment or materials proposed for use on this project. Attach additional information if necessary.				
Supplier name	Equipment / material provided	Furnish only	Furnish and install	HUB/MWBE firm
Ferguson Waterworks	Utility Materials	X		
Burton Trucking	Aggregate	X		

Current Projects and Project Completed within the last 10 Years

Project owner	Wylie Northeast SUD			Project name	Gravity Sewer Main	
General description of project: 12" Sanitary Sewer Installation w/ Associated Manholes						
Project cost 1,010,045				Date project completed		In progress 03/2019
Key project personnel		Project manager	Project superintendent		Safety manager	Quality control manager
Name		Adam Darrach	Cristian Rodriguez		Adam Darrach	Adam Darrach
Reference contact information (listing names indicates approval to contacting the named individuals as a reference)						
	Name	Title/ position	Organization		Telephone	Email
Owner	Chester Adams	Manager	Wylie NE SUD		972-442-2075	Chester@Wylienortheastwater.com
Designer	Jacob Dupuis	Engineer	DBI Consultants		972-784-7777	Jacob@dbiconsultants.com
Construction manager	ANA Site Construction					
Project owner	City of North Richland Hills			Project name	FM 1938/Davis & Mid-Cities Intersection Utility Relocations	
General description of project: 8"-16" Water Relocations						
Project cost \$500,321.14				Date project completed		11/2017
Key project personnel		Project manager	Project superintendent		Safety manager	Quality control manager
Name		Adam Darrach	Cristian Rodriguez		Adam Darrach	Adam Darrach
Reference contact information (listing names indicates approval to contacting the named individuals as a reference)						
	Name	Title/ position	Organization		Telephone	Email
Owner	Justin Naylor	Engineer	City of NRH		817-427-6405	Jnaylor@nrhtx.com
Designer	Aaron Conine	Engineer	Freese & Nichols		817-735-7300	Aaron.Conine@freese.com
Construction manager	ANA Site Construction					
Project owner	City of Weatherford			Project name	Upper Holland Regional Detention	
General description of project: 12"-60" Storm Sewer Installation, with associated Structures						
Project cost		710,344.50		Date project completed		07/2018
Key project personnel		Project manager	Project superintendent		Safety manager	Quality control manager
Name		Adam Darrach	Cristian Rodriguez		Adam Darrach	Adam Darrach
Reference contact information (listing names indicates approval to contacting the named individuals as a reference)						
	Name	Title/ position	Organization		Telephone	Email
Owner	Chad Marbut	Engineer	City of Weatherford		817-598-4006	Cmarbut@weatherfordtx.gov
Designer	Shannon Nave	Engineer	Baird, Hampton, Brown		817-596-7575	
Construction manager	ANA Site Construction					

Project Information

Project owner	City of Weatherford		Project name	Upper Holland Regional Detention		
General description of project 12"-60" Diameter Storm Sewer Installation with Associated Structures						
Project Budget and Schedule Performance						
Budget history			Schedule performance			
	Amount	% of Bid Amount		Date	Days	
Bid			Notice to Proceed	02/26/2018	120	
Change orders			Contract Substantial Completion date at Notice to Proceed	05/27/2018	90	
Owner enhancements			Contract final completion date at Notice to Proceed	06/26/2018	120	
Unforeseen conditions			Change Order authorized Substantial Completion date	N/A		
Design issues			Change Order authorized final completion date	N/A		
Total			Actual / estimated Substantial Completion date	05/12/2018	76	
Final cost			Actual / estimated final completion date	06/15/2018	110	
Key Project Personnel						
	Project Manager		Project Superintendent	Safety Manager	Quality Control Manager	
Name	Adam Darrach		Cristian Rodriguez	Adam Darrach	Adam Darrach	
Percentage of time devoted to the project.	25		100	50	50	
Proposed for this project.	50		100	75	75	
Did Individual start and complete the project?	YES		YES	YES	YES	
If not, who started or completed the project in their place.						
Reason for change.						
Reference contact information (listing names indicates approval to contacting the named individuals as a reference)						
	Name	Title/ position	Organization	Telephone	Email	
Owner	Chad Marbut	Engineer	City of Weatherford	817-598-4006	Cmarbut@weatherfordtx.gov	
Designer	Shannon Nave	Enginner	Baird, Hampton, Brown	817-596-7575		
Construction Manager	ANA Site Construction					
Surety			Developers Surety & Indemnity		Russ@Baldwinagency.com	
Issues / disputes resolved or pending resolution by arbitration, litigation or dispute review boards						
Number of issues resolved:	N/A	Total amount involved in resolved issues:	N/A	Number of issues pending:	N/A	Total amount involved in resolved Issues:
						N/A

Affidavits

One of the following four affidavits shall be executed and provided with this information. The individual signing the affidavit shall attach evidence of their authority to bind the organization to an agreement.

AFFIDAVIT FOR CORPORATION

State Texas) §

County of Denton) §

Adam Darrach, being duly sworn deposes and says
(Name)

that they are Operations Manager of the
(Title)

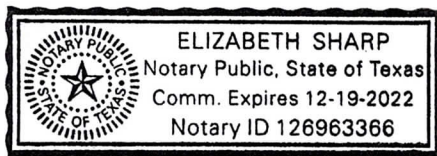
ANA Site Construction, LLC corporation submitting the foregoing
qualification form and related information; have read such documents; and that such documents are
true and correct and contain no material misrepresentations; and that they are authorized to make this
affidavit on behalf of the Corporation.

[Signature]
(Signature)

Signed and sworn to me before this 7th day of February, 2019.

[Signature]
(Notary Public)

My commission expires: 12-19-22



Secretary of State
P.O. Box 13697
Austin, TX 78711-3697
FAX: 512/463-5709



**Certificate of Formation
Limited Liability Company**

Filing Fee: \$300

Filed in the Office of the
Secretary of State of Texas
Filing #: 802602036 12/13/2016
Document #: 704069350002
Image Generated Electronically
for Web Filing

Article 1 - Entity Name and Type

The filing entity being formed is a limited liability company. The name of the entity is:

ANA Site Construction, LLC

Article 2 – Registered Agent and Registered Office

☒ A. The initial registered agent is an organization (cannot be company named above) by the name of:

United States Corporation Agents, Inc.

OR

☐ B. The initial registered agent is an individual resident of the state whose name is set forth below:

C. The business address of the registered agent and the registered office address is:

Street Address:

9900 Spectrum Drive Austin TX 78717

Consent of Registered Agent

☐ A. A copy of the consent of registered agent is attached.

OR

☒ B. The consent of the registered agent is maintained by the entity.

Article 3 - Governing Authority

☐ A. The limited liability company is to be managed by managers.

OR

☒ B. The limited liability company will not have managers. Management of the company is reserved to the members.

The names and addresses of the governing persons are set forth below:

Managing Member 1: **Adam Darrach**

Title: **Managing Member**

Address: **10100 Horsehoe Nail Rd. Pilot Point TX, USA 76258**

Article 4 - Purpose

The purpose for which the company is organized is for the transaction of any and all lawful business for which limited liability companies may be organized under the Texas Business Organizations Code.

Supplemental Provisions / Information

STANDARD FORM OF CONSTRUCTION AGREEMENT

THE STATE OF TEXAS §
 §
COUNTY OF TARRANT §

THIS AGREEMENT is entered into this the ____ day of _____, 20____, by and between the CITY NORTH RICHLAND HILLLS, a municipal corporation, of the County of Tarrant and State of Texas, hereinafter called "OWNER" and _____ of the City of _____, County of _____ and State of _____ hereinafter called "CONTRACTOR."

OWNER and CONTRACTOR in consideration of the mutual covenants contained in this Agreement, agree as follows:

ARTICLE 1. WORK.

CONTRACTOR covenants and agrees to perform the Work in every detail, in a good and first-class workmanlike manner as specified and indicated in the Contract Documents, of which are incorporated in this Agreement in their entirety as if they were herein set out at length written word for word. The CONTRACTOR shall furnish all labor, materials, tools and equipment required to perform and complete the Work in strict accordance with these Contract Documents. The Work is described as follows:

WALKER BRANCH INTERCEPTOR PROJECT

ARTICLE 2. CONTRACT PRICE.

OWNER agrees to pay CONTRACTOR for completion of the Work in accordance with the Contract Documents, the price or prices shown in the bidder's proposal, which total the following amount:

Three million, three hundred sixty-two thousand, three hundred eighty-nine dollars and seventy six cents (\$ 3,362,389.76) ("**Contract Price**").

ARTICLE 3. CONTRACT TIME / LIQUIDATED DAMAGES.

Unless otherwise stated in this agreement, **time shall be considered of the essence.**

- a. When **time is of** the essence, the CONTRACTOR shall be liable for failure to deliver or delay in delivery occasioned by and including without limitation strikes, lock-outs, inability of obtaining material or shopping space, breakdowns, delays of carriers or suppliers, and preexisting governmental acts and regulations of the Federal and State governments or any subdivision thereof, unless such governmental acts and regulations affecting delivery could not be found, recognized, or discovered by due diligence on the part of the CONTRACTOR prior to submission of his/her bid and City Council's acceptance thereof.
- b. When **time is not of** the essence, this agreement shall be inoperative during such period of time that aforesaid delivery or acceptance may be rendered impossible by reason of fire, strike, Acts of God, or government regulation. Provided, however, to the extent that the CONTRACTOR has any commercially reasonable alternative method of performing this contract by purchase on the market or otherwise, he/she shall not be freed of his/her obligation hereunder by this clause, even though the goods intended for this contract were destroyed or their delivery delayed because of any event described above.
- c. **As time is of the essence on this contract**, CONTRACTOR agrees to commence work under this contract within ten (10) days from the date specified in the "Notice to Proceed" and to totally complete the Work within 240 consecutive Calendar Days after the date specified in the "Notice to Proceed", subject to such extensions of time as noted below or as indicated in the Special Provisions.
- d. **Milestones** included in this contract are as follows:
 1. Completion of Segment 1 – Segment 1 must be completed within 180 calendar days of the Notice to Proceed date. Segment 1 shall mean the work to be performed from Mid-Cities Blvd to Smithfield Rd, more specifically described in the Bidder's Proposal, ANA Site Construction, LLC Bid Package For Walker Branch Interceptor Improvements, Segment 1 and 2, "Bid Form Exhibit A."
 2. For purposes of this section, to be considered completed, Segment 1 must
 - (i) be in place;
 - (ii) be functional;
 - (iii) have passed all required TCEQ tests;
 - (iv) all surfaces must be restored, AND
 - (v) the post-construction video must be accepted by OWNER.
 3. In the event that this milestone is not met, OWNER shall have the right to terminate the contract upon thirty (30) days' written notice to CONTRACTOR, if CONTRACTOR does not complete all surface restoration and meet the milestone to the OWNER's satisfaction within the 30-day cure period.

Calendar Days is defined as any day of the week or month; no days being excepted, such as, Saturdays, Sundays, holidays and inclement weather days. Counting of contract time will only be stopped when the Owner issues a written notice stating this fact, or when the project is noted as substantially complete by written notice from the Owner. OWNER shall determine when such action is necessary.

Extensions of time due to weather delays shall be determined in accordance with the following formula:

$$E = R - P \quad \text{where } P \text{ is greater than or equal to } R, \text{ and}$$

E = Extra Precipitation Days

P = Average Precipitation Days

R = Total Precipitation Days

Average Precipitation Days (P) is defined as a day of rain, sleet, hail, snow or any combination thereof, and shall be based upon the average precipitation for each month of the year as defined in the Local Climatological Data summaries issued by the National Climatic Data Center in Asheville, North Carolina, and for this contract shall be as follows:

Average Precipitation

Month	Jan	Feb	Mar	Apr	May	June
Number of Days	6	6	7	7	8	6

Month	July	Aug	Sept	Oct	Nov	Dec
Number of Days	4	4	6	6	6	6

Partial months shall be prorated uniformly for the entire month and the sum of all the months used will be rounded to the nearest whole number. This number shall be P.

Total Precipitation Days (R) is defined as a day of rain, sleet, hail, snow or any combination thereof, if determined by the Owner's Project Representative that the Contractor's construction cannot progress substantially due to precipitation and thus be put in the Daily Inspection Logs as a precipitation day. The sum of all precipitation says shall be R.

The total number of Extra Precipitation Days (E) shall be granted to the Contractor as extension of time due to weather delays, and no additional time due to drying time for saturated soil will be allowed. This contract time is both multi-tiered and cumulative.

Liquidated Damages. The CONTRACTOR further agrees to pay the following as liquidated damages:

1. \$500 per Calendar Day for any unfinished work beyond 270 consecutive calendar days after the "Notice to Proceed" issuance date. This rate shall continue until such time that the Project is complete and accepted by the OWNER.
2. It is understood between the parties hereto that these sums shall be treated as liquidated damages and not as a penalty, and the OWNER may withhold from the CONTRACTOR's compensation such sums as liquidated damages.

ARTICLE 4. PARTIAL PAYMENT.

OWNER shall make payments to the CONTRACTOR in the following manner. On or about the first of each month, the OWNER, or the OWNER's Authorized Representative, will make accurate estimates of the value, based on contract prices, of the work done and materials incorporated in the work and of materials suitably stored at the site during the preceding calendar month. The CONTRACTOR shall furnish to the OWNER, or the OWNER's Representative, such detailed information as the OWNER may request to aid OWNER as a guide in the preparation of the monthly estimate.

Within the following thirty (30) days, OWNER shall make partial payments to the CONTRACTOR for work performed during the preceding calendar month as estimated by the OWNER or OWNER's Representative. Ten percent (10%) of each estimate shall be retained by the OWNER until final completion and acceptance of all work covered by the Contract for contracts less than four hundred thousand dollars (\$ 400,000). Five percent (5%) of each estimate shall be retained by the OWNER until final completion and acceptance of all work covered by the Contract for contracts greater than four hundred thousand dollars (\$ 400,000). Upon completion and acceptance of all work in compliance with the Contract, the OWNER shall, within thirty (30) days, pay the CONTRACTOR the balance due under the terms and conditions of the Contract.

It is understood that the monthly estimates shall be approximate only, and all monthly estimates and partial payments shall be subject to correction in the estimate rendered following the discovery of an error in any previous estimate, and such estimate shall not in any respect be taken as an admission of the OWNER of the amount of work done or of its quality or sufficiency nor as an acceptance of the work or the release of the CONTRACTOR of any of its responsibility under the Contract.

ARTICLE 5. DISCRIMINATION.

The CONTRACTOR agrees, in connection with the performance of work under this contract as follows:

- a. The CONTRACTOR will not discriminate against any employee or applicant for employment because of race, creed, color, sex, religion, national origin or ancestry. Such actions shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruiting or recruitment, advertising, layoff, termination, rates of pay or other forms of compensation and selection for training, including apprenticeship.
- b. The CONTRACTOR agrees to include this non-discrimination clause in any subcontracts connected with the performance of this agreement.
- c. In the event of the CONTRACTOR's non-compliance with the above non-discrimination clause, the contract may be canceled or terminated by the OWNER. The CONTRACTOR may be declared by the OWNER to be ineligible for future contracts with the OWNER, until satisfactory proof of intent to comply shall be made by the CONTRACTOR.
- d. The OWNER shall be provided a list of subcontractors who are to be paid \$10,000 or more. The CONTRACTOR must ensure that such subcontractors meet the requirements as outlined in Title VI of the Civil Rights Act of 1964 (42 USC 2000d et seq), execute required assurances and provide the OWNER a copy of the signed assurance of all such subcontractors prior to final payment. In the event of a claim of \$10,000 or more against the CONTRACTOR by a subcontractor under this section, no further payment shall be processed unless and until each required subcontractor assurance is provided the OWNER.

ARTICLE 6. ENTIRE CONTRACT.

This Contract and Agreement contains the entire understanding and agreement of the parties upon the subject matter hereof. There is no agreement, oral or otherwise, which is not set forth in writing as part of this Agreement or the Contract Documents.

ARTICLE 7. MODIFICATION.

This contract cannot be modified except by a writing signed by both parties.

ARTICLE 8. VARIABLES IN COST.

The parties hereto assume and understand that the variables in the CONTRACTOR's cost of performance may fluctuate; consequently, the parties hereto agree that any fluctuations in the CONTRACTOR's costs will in no way alter the CONTRACTOR's obligations under this contract nor excuse nonperformance or delay on his/her part.

ARTICLE 9. VENUE.

This contract shall be governed by the laws of the State of Texas. Venue for any court proceedings shall be in Tarrant County, Texas.

ARTICLE 10. CONTRACT DOCUMENTS.

Documents Listed. The Contract Documents which comprise the entire agreement between OWNER and CONTRACTOR for the performance of and payment for the Work, consist of the following:

- (1) This Agreement
- (2) Addendum(s)
- (3) "Notice to Bidders" advertisement
- (4) Bidder's Proposal
- (5) Special Instruction to Bidders
- (6) Performance, Payment and Maintenance Bonds
- (7) Certification of Insurance
- (8) Notice to Proceed
- (9) City of North Richland Hills' Public Works Design Manual
- (10) Specifications, forms and documents listed in Section 00 01 10 "Table of Contents"
- (11) Drawings as listed in the Section 00 01 15 "List of Drawings" or a drawing that is incorporated into the Contract upon agreement of the parties
- (12) Special Material and/or Equipment Specifications
- (13) Special Material and/or Equipment Drawings

(14) "Public Works Construction Standards - North Central Texas" adopted by the North Central Texas Council of Governments (NCTCOG), November 2017 Edition

(15) North Central Texas Council of Government references

ARTICLE 11. DEFAULT

OWNER may declare CONTRACTOR in default of this Contract in the event Contractor fails to comply with the terms and conditions set forth in this Contract or any of the Contract Documents.

ARTICLE 12. SUBCONTRACTORS

Any subcontractor who furnishes labor or materials to fulfill an obligation to CONTRACTOR under this Contract or who performs all or part of the work required by this Contract, must comply with all notice and filing requirements of Texas Property Code, Chapter 53 in order to perfect a mechanic's, contractor's or materialman's lien. If a subcontractor complies with Chapter 53 of the Texas Property Code, Owner shall be authorized to withhold payment from the CONTRACTOR for payment of the claim. Owner shall release any such payment to the CONTRACTOR upon written notice and sufficient documentation to Owner from subcontractor that the claim has been paid or otherwise settled.

IN TESTIMONY WHEREOF, the CITY OF NORTH RICHLAND HILLS has caused this instrument to be signed in its corporate name, and on its behalf by the Mayor, or City Manager, duly authorized to execute this instrument by action of the City Council and _____ a corporation, a partnership, an individual acting

(Name of Contractor)

("X" out the inappropriate wording)

by and through its duly authorized officials, thereby binding themselves for the faithful and full performance of the terms and provisions of this Agreement.

City of North Richland Hills

OWNER

CONTRACTOR

By: _____
City Manager

By: _____

Title: _____

Attest: _____

Attest: _____

Title: _____

Title: _____

CONTRACTOR'S PERFORMANCE BOND

THE STATE OF _____ |
COUNTY OF _____ | KNOW ALL MEN BY THESE PRESENTS

That, _____ a _____,
(Name of Contractor) (Corporation, Partnership, Etc.)
hereinafter after called Principal and _____,
(Name of Surety and Address)
State of _____, hereinafter called the Surety, are held and firmly bound unto the
CITY OF NORTH RICHLAND HILLS, a municipal corporation of Tarrant County, Texas,
hereinafter called City, the sum of _____ (100 percent of
Contract price) DOLLARS (\$_____), in lawful money of the United States, to be
paid in Tarrant County, Texas, for the payment of which sum will truly be made, we bind
ourselves, our heirs, executors, administrators, and successors, jointly and severally,
firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the principal
entered into a certain contract with _____, dated the ____ day
of _____, A.D. 200____, a copy of which is hereto attached and made a
part hereof for the _____ improvements located at
_____.

WHEREAS, said Contract was entered into pursuant to the requirements of the
City of North Richland Hills and in accordance with the conditions of a written
City-Developer Agreement between the City of North Richland Hills and the Developer.

NOW THEREFORE, if the Principal shall well, truly and faithfully perform its
duties, all of the undertaking, covenants, terms thereof, and any extensions thereof
which may be granted by the City, with or without notice to the Surety and if it shall
satisfy all claims and demands incurred under such Contract, and shall fully indemnify
and save harmless the City and/or Developer from all costs and damages which it may
suffer by reason of failure to do so, and shall reimburse and repay the City and/or
Developer all outlay and expense which the City and/or Developer may incur in making
good any default, and shall promptly make payment to all persons, firms, subcontractors
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, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED FURTHER, that if any legal action be filed upon this bond, venue shall lie in Tarrant County, Texas, and 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 the 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 City and/or Developer and the Principal shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in three (3) counterparts, each one of which shall be deemed an original this _____ day of _____, A.D., 200____.

ATTEST:

Witness as to Principal

Address

ATTEST:

(Surety) Secretary

PRINICIPAL

By

Address

Surety

By

Address

NOTE: POWER OF ATTORNEY OR SURETY MUST BE ATTACHED. DATE OF BOND MUST NOT BE PRIOR TO DATE OF CONTRACT.

00 61 13.16 PAYMENT BOND FORM

Contractor as Principal Name: Mailing address (<i>principal place of business</i>):	Surety Name: Mailing address (<i>principal place of business</i>): Physical address (<i>principal place of business</i>):
Owner Name: Mailing address (<i>principal place of business</i>):	Surety is a corporation organized and existing under the laws of the state of: _____ <i>By submitting this bond, Surety affirms their authority to do business in the State of Texas and their license to execute bonds in the State of Texas.</i>
Contract Project name and location: Effective Date of the Agreement: Contract Price:	Telephone (<i>main number</i>): Telephone (<i>for notice of claim</i>): Local Agent for Surety Name: Address: Telephone:
Bond Date of Bond (<i>Date of Bond cannot be earlier than Effective Date of Agreement</i>) Bond Amount:	<i>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 following toll-free telephone number: 1-800-252-3439</i>
Surety and Contractor, intending to be legally bound and obligated to Owner do each cause this Payment Bond to be duly executed on its behalf by its authorized officer, agent or representative. The Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally to this bond. The condition of this obligation is such that if the Contractor as Principal pays all claimants providing labor or materials to him or to a subcontractor in the prosecution of the Work required by the Contract then this obligation shall be null and void; otherwise the obligation is to remain in full force and effect. Provisions of the bond shall be pursuant to the terms and provisions of Chapter 2253 of the Texas Government Code as amended and all liabilities on this bond shall be determined in accordance with the provisions of said Chapter to the same extent as if it were copied at length herein. Venue shall lie exclusively in _____ County, Texas for any legal action.	
Contractor as Principal Signature: _____ Name and _____ Title: _____	Surety Signature: _____ Name and _____ Title: _____ (Attach Power of Attorney)

END OF SECTION

CITY OF NORTH RICHLAND HILLS, TEXAS

CONTRACTOR'S MAINTENANCE BOND

STATE OF _____ §

KNOW ALL MEN BY THESE PRESENTS

COUNTY OF _____ §

That _____ as principal, and _____,
(Name of Contractor) (Name of Surety)

a corporation organized under the laws of _____ as Sureties do hereby expressly acknowledge themselves to be held and bound to pay unto the CITY OF NORTH RICHLAND HILLS, TEXAS, a municipal corporation, the sum of _____

TWENTY (20%) PERCENT OF TOTAL CONTRACT PRICE

Dollars (\$_____) for payment of which sum will truly be made unto said CITY OF NORTH RICHLAND HILLS, TEXAS, and its successors, said principal and sureties do hereby bind themselves, their assigns and successors jointly and severally.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a certain contract with _____ dated the _____ day of _____, A.D. 20____, a copy of which is hereto attached and made apart hereof for the installation **of water, sewage, storm drainage and/or paving** systems of the CITY OF NORTH RICHLAND HILLS to serve the _____ Addition, Block(s) _____, Lot(s) _____, to the City of North Richland Hills and,

WHEREAS, said Contract was entered into pursuant to the requirements of the City of North Richland Hills and,

WHEREAS, in said Contract, Contractor binds itself to use of materials and methods of construction such that improvements will be initially complete free of perceptible defects and will remain in good repair and condition and free of perceptible defects for and during the period of TWO (2) YEARS after the date of acceptance of the completed improvements by the City; and,

WHEREAS, said Contract binds itself to construct said improvements in such manner and obtain inspection approvals in proper sequence as are required to obtain acceptance by the City and to repair or reconstruct the said improvements in whole or in part at any time within said TWO (2) YEARS period to such extent as the City deems necessary to properly correct all defects except those which have been caused by circumstances and conditions occurring after the time of construction over which the Contractor had no control which are other than those arising from defect of construction by the Contractor; and,

WHEREAS, after acceptance of the improvements by the City, said Contractor binds itself, upon receiving notice from the City of the need therefore to repair or reconstruct said improvements and if the Contractor fails to make the necessary corrections the City of North Richland Hills may do and have done all said corrective work and shall have recovery hereon for all expenses thereby incurred.

NOW THEREFORE, if said Contractor shall keep and perform its said agreement to maintain, repair or reconstruct said improvements for a period of TWO (2) YEARS, as provided, then these presents shall be null and void, and have no further effect. Otherwise, this Bond shall be and remain in full force and effect, said City shall have and recover from the said Contractor and its Surety damages in the premises as prescribed by said Contract. This obligation shall be a continuing one and successive recoveries may be had hereon for successive breaches until the full amount hereof is exhausted.

IN WITNESS WHEREOF, the said _____ HAS CAUSED
(Name of Contractor)
THESE PRESENTS TO BE EXECUTED BY _____ and the
(Contractors Authorized Signer)
said _____ has caused these presents to be executed by its
(Surety)
_____ has hereunto set his hand this the _____ day
(Attorney-in-Fact) or (Official)
of _____, A.D., 20__.

SURETY

By: _____

Title _____

Address _____

Phone _____

PRINCIPAL

By: _____

Title _____

Address _____

Phone _____

The name and address of the Resident Agent of Surety is:

_____ Phone _____

00 62 16 CERTIFICATE OF INSURANCE

The Certificate of Insurance shall be provided to the Owner by the Successful Bidder prior to conforming of documents. Certificate will be included in the documents to be executed by the Owner and in the conformed construction Contract Documents.

END OF SECTION

00 62 16.01 WORKERS' COMPENSATION INSURANCE

1.00 REQUIRED NOTICE

1.01 WORKER'S COMPENSATION INSURANCE COVERAGE

A. Definitions:

1. Certificate of coverage ("certificate") - A copy of a certificate of insurance, a certificate of authority to self-insure issued by the commission, or a coverage agreement (TWCC-81, TWCC-82, TWCC-83, or TWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on a project, for the duration of the project.
 2. Duration of the project - includes the time from the beginning of the work on the project until the contractor's/person's work on the project has been completed and accepted by the governmental entity.
 3. Persons providing services on the project ("subcontractor" in §406.096) - includes all persons or entities performing all or part of the services the contractor has undertaken to perform on the project, regardless of whether that person contracted directly with the contractor and regardless of whether that person has employees. This includes, without limitation, independent contractors, subcontractors, leasing companies, motor carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other services related to a project. "Services" does not include activities unrelated to the project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.
- B. The contractor shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all employees of the contractor providing services on the project, for the duration of the project.
- C. The Contractor must provide a certificate of coverage to the governmental entity prior to being awarded the contract.
- D. If the coverage period shown on the contractor's current certificate of coverage ends during the duration of the project, the contractor must, prior to the end of the coverage period, file a new certificate of coverage with the governmental entity showing that coverage has been extended.
- E. The contractor shall obtain from each person providing services on a project, and provide to the governmental entity:
1. a certificate of coverage, prior to that person beginning work on the project, so the governmental entity will have on file certificates of coverage showing coverage for all persons providing services on the project; and
 2. no later than seven days after receipt by the contractor, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project.

- F. The contractor shall retain all required certificates of coverage for the duration of the project and for one year thereafter.
- G. The contractor shall notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the contractor knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project.
- H. The contractor shall post on each project site a notice, in the text, form and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on the project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.
- I. The contractor shall contractually require each person with whom it contracts to provide services on a project, to:
 - 1. provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all of its employees providing services on the project, for the duration of the project;
 - 2. provide to the contractor, prior to that person beginning work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project, for the duration of the project;
 - 3. provide the contractor, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the project;
 - 4. obtain from each other person with whom it contracts, and provide to the contractor:
 - a. a certificate of coverage, prior to the other person beginning work on the project; and
 - b. a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;
 - 5. retain all required certificates of coverage on file for the duration of the project and for one year thereafter;
 - 6. notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the project; and
 - 7. contractually require each person with whom it contracts, to perform as required by paragraphs 1 - 7, with the certificates of coverage to be provided to the person for whom they are providing services.
- J. By signing this contract or providing or causing to be provided a certificate of coverage, the contractor is representing to the governmental entity that all employees of the contractor who will provide services on the project will be covered by workers' compensation coverage for the duration of the project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject

the contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

- K. The contractor's failure to comply with any of these provisions is a breach of contract by the contractor which entitles the governmental entity to declare the contract void if the contractor does not remedy the breach within ten days after receipt of notice of breach from the governmental entity.

END OF SECTION

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
 7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
 9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 Terminology

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
 4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on

Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

- A. Standards, Specifications, Codes, Laws, and Regulations
 1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;
2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or
3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

- A. *Reports and Drawings:* The Supplementary Conditions identify:
 - 1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
 - 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

1. is of such a nature as to establish that any “technical data” on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
2. is of such a nature as to require a change in the Contract Documents; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer’s Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner’s obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer’s findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor’s cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and

contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

- c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents;
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the

consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.
- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, OWNER SHALL INDEMNIFY AND HOLD HARMLESS CONTRACTOR, SUBCONTRACTORS, AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS, AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO A HAZARDOUS ENVIRONMENTAL CONDITION, PROVIDED THAT SUCH HAZARDOUS ENVIRONMENTAL CONDITION: (I) WAS NOT SHOWN OR**

INDICATED IN THE DRAWINGS OR SPECIFICATIONS OR IDENTIFIED IN THE CONTRACT DOCUMENTS TO BE INCLUDED WITHIN THE SCOPE OF THE WORK, AND (II) WAS NOT CREATED BY CONTRACTOR OR BY ANYONE FOR WHOM CONTRACTOR IS RESPONSIBLE. NOTHING IN THIS PARAGRAPH 4.06.G SHALL OBLIGATE OWNER TO INDEMNIFY ANY INDIVIDUAL OR ENTITY FROM AND AGAINST THE CONSEQUENCES OF THAT INDIVIDUAL'S OR ENTITY'S OWN NEGLIGENCE.

H. TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS, AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO A HAZARDOUS ENVIRONMENTAL CONDITION CREATED BY CONTRACTOR OR BY ANYONE FOR WHOM CONTRACTOR IS RESPONSIBLE. NOTHING IN THIS PARAGRAPH 4.06.H SHALL OBLIGATE CONTRACTOR TO INDEMNIFY ANY INDIVIDUAL OR ENTITY FROM AND AGAINST THE CONSEQUENCES OF THAT INDIVIDUAL'S OR ENTITY'S OWN NEGLIGENCE.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.

- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.
- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
 - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
 1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;
 2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and
 7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.
- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property

insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:
1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.
- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
 - 1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *“Or-Equal” Items:* If in Engineer’s sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an “or-equal” item, in which case review and approval of the proposed item may, in Engineer’s sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
 - 3) it has a proven record of performance and availability of responsive service.
 - b. Contractor certifies that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.
2. *Substitute Items:*
 - a. If in Engineer’s sole discretion an item of material or equipment proposed by Contractor does not qualify as an “or-equal” item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
 - b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
 - c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
 - d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - 1) shall certify that the proposed substitute item will:
 - a) perform adequately the functions and achieve the results called for by the general design,

- b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified;
- 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
 - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
 - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
- 3) will identify:
 - a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services; and
- 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not

Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

- F. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.
- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, OWNER SHALL INDEMNIFY AND HOLD HARMLESS CONTRACTOR, AND ITS OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS, AND SUBCONTRACTORS FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS, AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY INFRINGEMENT OF PATENT RIGHTS OR COPYRIGHTS INCIDENT TO THE USE IN THE PERFORMANCE OF THE WORK OR RESULTING FROM THE INCORPORATION IN THE WORK OF ANY INVENTION, DESIGN, PROCESS, PRODUCT, OR DEVICE SPECIFIED IN THE CONTRACT DOCUMENTS, BUT NOT IDENTIFIED AS BEING SUBJECT TO PAYMENT OF ANY LICENSE FEE OR ROYALTY TO OTHERS REQUIRED BY PATENT RIGHTS OR COPYRIGHTS.**

- C. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY INFRINGEMENT OF PATENT RIGHTS OR COPYRIGHTS INCIDENT TO THE USE IN THE PERFORMANCE OF THE WORK OR RESULTING FROM THE INCORPORATION IN THE WORK OF ANY INVENTION, DESIGN, PROCESS, PRODUCT, OR DEVICE NOT SPECIFIED IN THE CONTRACT DOCUMENTS.**

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 Taxes

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 Use of Site and Other Areas

A. *Limitation on Use of Site and Other Areas:*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY CLAIM OR ACTION, LEGAL OR EQUITABLE, BROUGHT BY ANY SUCH OWNER OR OCCUPANT AGAINST OWNER, ENGINEER, OR ANY OTHER PARTY INDEMNIFIED HEREUNDER TO THE EXTENT CAUSED BY OR BASED UPON CONTRACTOR'S PERFORMANCE OF THE WORK.**

- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

- D. *Loading Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
1. all persons on the Site or who may be affected by the Work;
 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.
 - 1. *Shop Drawings:*
 - a. Submit number of copies specified in the General Requirements.

- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

- a. Submit number of Samples specified in the Specifications.
- b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures:*

- 1. Before submitting each Shop Drawing or Sample, Contractor shall have:
 - a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
- 2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
- 3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;
2. recommendation by Engineer or payment by Owner of any progress or final payment;
3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
4. use or occupancy of the Work or any part thereof by Owner;
5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
6. any inspection, test, or approval by others; or
7. any correction of defective Work by Owner.

6.20 *Indemnification*

A. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO THE PERFORMANCE OF THE WORK, PROVIDED THAT ANY SUCH CLAIM, COST, LOSS, OR DAMAGE IS ATTRIBUTABLE TO BODILY INJURY, SICKNESS, DISEASE, OR DEATH, OR TO INJURY TO OR DESTRUCTION OF TANGIBLE PROPERTY (OTHER THAN THE WORK ITSELF), INCLUDING THE LOSS OF USE RESULTING THEREFROM BUT ONLY TO THE EXTENT CAUSED BY ANY NEGLIGENT ACT OR OMISSION OF CONTRACTOR, ANY SUBCONTRACTOR, ANY SUPPLIER, OR ANY INDIVIDUAL OR ENTITY DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM TO PERFORM ANY OF THE WORK OR ANYONE FOR WHOSE ACTS ANY OF THEM MAY BE LIABLE .**

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages,

compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
 - 1. written notice thereof will be given to Contractor prior to starting any such other work; and
 - 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
 - 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 - 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 - 3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

- A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

- A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

- A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or

continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not

exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
 - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 - 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 - 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data

shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
1. deny the Claim in whole or in part;
 2. approve the Claim; or
 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of

said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not

limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.
- C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.
- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances:*
 1. Contractor agrees that:
 - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. *Contingency Allowance:*
 1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 Unit Price Work

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to

the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:
 - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
 - 2. there is no corresponding adjustment with respect to any other item of Work; and
 - 3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
 - 1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 - 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 - 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee*: The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or
2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
 - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
 - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or

neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.
- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
 - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
 - 3. as otherwise specifically provided in the Contract Documents.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or
 2. correct such defective Work; or
 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.
- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. Applications for Payments:

- 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an

Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. Review of Applications:

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
 - a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
 - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or

- involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
- b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
- a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:
- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
 - b. the Contract Price has been reduced by Change Orders;
 - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
 - d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. Payment Becomes Due:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment:

1. Owner may refuse to make payment of the full amount recommended by Engineer because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. there are other items entitling Owner to a set-off against the amount recommended; or
 - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 Contractor's Warranty of Title

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 Substantial Completion

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before

final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.
 - 2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
 - 3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and
 - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying

documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due:

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

- A. The making and acceptance of final payment will constitute:
 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:
 - 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 - 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 - 3. Contractor's repeated disregard of the authority of Engineer; or
 - 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
 - 1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);
 - 2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
 - 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when

so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
 - 1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 - 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 - 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
 - 4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days

to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

- A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.
- C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or
 2. agrees with the other party to submit the Claim to another dispute resolution process; or
 3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 *Survival of Obligations*

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 *Controlling Law*

- A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 *Headings*

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

00 73 00 SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement Section 00 72 00 – Standard General Conditions of the Construction Contract prepared by the Engineers Joint Contract Documents Council (EJCDC C-700, 2007 edition) and other provisions of the Contract Documents as indicated below. All provisions which are not amended or supplemented in these Supplementary Conditions remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

SC-1.01 *Defined Terms*

- A. Add a new Paragraph 1.01.A.52:

“52. *Written Amendment*—A written statement modifying the Contract Documents, signed by Owner and Contractor on or after the Effective Date of the Agreement and normally dealing with the nonengineering or nontechnical rather than strictly construction-related aspects of the Contract Documents.

- B. Add a new Paragraph 1.01.A.53:

“53. *Construction Manager*—The authorized representative of Owner who may be assigned to the Site or any part thereof. The individual or entity will be responsible for administration of the Contract as a representative of the Owner. This individual may also serve as the Resident Project Representative. For this Project the Owner has designated city staff to serve as Construction Manager.”

SC-1.02 *Terminology*

- A. Add a new Paragraph 1.02.B.2 as follows:

“2. “At no additional cost to Owner”, “With no extra compensation to Contractor”, “At Contractor’s own expense”, or similar words mean that the Contractor will perform or provide specified Work and that all cost for performing the Work is included in the Contract Price. “

- B. Delete Paragraph 1.02.C and add the following:

“C. *Day*:

1. A “calendar day” shall be a day of 24 hours measured from midnight to the next midnight, and is any day of the year, with no days being excluded.
2. A “working day” shall be a day which permits construction of the principal units of the Work for a period of not less than 7 hours between 7:00 a.m. and 6:00 p.m. Working days do not include days on which weather or other conditions not under the control of the Contractor prevent Contractor from working the seven hours defining a working day. Working days do not include Saturdays, Sundays or any of the following holidays: New Year’s Day, President’s Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the day after Thanksgiving and Christmas Eve and Christmas Day.”

- C. Add new Paragraphs 1.02.E.5 and 1.02.E.6 as follows:
 - “5. Specifications are written in modified brief style. Requirements apply to all Work of the same kind, class, and type even though the word “all” is not stated.”
 - “6. Simple imperative sentence structure is used which places a verb as the first word in the sentence. It is understood that the words “furnish”, “install”, “provide”, or similar words include the meaning of the phrase “The Contractor shall...” before these words.”

ARTICLE 2 - PRELIMINARY MATTERS

SC.2.02 Copies of Documents

- A. Amend the first sentence of Paragraph 2.02.A by deleting “ten” and inserting “five.”
- B. Delete Paragraph 2.02.A entirely and insert the following in its place:
 - “A. Owner shall furnish one fully executed Agreement and one copy of the executed Contract Documents in electronic Portable Document Format (PDF). This document is the Project Record Copy of the Contract Documents. Contractor may make as many prints of the documents as needed for construction. Engineer will not provide printed or hard copies to the Contractor.”

SC-2.05 Before Starting Construction

- A. Add a new paragraph immediately after Paragraph 2.05.A.3:
 - “B. Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures shown thereon and all applicable field measurements. Contractor shall promptly report in writing to the Engineer any conflict, error, ambiguity or discrepancy which the Contractor may discover and shall obtain a written interpretation from the Engineer before proceeding with any Work affected thereby. In the event of a conflict in the Drawings, Specifications, or other portions of the Contract Documents which were not reported prior to the Award of the Contract, the Contractor shall be deemed to have included the most expensive item in its Bid.”

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

SC-3.01 Intent

- A. Add the following to Paragraph 3.01.A:
 - “Drawings and Specifications do not indicate or describe all of the Work required to complete the Project. Additional details required for the correct installation of selected products are to be provided by the Contractor and coordinated with the Engineer. Provide any work, materials or equipment required for a complete and functional system even if they are not detailed or specified.
 - 1. The Contract requirements described in the General Conditions, Supplementary Conditions and General Requirements apply to each and all Sections of the Specifications unless specifically noted otherwise.

2. Organization of Contract Documents is not intended to control or to lessen the responsibility of the Contractor when dividing Work among Subcontractors, or to establish the extent of Work to be performed by any trade, Subcontractor or Supplier. Specifications or details do not need to be indicated or specified in each specification or drawing. Items shown in the Contract Documents are applicable regardless of location in the Contract Documents.
 3. Standard paragraph titles and other identifications of subject matter in the Specifications are intended to aid in locating and recognizing various requirements of the Specifications. Titles do not define, limit, or otherwise restrict specification text.”
- B. Add new Paragraphs 3.01.D through 3.01.F as follows:
- “D. Comply with the most stringent requirements where compliance with two or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, unless Contract Documents indicate otherwise.
 1. Quantity or quality level shown or indicated shall be the minimum to be provided or performed in every instance.
 2. Actual installation must meet or exceed the minimum quality indicated.
 3. In complying with these requirements, indicated numeric values are minimum or maximum values, as noted, or appropriate for context of requirements.
 4. Refer instances of uncertainty to the Engineer for a decision before proceeding.”
 - “E. Provide materials and equipment comparable in quality to similar materials and equipment incorporated in the Project or as required to meet the minimum requirements of the application if the materials and equipment are shown in the Drawings but are not included in the Specifications.”
 - “F. The Contract Documents comprise the entire Agreement between Owner and Contractor. The Contract Documents may be modified only by Field Order, Change Order or Written Amendment.”

SC-3.02 Reference Standards

- A. Add a new Paragraph 3.02.B as follows:
- “B. Comply with applicable construction industry standards as if bound or copied directly into the Contract Documents regardless of lack of reference in the Contract Documents. Apply provisions of the Contract Documents where Contract Documents include more stringent requirements than these referenced standards.
 1. Standards referenced directly in the Contract Documents take precedence over standards that are not referenced but recognized in the construction industry as applicable.
 2. Comply with standards not referenced but recognized in the construction industry as applicable for performance of the Work except as otherwise limited

by the Contract Documents. The Engineer determines whether code or standard is applicable, or which of several are applicable.

3. Make copies of reference standards available as requested by Engineer or Owner."

SC-3.03 Reporting and Resolving Discrepancies

- A. Delete Paragraph 3.03.A.3 entirely and insert the following in its place:

"3. In the event of a conflict in the Drawings, Specifications, or other portions of the Contract Documents which were not reported prior to the Bidding of the Contract, the Contractor shall be deemed to have included the most expensive item, system, procedure, etc. in his Bid."

SC-3.05 Reuse of Documents

- A. Delete the last sentence of Paragraph 3.05.B entirely and insert the following in its place:

"B. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes, unless specifically prohibited in writing by the Owner for security reasons. If the Owner so directs, Contractor shall surrender all copies of the construction Contract Documents and other related documents, in paper or digital format and remove these documents from computer equipment or storage devices as a condition of final payment."

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE CONDITIONS AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

SC-4.01 Availability of Lands

- A. Add the following to Paragraph 4.01.C:

"A copy of the written agreements for the use of such land shall be provided to the Owner for record purposes."

SC-4.02 Subsurface and Physical Conditions

- A. Delete Paragraphs 4.02.A and 4.02.B in their entirety and insert the following:

"A. No reports of explorations or tests of subsurface conditions at or contiguous to the Site, or drawings of physical conditions relating to existing surface or subsurface structures at the Site, are known to Owner."

SC-4.03 Differing Subsurface or Physical Conditions

- A. Amend Paragraph 4.03.A by deleting "promptly" and inserting "promptly but no later than within 3 days."

SC-4.04 Underground Facilities

- A. Amend Paragraph 4.04.B.1 by deleting "promptly" and inserting "promptly but no later than within 3 days."

SC-4.06 Hazardous Environmental Conditions at Site

- A. Delete Paragraphs 4.06.A and 4.06.B in their entirety and insert the following:

“A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.”

- B. Delete Paragraph 4.06.G entirely and insert the following in its place:

“G. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, OWNER SHALL INDEMNIFY AND HOLD HARMLESS CONTRACTOR, SUBCONTRACTORS, AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS, AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO A HAZARDOUS ENVIRONMENTAL CONDITION, PROVIDED THAT SUCH HAZARDOUS ENVIRONMENTAL CONDITION: (I) WAS NOT SHOWN OR INDICATED IN THE DRAWINGS OR SPECIFICATIONS OR IDENTIFIED IN THE CONTRACT DOCUMENTS TO BE INCLUDED WITHIN THE SCOPE OF THE WORK, AND (II) WAS NOT CREATED BY CONTRACTOR OR BY ANYONE FOR WHOM CONTRACTOR IS RESPONSIBLE. NOTHING IN THIS PARAGRAPH 4.06.G SHALL OBLIGATE OWNER TO INDEMNIFY ANY INDIVIDUAL OR ENTITY FROM AND AGAINST THE CONSEQUENCES OF THAT INDIVIDUAL’S OR ENTITY’S OWN NEGLIGENCE.”**

- C. Delete Paragraph 4.06.H entirely and insert the following in its place:

“H. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS, AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO A HAZARDOUS ENVIRONMENTAL CONDITION CREATED BY CONTRACTOR OR BY ANYONE FOR WHOM CONTRACTOR IS RESPONSIBLE. NOTHING IN THIS PARAGRAPH 4.06.H SHALL OBLIGATE CONTRACTOR TO INDEMNIFY ANY INDIVIDUAL OR ENTITY FROM AND AGAINST THE CONSEQUENCES OF THAT INDIVIDUAL’S OR ENTITY’S OWN NEGLIGENCE.”**

ARTICLE 5 - BONDS AND INSURANCE

SC-5.01 Performance, Payment, and Other Bonds

- A. Add the following to Paragraph 5.01.C:

“Failure of the Contractor to provide a satisfactory replacement bond may be considered an event of default under Article 15, Paragraph 15.02.”

B. Add new paragraphs immediately after Paragraph 5.01.C:

- “D. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond or payment bond. By Contractor furnishing and Owner accepting these bonds, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor under these bonds, subject to Owner’s priority to use the funds for the completion of the Work.”
- “E. Contractor or surety on behalf of Contractor shall promptly notify the Owner of all claims filed against the Payment Bond. When a claimant has satisfied the conditions prescribed by Texas Government Code 2253, the Contractor or surety on behalf of Contractor shall, with reasonable promptness, notify the claimant and Owner of the amounts that are undisputed and the basis for challenging any amounts that are disputed, including, but not limited to, the lack of substantiating documentation to support the claim as to entitlement or amount, and the Contractor or surety on behalf of Contractor shall, with reasonable promptness, pay or make arrangements for payment of any undisputed amount; provided, however, that the failure of the Contractor or surety on behalf of Contractor to timely discharge its obligations under this paragraph or to dispute or identify any specific defense to all or any part of a claim shall not be deemed to be an admission of liability by the Contractor or surety as to such claim or otherwise constitute a waiver of the Contractor’s or surety’s defenses to, or right to dispute, such claim.”
- “F. Owner shall not be liable for payment of any costs or expenses of any claimant under Payment Bonds, and shall have no obligations to make payments to, give notices on behalf of, or otherwise have obligations to claimants under Payment Bonds.”
- “G. The Performance, Payment, and Maintenance Bond shall be provided by the Contractor in the amount of 100 percent of the Contract Price. This bond is to become effective the date of the expiration of the one year correction period specified in Paragraph 13.07 for all or any part of the Project so designated in accordance with GC-14.04, and shall remain in effect for a period of one year after the expiration of the one-year correction period, except as provided otherwise by Laws or Regulations. Surety for the Maintenance Bond shall meet same requirements as for Performance and Payment Bonds set forth in GC-5.01.

SC-5.02 Licensed Sureties and Insurers

A. Add a new Paragraph 5.02.B as follows:

- “B. Insurance companies providing insurance required by Contract Documents shall have a minimum rating of A-VIII according to A.M. Best Company.”

SC-5.03 Certificates of Insurance

A. Delete Paragraph 5.03.B entirely.

SC-5.04 Contractor's Insurance

- A. The following additional information is provided as required by Paragraph 5.04 Contractor's Liability Insurance:

1. Workers' Compensation and Employer's Liability Insurance required by Paragraph 5.04 is to provide coverage for not less than the following amounts or greater where required by Laws and Regulations.

Workers' Compensation, etc.,	
State	Statutory
Applicable Federal (e.g., Longshore)	Statutory
Employers' Liability	
Bodily Injury by Accident	\$500,000
Bodily Injury by Disease - Each Employee	\$500,000
Bodily Injury by Disease - Policy Limit	\$500,000

Insurance shall include a waiver of subrogation in favor of the Additional Insured identified in these Supplementary Conditions.

2. Contractor's Liability Insurance required by Paragraph 5.04 is to provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

Insurance for Claims of Damages	
General Aggregate (Except Products - Completed Operations)	\$1,000,000 / Occurrence \$2,000,000 / Aggregate
Products - Completed Operations Aggregate	\$1,000,000 / Occurrence \$2,000,000 / Aggregate
Personal and Advertising Injury (One Person/Organization)	\$1,000,000
Each Occurrence (Bodily Injury and Property Damage)	\$1,000,000
Limit Per Person - Medical Expense	\$5000
Personal Injury Liability coverage will include claims arising out of Employment Practices Liability, limited to coverage provided under standard contract	\$1,000,000
Property Damage Liability insurance will provide explosion, collapse and underground coverage where applicable	\$1,000,000
Watercraft Liability Policy. Coverage shall apply to all self-propelled vessels	\$1,000,000
Excess Liability, Umbrella Form to include coverage of Watercraft Liability. General Aggregate - Each Occurrence	\$1,000,000

3. Contractor's Liability Insurance shall also include completed operations and product liability coverage, and eliminate the exclusion with respect to property under the care, custody and control of Contractor. In lieu of elimination of the exclusion, Contractor may provide and maintain Installation Floater insurance for property under the care, custody, or control of Contractor. The Installation Floater insurance shall be a broad form or "All Peril" policy providing coverage for all materials, supplies, machinery, fixture, and equipment which will be incorporated into the Work.
 - a. Coverage under the Contractors Installation Floater will include:
 - 1). Faulty or defective workmanship, materials, maintenance or construction.
 - 2). Cost to remove defective or damaged Work from the Site or to protect it from loss or damage.
 - 3). Cost to cleanup and remove pollutants.
 - 4). Coverage for testing and startup.
 - 5). Any loss to property while in transit.
 - 6). Any loss at the Site.
 - 7). Any loss while in storage, both on-site and off-site.
 - 8). Any loss to temporary project works if their value is included in the Contract Price.
4. Coverage cannot be contingent on an external cause or risk or limited to property for which the Contractor is legally liable. Contractor's Installation Floater will provide limits of insurance adequate to cover the value of the installation. The Contractor will be solely responsible for any deductible carried under this coverage and claims on materials, supplies, machinery, fixture, and equipment which will be incorporated into the Work while in transit or in storage. This policy will include a waiver of subrogation for those listed as additional insured in these Supplemental Conditions.
5. Contractor's Automobile Liability Insurance required by Paragraph 5.04.A.6 is to provide coverage for not less than the following amounts or greater where required by Laws and Regulations.

Bodily Injury	
Each Person	\$1,000,000
Each Accident	\$1,000,000
Property Damage	
Each Accident, or	\$1,000,000
Combined Single Limit (Bodily Injury and Property Damage)	\$1,000,000

6. Additional insured on all insurance policies in accordance with Paragraph 5.04.B include:
 - a. City of North Richland Hills

- b. Freese and Nichols, Inc.
- 7. Contractor's Contractual Liability Insurance required by Paragraph 5.04.B is to provide coverage for not less than the following amounts or greater where required by Laws and Regulations.

B. Contractor's Contractual Liability Insurance

Contractor's Contractual Liability Insurance	
General Aggregate	\$1,000,000
Each Occurrence (Bodily Injury and Property Damage)	\$1,000,000

SC-5.05 Owner's Liability Insurance

- A. Delete Paragraph 5.05.A entirely and insert the following in its place:
 - "A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Contractor shall purchase and maintain for Owner, at no additional cost, Owner's Protective Liability insurance naming Owner as the named insured with insurance that will protect said parties against claims which may arise from operations under the Contract Documents. This coverage shall be from the same company that provides Contractor's liability insurance coverage, and in the same minimum amounts. The Engineer and Engineer's consultants are additional insured as their interest may appear, including their officers, directors, agents and employees."

SC-5.06 Property Insurance

- A. Delete Paragraph 5.06.A entirely and insert the following in its place; Subparagraphs 1 through 7 shall remain:
 - "A. Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to deductible amounts as may be provided by the Supplementary Conditions or required by Laws and Regulations). The policies of insurance required to be purchased and maintained by Contractor in accordance with this Paragraph 5.06 shall comply with requirements of Paragraph 5.08. This insurance shall:"
- B. Amend Paragraph 5.06.A.4 by inserting the following language after the word "Work" in the second line:
 - "and in transit for incorporation in the Work from such storage locations"
- C. Delete Paragraph 5.06.B entirely and insert the following in its place:
 - "B. Contractor shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of those listed as an insured or listed as an additional insured in Paragraph SC-5.04.E."
- D. Delete Paragraph 5.06.D entirely.
- E. Delete Paragraph 5.06.E entirely.

SC-5.07 Waiver of Rights

- A. Delete Paragraph 5.07.B entirely.

SC-5.08 Receipt and Application of Insurance Proceeds

- A. Delete Paragraph 5.08 entirely.

SC-5.11 Owner's Insurance for Project

- A. Add a new Paragraph 5.11 as follows:

"5.11 Owner's Insurance for Project

- A. Owner shall not be responsible for purchasing and maintaining any insurance to protect the interest of the Contractor, Subcontractors, or others in the Work. The stated limits of insurance required are minimum only. Contractor shall determine the limits that are adequate. These limits may be basic policy limits or any combination of basic limits and umbrella limits. In any event, Contractor is fully responsible for all losses arising out of, resulting from or connected with operations under this Contract whether or not said losses are covered by insurance. The acceptance of certificates or other evidence of insurance by the Owner, Engineer, and/or others listed as additional insured in Paragraph SC-5.04.E that in any respect do not comply with the Contract requirements does not release the Contractor from compliance herewith."

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

SC-6.05 Substitutes and "Or-Equals"

- A. Delete Paragraph 6.05.A and insert the following in its place:
 - "A. Where equipment and products are specified by name, no substitutes or "or-equal" will be considered or approved unless the term "or-equal" is included in the individual Specification. If substitutes or "or equals" are specifically permitted for consideration by the individual Specifications, they must be submitted and will be reviewed and evaluated in accordance with the provisions established in Paragraph 6.05 and in the General Requirements of the Specifications."
- B. Subparagraphs 6.05.A.1 and 6.05.A.2 remain intact.
- C. Amend Paragraph 6.05.C by deleting the fourth sentence and inserting the following in its place:
 - "No "or-equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order or Field Order."
- D. Amend Paragraph 6.05.E by deleting the word "substitute" in all locations and replacing it with the phrase "substitute or "or-equal"."

SC-6.06 Concerning Subcontractors, Suppliers, and Others

- A. Amend Paragraph 6.06.B by deleting the words "Supplementary Conditions" and inserting the words "Contract Documents" in their place.

- B. Add a new Paragraph 6.06.H as follows:

“H. Owner or Engineer may furnish to any such Subcontractor, Supplier, or other person or organization, to the extent practicable, information about amounts paid to Contractor in accordance with Contractor’s Application for Payment on account of the particular Subcontractor’s, Supplier’s, other person’s or other organization’s Work.”

SC-6.07 Patent Fees and Royalties

- A. Delete Paragraph 6.07.B entirely and insert the following in its place:

“B. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, OWNER SHALL INDEMNIFY AND HOLD HARMLESS CONTRACTOR, AND ITS OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS, AND SUBCONTRACTORS FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS, AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY INFRINGEMENT OF PATENT RIGHTS OR COPYRIGHTS INCIDENT TO THE USE IN THE PERFORMANCE OF THE WORK OR RESULTING FROM THE INCORPORATION IN THE WORK OF ANY INVENTION, DESIGN, PROCESS, PRODUCT, OR DEVICE SPECIFIED IN THE CONTRACT DOCUMENTS, BUT NOT IDENTIFIED AS BEING SUBJECT TO PAYMENT OF ANY LICENSE FEE OR ROYALTY TO OTHERS REQUIRED BY PATENT RIGHTS OR COPYRIGHTS.**”

- B. Delete Paragraph 6.07.C entirely and insert the following in its place:

“C. **TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY INFRINGEMENT OF PATENT RIGHTS OR COPYRIGHTS INCIDENT TO THE USE IN THE PERFORMANCE OF THE WORK OR RESULTING FROM THE INCORPORATION IN THE WORK OF ANY INVENTION, DESIGN, PROCESS, PRODUCT, OR DEVICE NOT SPECIFIED IN THE CONTRACT DOCUMENTS.**”

SC-6.09 Laws and Regulations

- A. Delete Paragraph 6.09.B and insert the following in its place:

“B. If Contractor performs any Work that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work.”

- B. Add a new Paragraph 6.09.D as follows:

“D. All Bidders are required to complete and submit with their Bid, the Contractor Compliance to State Law form, which follows the proposal.”

SC-6.10 Taxes

- A. Add the following to Paragraph 6.10.A:

“The Owner qualifies as an exempt agency as defined by the statutes of the State of Texas. The Contractor shall comply with all statutes and rulings of the State Comptroller.”

SC-6.11 Use of Site and Other Areas

- A. Delete Paragraph 6.11.A.3 entirely and insert the following in its place:

“3. TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS OWNER AND ENGINEER, AND THE OFFICERS, DIRECTORS, MEMBERS, PARTNERS, EMPLOYEES, AGENTS, CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES, AND DAMAGES (INCLUDING BUT NOT LIMITED TO ALL FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND ALL COURT OR ARBITRATION OR OTHER DISPUTE RESOLUTION COSTS) ARISING OUT OF OR RELATING TO ANY CLAIM OR ACTION, LEGAL OR EQUITABLE, BROUGHT BY ANY SUCH OWNER OR OCCUPANT AGAINST OWNER, ENGINEER, OR ANY OTHER PARTY INDEMNIFIED HEREUNDER TO THE EXTENT CAUSED BY OR BASED UPON CONTRACTOR’S PERFORMANCE OF THE WORK.”

SC-6.13 Safety and Protection

- A. As described in Paragraph 6.13.C, the Contractor is to comply with the applicable requirements of Owner’s safety program presented as Appendix “A.”

- B. Add the following to Paragraph 6.13.F:

“The Contractor’s duties and responsibilities for the safety or protection of persons or the Work or property at the Site or adjacent thereto shall be reinstated when any additional efforts are required during the one-year correction period to correct defects in the Work.”

SC-6.16 Emergencies

- A. Amend Paragraph 6.16.A by deleting the third sentence and inserting the following in its place:

“If Engineer determines that the incident giving rise to the emergency action was not the responsibility of the Contractor and that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Change Order, Field Order or Work Change Directive will be issued.”

SC-6.17 Shop Drawings and Samples

- A. Delete Paragraph 6.17.C.3 entirely and insert the following in its place:
 - “3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents on a Shop Drawing Deviation Request form provided by the Engineer and request that a Field Order or Change Order be issued for each of the specific variations submitted for approval. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.”
- B. Delete Paragraph 6.17.D.3 entirely and insert the following in its place:
 - “3. Engineer’s review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation issuing a Field Order or Change Order. If the proposed modification is approved by the Engineer, the submittal will be considered to be in strict compliance with the Contract Documents and it will be reviewed in accordance with the Contract Documents. If the proposed Modification is not approved, the submittal will be returned to the Contractor with appropriate comments. Engineer’s review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.”
- C. Delete Paragraph 6.17.E.1 entirely and insert the following in its place:
 - “1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Re-submittals shall reference and respond directly to Engineer’s previous comments. Any variations from strict compliance with the Contract Documents will be identified in the same manner as required in Paragraph 6.17.C.3 and will require the same approvals.”
- D. Add the following new paragraphs immediately after Paragraph 6.17.E:
 - “F. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than two submittals. Engineer will record Engineer’s time for reviewing subsequent submittals of Shop Drawings, Samples, or other items requiring approval and Contractor shall reimburse Owner for Engineer’s charges for such time.”
 - “G. In the event that Contractor requests a change of a previously approved item, Contractor shall reimburse Owner for Engineer’s charges for its review time unless the need for such change is beyond the control of Contractor.”

SC-6.18 Continuing the Work

- A. Add the following to Paragraph 6.18.A:
 - “Contractor assumes and bears responsibility for all costs and time delays associated with any variation from the requirements of the Contract Documents.”

SC-6.20 *Indemnification*

- A. Delete Paragraph 6.20.C entirely.

ARTICLE 7 - OTHER WORK AT SITE

SC-7.04 *Claims Between Contractors*

- A. Add a new Paragraph 7.04 as follows:

"7.04 Claims between Contractors

- A. Should Contractor cause damage to the work or property of any other contractor at the Site, or should any claim arising out of Contractor's performance of the Work at the Site be made by any other contractor against Contractor, Owner, Engineer, or the construction coordinator, then Contractor (without involving Owner, Engineer, or construction coordinator) shall either (1) remedy the damage, (2) agree to compensate the other contractor for remedy of the damage, or (3) remedy the damage and attempt to settle with such other contractor by agreement, or otherwise resolve the dispute by arbitration or at law.
- B. **CONTRACTOR SHALL, TO THE FULLEST EXTENT PERMITTED BY LAWS AND REGULATIONS, INDEMNIFY AND HOLD HARMLESS OWNER, ENGINEER, THE CONSTRUCTION COORDINATOR AND THE OFFICERS, DIRECTORS, PARTNERS, EMPLOYEES, AGENTS AND OTHER CONSULTANTS AND SUBCONTRACTORS OF EACH AND ANY OF THEM FROM AND AGAINST ALL CLAIMS, COSTS, LOSSES AND DAMAGES (INCLUDING, BUT NOT LIMITED TO, FEES AND CHARGES OF ENGINEERS, ARCHITECTS, ATTORNEYS, AND OTHER PROFESSIONALS AND COURT AND ARBITRATION COSTS) ARISING DIRECTLY, INDIRECTLY OR CONSEQUENTIALLY OUT OF ANY ACTION, LEGAL OR EQUITABLE, BROUGHT BY ANY OTHER CONTRACTOR AGAINST OWNER, ENGINEER, CONSULTANTS, OR THE CONSTRUCTION COORDINATOR TO THE EXTENT SAID CLAIM IS BASED ON OR ARISES OUT OF CONTRACTOR'S PERFORMANCE OF THE WORK. SHOULD ANOTHER CONTRACTOR CAUSE DAMAGE TO THE WORK OR PROPERTY OF CONTRACTOR OR SHOULD THE PERFORMANCE OF WORK BY ANY OTHER CONTRACTOR AT THE SITE GIVE RISE TO ANY OTHER CLAIM, CONTRACTOR SHALL NOT INSTITUTE ANY ACTION, LEGAL OR EQUITABLE, AGAINST OWNER, ENGINEER, OR THE CONSTRUCTION COORDINATOR OR PERMIT ANY ACTION AGAINST ANY OF THEM TO BE MAINTAINED AND CONTINUED IN ITS NAME OR FOR ITS BENEFIT IN ANY COURT OR BEFORE ANY ARBITER WHICH SEEKS TO IMPOSE LIABILITY ON OR TO RECOVER DAMAGES FROM OWNER, ENGINEER, OR THE CONSTRUCTION COORDINATOR ON ACCOUNT OF ANY SUCH DAMAGE OR CLAIM.**
- C. If Contractor is delayed at any time in performing or furnishing the Work by any act or neglect of another contractor, and Owner and Contractor are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a Claim for an extension of times in accordance with Article 12. An extension of the Contract Times shall be Contractor's exclusive remedy with respect to Owner, Engineer, and construction coordinator for any delay, disruption, interference, or hindrance caused by any other contractor. This paragraph does not

prevent recovery from Owner, Engineer, or construction coordinator for activities that are their respective responsibilities.”

ARTICLE 9 - ENGINEER’S STATUS DURING CONSTRUCTION

SC-9.04 Authorized Variations in Work

- A. Add the following to Paragraph 9.04.A:

“The Contractor shall notify the Engineer in writing prior to beginning any Work addressed in a Field Order if the Contractor does not agree that the Work involved represents no additional cost and/or time change in the Contract Documents.”

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

SC-10.03 Execution of Change Orders

- A. Add a new Paragraph 10.03.B as follows:

“B. Contractor assumes and bears responsibility for all costs and time delays associated with any variation from the requirements of the Contract Documents unless the variation is specifically approved by Change Order.”

SC-10.05 Claims

- A. Amend Paragraph 10.05.B by deleting “30” and inserting “7” in its place and by deleting “60” and inserting “30” in its place.

ARTICLE 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

SC-11.01 Cost of the Work

- A. Amend Paragraph 11.01.A by deleting the following words in the third sentence:

“those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:”

and insert the following in its place:

“those paid for the Work included in the Contract Price, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B. Contractor shall provide certified payroll records listing personnel classifications and salaries for all individuals involved in additional Work. Salaries for those not included in the certified payroll will be considered as being compensated under Paragraph 11.01.B, and shall include only the following items:”

- B. Amend Paragraph 11.01.A.1 by deleting the following words in the second sentence:

“without limitation superintendents, foreman”

and inserting the following in its place:

“one foreman (unless agreed upon prior to beginning Work)”

- C. Amend Paragraph 11.01.A.1 by deleting the following words in the last sentence:

“be included in the above”

and inserting the following in its place:

“not exceed 1.5 times regular pay and shall be included in the above”

- D. Amend Paragraph 11.01.B.1 by adding “superintendents” to the list of excluded personnel in the first sentence.
- E. Amend Paragraph 11.01.D by inserting “and at intervals” in the last sentence as shown below:

“.....and submit in a form and at intervals acceptable to Engineer ...”

SC-11.03 Unit Price Work

- A. Delete Paragraph 11.03.D entirely and insert the following in its place:

“D. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:

 - 1. If the total cost of a particular item of Unit Price Work amounts to 20 percent or more of the Total Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by the Contractor differs by more than 20 percent from the estimated quantity of such item indicated in the Agreement; and
 - 2. If there is no corresponding adjustment with respect to any other item of Work; and
 - 3. If Contractor believes that Contractor has incurred additional expense as a result thereof; or if Owner believes that the quantity variation entitles Owner to an adjustment in the Unit Price, either the Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Article 11 if the parties are unable to agree as to the effect of any such variation in the quantity of the Unit Price Work performed.”

ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

SC-12.03 Delays

- A. Add the following to Paragraph 12.03.A:

“No time extensions will be allowed for weather conditions for Projects using calendar days for the Contract Time.”

SC-12.04 No Damage for Delays

- A. Add a new Paragraph 12.04 as follows:

“12.04 *No Damage for Delays*

A. The Contractor agrees to make no claims for damage for delay in the performance of the Contract occasioned by any act or omission to act of the Owner, Engineer, or any of the Engineer’s or Owner’s agents, and agrees that any such claim

shall be fully compensated by an extension of time, as set forth in a Change Order, to complete performance of the Work as provided herein.”

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL, OR ACCEPTANCE OF DEFECTIVE WORK

SC-13.07 Correction Period

- A. Amend Paragraph 13.07.A by adding:
- “When early acceptance of a Substantially Completed portion of the Work is accomplished in the manner indicated, the correction period for that portion of the Work shall commence at the time of substantial completion of that Work.”

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

SC-14.02 Progress Payments

- A. Amend Paragraph 14.02.C.1 by deleting “Ten” and inserting “Thirty” in its place.
- B. Amend Paragraph 14.02.D.1 by deleting “or” in Paragraph 14.02.D.1.c and adding new paragraphs “e”, “f”, “g”, and “h” as follows:
- “e. Owner has been notified of failure to make payments to Subcontractors or Suppliers or for labor, or”
- “f. failure to submit up-to-date record documents as required by GC-6.12, or”
- “g. failure to submit monthly Progress Schedule updates or revised schedules as requested by the Owner or Engineer, or”
- “h. failure to provide project photographs required by the Specifications.”
- C. Amend Paragraph 14.02.D.2 by adding “to Owner’s satisfaction.”
- D. Amend Paragraph 14.02.D.3 by deleting “and subject to interest as provided in the Agreement.”
- E. Add a new Paragraph 14.02.D.4 as follows:
- “4. Owner may permanently withhold payment from Contract Price for:
- a. liquidated damages incurred by Contractor, or
- b. compensation for Engineer for overtime charges for more than two reviews of submittals, review of substitutions, re-inspection fees, inspections or designs related to correction of defective Work, or other Services identified as requiring payment by the Contractor. Compensation will be based on the following rates:

Position	Hourly Rate
Principal-in-Charge	\$200
Project Manager	\$160
Project Engineer	\$140

Position	Hourly Rate
Engineering Technician	\$110
Clerk	\$90
Expenses will be billed at the actual cost multiplied by 1.15	

- c. Costs for tests performed by the Owner to verify that Work previously tested and found to be defective has been corrected. Verification testing is to be provided at the Contractor's expense to verify products or constructed works are in compliance after corrections have been made."

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

SC-15.02 Owner May Terminate for Cause

- A. Add a new Paragraph 15.02.A.5 as follows:
- "5. If Contractor fails to provide the replacement bond required by General Conditions, Section 5.01.C or insurance coverage as required by General Conditions Article 5 and as amended by Supplemental Conditions."
- B. Add a new Paragraph 15.02.A.6 as follows:
- "6. If any petition of bankruptcy is filed by or against Contractor, or if Contractor is adjudged as bankrupt or insolvent or makes a general assignment for the benefit of creditors, or if a receiver is appointed for the benefit of Contractor's creditors, or if a receiver is appointed on account of Contractor's insolvency, upon the occurrence of any such event, Owner shall be entitled to request of Contractor or its successor in interest adequate assurance of future performance in accordance with the terms and conditions hereof. Failure to comply with such request within 7 days of delivery of the request shall entitle Owner to terminate this agreement and to the accompanying rights set forth in Paragraphs 15.02 and 15.03 hereof. In all events pending receipt of adequate assurance of performance and actual performance in accordance therewith, Owner shall be entitled to proceed with the Work with its own forces or with other contractors on a time and material or other appropriate basis. The cost of work by Owner or other contractors will be back charged against the Contract Sum hereof."
- C. Delete Paragraph 15.02.F entirely.

SC-15.04 Contractor May Stop Work or Terminate

- A. Add a new Paragraph 15.04.C as follows:
- "C. This Contract may not be assigned in whole or in part by the Contractor without the previous written consent of the Owner."

ARTICLE 16 - DISPUTE RESOLUTION

SC-16.01 Methods and Procedures

- A. Delete Paragraph 16.01 entirely and insert the following in its place:

"16.01 Methods and Procedures

- A. Owner and Contractor may exercise such rights or remedies as either may otherwise have under the Contract Documents or by Law."

ARTICLE 17 - MISCELLANEOUS

SC-17.02 Giving Notice

- A. Add a new Paragraph 17.02.B as follows:
 - "B. All references and conditions for a "calendar day contract" in the General Conditions and Supplementary Conditions shall apply for a "Fixed Date Contract." A "Fixed Date Contract" is one in which the calendar dates for reaching Substantial Completion and/or final completion are specified in lieu of identifying the actual calendar days involved."

SC-17.06 Headings

- A. Delete Paragraph 17.06 in its entirety and add a new Paragraph 17.06 as follows:

"17.06 Headings

 - A. The Article and paragraph headings in this Agreement are inserted for convenience only and do not constitute parts of these General Conditions or as a limitation of the scope of the particular section to which they refer. This Agreement will be fairly interpreted in accordance with its terms and conditions and not for or against either Party."

SC-17.07 Independent Contractor

- A. Add a new Paragraph 17.06 as follows:

"17.07 Independent Contractor

 - A. Each Party will perform its duties under this Agreement as an independent contractor. The Parties and their personnel will not be considered to be employees or agents of the other Party. Nothing in this Agreement will be interpreted as granting either Party the right or authority to make commitments of any kind for the other. This Agreement will not constitute, create, or be interpreted as a joint venture, partnership or formal business organization of any kind."

SC-17.08 Severability

- A. Add a new Paragraph 17.08 as follows:

"17.08 Severability

 - A. If a court of competent jurisdiction renders any part of this Agreement invalid or unenforceable, that part will be severed and the remainder of this Agreement will continue in full force and effect."

SC-17.09 No Third Party Beneficiaries

- A. Add a new Paragraph 17.09 as follows:

“17.09 No Third Party Beneficiaries

- B. Nothing in this Agreement shall be construed to create any right in any third party not a signatory to this Agreement, and the parties do not intend to create any third party beneficiaries by entering into this Agreement.”

SC-17.10 Sovereign Immunity

- C. Add a new Paragraph 17.10 as follows:

“17.10 Sovereign Immunity

- A. The parties agree that the Owner has not waived its sovereign immunity by entering into and performing its obligations under this Agreement.”

END OF SECTION

DIVISION 01
GENERAL REQUIREMENTS

01 11 00 SUMMARY OF WORK

1.00 GENERAL

1.01 WORK INCLUDED

- A. Construct Work as described in the Contract Documents.
 - 1. Provide the materials, equipment, and incidentals required to make the Project completely and fully operable.
 - 2. Provide the labor, equipment, tools, and consumable supplies required for a complete Project.
 - 3. Test and place the completed Project in operation.
 - 4. Provide the special tools, spare parts, lubricants, supplies, or other materials as indicated in Contract Documents for the operation and maintenance of the Project.
 - 5. Install Owner provided products and place in operation.
 - 6. The Contract Documents do not indicate or describe all of the Work required to complete the Project. Additional details required for the correct installation of selected products are to be provided by the Contractor and coordinated with the Engineer.

1.02 JOB CONDITIONS

- A. The General Conditions, the Supplementary Conditions, and General Requirements apply to each Section of the Specifications.
- B. Comply with all applicable state and local codes and regulations pertaining to the nature and character of the Work being performed.

1.03 DESCRIPTION OF WORK

- A. Work is described in general, non-inclusive terms as:
 - 1. This Project consists of the installation of two sanitary sewer lines; a 15" line that is approximately 6,000 linear feet and a 27" line that is approximately 4,300 linear feet, and approximately 50 total manholes. The project includes several different methods of installation including open cut, other than open cut, and pipe bursting.

1.04 WORK BY OWNER

- A. The Owner is not self-performing work related to the construction of this project.

1.05 OWNER-PROVIDED PRODUCTS

- A. There is no owner provided equipment.

1.06 CONSTRUCTION OF UTILITIES

- A. Existing utilities will be used for this Project. Coordinate with others performing Work associated with this Project.

1.07 OCCUPANCY

- A. As soon as any portion of the structure and equipment are ready for use, the Owner shall have the right to occupy or operate that portion upon written notice to the Contractor.
- B. Testing of equipment and appurtenances including specified test periods, training, and startup does not constitute acceptance for operation.
- C. Owner may accept the facility for continued use after startup and testing at the option of the Owner. If acceptance is delayed at the option of the Owner, shut down facilities per approved Operation and Maintenance procedures.
- D. The execution of bonds is understood to indicate the consent of the surety to these provisions.
- E. Provide an endorsement from the insurance carrier permitting occupancy of the structures and use of equipment during the remaining period of construction.
- F. Conduct operations to insure the least inconvenience to the Owner and general public.

2.00 PRODUCTS

2.01 MATERIALS

- A. Provide materials and products per the individual Sections of the Specifications.

3.00 EXECUTION (NOT APPLICABLE)

END OF SECTION

01 23 10 ALTERNATES AND ALLOWANCES

1.00 GENERAL

1.01 REQUIREMENTS

1.02 ALTERNATES:

1. This Section describes each alternate by number and describes the basic changes to be incorporated into the Work when this alternate is made a part of the Work in the Agreement.
2. Drawings and Specifications will outline the extent of Work to be included in the alternate Contract Price.
3. Coordinate related Work and modify surrounding Work as required to properly integrate the Work under each alternate, and provide a complete and functional system as required by the Contract Documents.
4. Alternates will be accepted or rejected at the option of the Owner.
5. Owner has 120 days from the date of the Notice of Award (or effective Date of Agreement) to elect to modify the Contract Documents by Change Order to add Alternate items at the cost indicated in Section 00 42 23.01 "Proposal Form Exhibit A."

1.03 ALLOWANCES:

1. Include specified allowance amount in Contract Price.
2. The amount of each allowance includes:
 - a. The cost of the product to the Contractor less any applicable trade discounts.
 - b. Delivery to the Site.
 - c. Applicable taxes.
3. Include in the Contract Price all costs for:
 - a. Handling at the Site, including unloading, uncrating, and storage per Section 01 31 00 "Project Management and Coordination."
 - b. Cost for labor and equipment for installation and finishing.
 - c. Cost for related products not specifically listed in the allowance required for installation, including consumable supplies and materials.
 - d. All overhead, profit, and related costs.
4. Assist Owner in the selection of products.
 - a. Determine qualified Suppliers.
 - b. Obtain proposals from qualified Suppliers.
 - c. Present available alternates to the Owner through the Engineer. Notify Engineer of:
 - 1). Any objections to a particular Supplier or product.

- 2). Effect on the Construction Schedule anticipated by the selection of each option.
- 3). Cost of each option.
5. Upon selection of the product:
 - a. Purchase and install the product.
 - b. Contractor's responsibilities for products shall be the same as for products selected by the Contractor.
6. Submit a Contract Modification Request per Section 01 31 13 "Project Coordination" to adjust Contract Price if the net cost of the product is more or less than the specified amount.
 - a. For products specified as Unit Price Work, the unit cost shall apply to the quantities installed per the method of payment described in Section 01 29 00 "Payment Procedures."
 - b. Do not perform Work until selection of alternate has been approved in writing by the Owner.
 - c. Provide actual invoices for the materials.

1.04 SUBMITTALS

1. Provide submittals for materials furnished as part of the alternate in accordance with Section 01 33 00 "Submittal Procedures."

1.05 DESCRIPTION OF ALTERNATES

1. Segment 2 – Item 203a "27" FRP Pipe (By Open Cut)"
 - a. Replace PVC Pipe in Item 203 with FRP pipe.

1.06 DESCRIPTION OF ALLOWANCES

1. Segment 1 and 2 - "Landscape and Irrigation Allowance":
 - a. The Sum of \$5,000.00 to be used to reconnect the existing irrigation system in Walker Creek Park including sprinkler heads, valves, programming, and all other required work not specifically set in a separate bid item.
2. Segment 1 and 2 - "Miscellaneous Utility Fund":
 - a. The Sum of \$25,000.00 to be used to for miscellaneous utility items as approved by the City.
3. Segment 1 and 2 - "Paving Allowance":
 - a. The Sum of \$5,000.00 to be used to repair damaged paving not specifically set in a separate bid item. This allowance must be approved by the City.

1.07 GUARANTEES

1. Provide guarantees for products furnished under alternate bids / proposals or purchased by allowances as required by the Contract Documents.

2.00 PRODUCTS (NOT APPLICABLE)

3.00 EXECUTION (NOT APPLICABLE)

END OF SECTION

01 29 00 PAYMENT PROCEDURES

1.00 GENERAL

1.01 WORK INCLUDED

- A. Payments for Work shall conform to the provisions of the General Conditions, the Supplementary Conditions, the Agreement, and this Section. Apply provisions for payments in the Section to all Subcontractors and Suppliers.
- B. Submit Applications for Payment at the amounts indicated in the Agreement:
 - 1. Amounts for each item in the Agreement shall include but not be limited to cost for:
 - a. Mobilization, demobilization, cleanup, bonds, and insurance.
 - b. Professional services including but not limited to engineering and legal fees.
 - c. The products to be permanently incorporated into the Project.
 - d. The products consumed during the construction of the Project.
 - e. The labor and supervision to complete the Project.
 - f. The equipment, including tools, machinery, and appliances required to complete the Project.
 - g. The field and home office administration and overhead costs related directly or indirectly to the Project.
 - h. Any and all kinds, amount or class of excavation, backfilling, pumping or drainage, sheeting, shoring and bracing, disposal of any and all surplus materials, permanent protection of all overhead, surface or underground structures; removal and replacement of any poles, conduits, pipelines, fences, appurtenances and connections, cleaning up, overhead expense, bond, public liability and compensation and property damage insurance, patent fees, and royalties, risk due to the elements, and profits, unless otherwise specified.
 - 2. Provide Work not specifically set forth as an individual payment item but required to provide a complete and functional system. These items are a subsidiary obligation of the Contractor and are to be included in the Cost of Work.
 - 3. Payment will be made for materials on hand.
 - a. Store materials properly on Site per Section 01 31 00 "Project Management and Coordination."
 - 1). Payment will be made for the invoice amount less the specified retainage.
 - 2). Provide invoices at the time materials are included on the materials-on-hand tabulation.
 - b. Provide documentation of payment for materials-on-hand with the next payment request. Adjust payment to the amount actually paid if this differs from the invoice amount. Remove items from the materials on hand tabulation if this documentation is not provided so payment will not be made.

- c. Payment for materials-on-hand is provided for the convenience of the Contractor and does not constitute acceptance of the product.
- 4. The Work covered by progress payments becomes the property of the Owner at the time of payment.

1.02 SCHEDULE OF VALUES AND PAYMENTS

- A. Submit a detailed Schedule of Values for the Work to be performed on the project.
 - 1. Submit schedule within 10 days prior to submitting the first Application for Payment.
 - 2. Line items in the Agreement are to be used as line items in the schedule.
 - 3. Payment will be made on the quantity of Work completed per Contract Documents during the payment period and as measured per this Section.
 - a. Payment amount is the Work quantity measured multiplied by the unit prices for that line item in the Agreement.
 - b. Payment on a unit price basis will not be made for Work outside finished dimensions shown in the Contract Documents.
 - c. Partial payments will be made for lump sum line items in the Agreement.
 - 1). Lump sum line items in the Agreement are to be divided into smaller unit prices to allow more accurate determination of the percentage of the item that has been completed.
 - a). Provide adequate detail to allow more accurate determination of the percentage of Work completed for each item.
 - b). Provide amounts for items that do not exceed \$50,000.00. An exception may be made for equipment packages that cannot be subdivided into units or subassemblies.
 - c). Separate product costs and installation costs.
 - (1). Product costs include cost for product, delivery and unloading costs, royalties and patent fees, taxes, and other costs paid directly to the Subcontractor or Supplier.
 - (2). Installation costs include cost for the supervision, labor and equipment for field fabrication, erection, installation, start-up, initial operation and overhead and profit.
 - d). Lump sum items may be divided into an estimated number of units.
 - (1). The estimated number of units times the cost per unit must equal the lump sum amount for that line item.
 - (2). Payment will be made for all of the lump sum line item amount.
 - e). Include a directly proportional amount of overhead and profit for each line item.
 - f). Divide principal subcontract amounts into an adequate number of line items to allow determination of the percentage of Work completed for each item.

- 2). These line items may be used to establish the value of Work to be added or deleted from the Project.
- 3). Correlate line items with other administrative schedules and forms:
 - a). Progress schedule.
 - b). List of Subcontractors.
 - c). Schedule of allowances.
 - d). Schedule of alternatives.
 - e). List of products and principal Suppliers.
 - f). Schedule of Submittals.
- 4). Costs for mobilization/demobilization are to be listed as a separate line item and includes the actual cost for:
 - a). Bonds and insurance.
 - b). Transportation and setup for equipment.
 - c). Transportation and/or erection of all field offices, sheds and storage facilities.
 - d). Salaries for preparation of submittals required before the first Application for Payment.
 - e). Salaries for field personnel assigned to the Project related to the mobilization/demobilization of the Project.
 - f). Transportation, breakdown/loading, and removal of equipment.
 - g). Transportation and/or disassembly of all temporary facilities erected for construction.
 - (1). Mobilization/demobilization may not exceed 5 percent of the total Contract amount. Cost for mobilization and demobilization may be submitted only for Work completed.
- 5). The sum of all values listed in the schedule must equal the total Contract amount.
4. Submit a schedule indicating the anticipated schedule of payments to be made by the Owner. Schedule shall indicate:
 - a. The Application for Payment number.
 - b. Date the request is to be submitted.
 - c. Anticipated amount of payment to be requested.
5. Update the Schedule of Values quarterly or more often if necessary to provide a reasonably accurate indication of the funds that the Owner will need to have available to make payment to the Contractor for the Work performed.
- B. Provide written approval of the Schedule of Values, Application for Payment form, and method of payment by the Surety Company providing performance, and bonds prior to

submitting the first Application for Payment. Payment will not be made without this approval.

1.03 PAYMENT PROCEDURES

- A. Submit Applications for Payment per the procedures indicated in Section 01 33 00 "Submittal Procedures." Submit a Schedule of Values in the Application for Payment format to be used.
- B. Applications for Payment may be submitted on a pre-printed form as indicated in Section 01 31 13.13 "Forms" or may be generated by computer. Computer generated payment requests must have the same format and information indicated in the pre-printed form and be approved by the Engineer.
 - 1. Indicate the total contract amount and the Work completed to date on the Tabulation of Values for Original Contract Performed (Attachment "A.").
 - 2. Include only approved Change Order items in the Tabulation of Extra Work on Approved Change Orders (Attachment "B.").
 - 3. List all materials on hand that are presented for payment on the Tabulation of Materials on Hand (Attachment "C.") Once an item has been entered on the tabulation it is not to be removed.
 - 4. Include the Project Summary Report (Attachment "D") with each Application for Payment. Data included in the Project Summary Report are to be taken from the other tabulations. Include a completed summary as indicated with Applications for Payment submitted.
 - a. Number each application sequentially and indicate the payment period. Revised Applications for Payment will be resubmitted as A, B, C and so forth to note changes in content.
 - b. Show the total amounts for value of original Contract performed, extra Work on approved Change Orders, and materials on hand on the Project Summary Report. Show total amounts that correspond to totals indicated on the attached tabulation for each.
 - c. Note the number of pages in tabulations in the blank space on the Project Summary Report to allow a determination that all sheets have been submitted.
 - d. Execute Contractor's certification by the Contractor's agent of authority and notarize for each Application for Payment.
 - 5. Do not alter the schedule of values and the form for the submission of requests without the written approval of the Engineer once these have been approved by the Engineer.
 - 6. Final payment requires additional procedures and documentation per Section 01 70 00 "Execution and Closeout Requirements."
- C. Progress payments shall be made as the Work progresses on a monthly basis.
 - 1. End the payment period on the day indicated in the Agreement and submit an Application for Payment for Work completed and materials received since the end of the last payment period.

2. At the end of the payment period, submit a draft copy of the Application for Payment for that month to the Engineer. Agreement is to be reached on:
 - a. The percentage of Work completed for each lump sum item.
 - b. The quantity of Work completed for each unit price item.
 - c. The percentage of Work completed for each approved Change Order item.
 - d. The amount of materials-on-hand.
 3. On the basis of these agreements the Contractor is to prepare a final copy of the Application for Payment and submit it to the Engineer for approval.
 4. The Engineer will review the Application for Payment and if appropriate will recommend payment of the application to the Owner.
- D. Provide a revised and up-to-date Progress Schedule per Section 01 32 16 "Construction Progress Schedules" with each Application for Payment.
- E. Provide project photographs per Section 01 32 33 "Photographic Documentation" with final Application for Payment.

1.04 MEASUREMENT PROCEDURES

- A. Measure the Work described in the Agreement for payment. Payment will be made only for the actual measured and/or computed length, area, solid contents, number and weight, unless otherwise specifically provided. No extra or customary measurements of any kind will be allowed.

1.05 BASIS OF PAYMENT

- A. The Basis of Payment will be as established in the Contract Documents and as described below:

Segment 1

1. BID ITEM 101 – 16" DIPS DR-17 Grey Pipe (By Pipe Burst Ex. 10")
 - a. This item shall consist of pipe provision and installation by pipe burst method, access, receiving, and intermediate bore pits, fence removal/replacement to existing conditions, associated surface restoration, and temporary fence, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property, and all other required work not specifically set in a separate bid item.
 - b. This bid item shall be measured horizontally from the center of the manhole to the center of the manhole or cleanout without any deductions for the length of pipe through manholes.
 - c. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.

2. BID ITEM 102 – 16" DIPS DR-17 Grey Pipe (By Pipe Burst Ex. 8")
 - a. This item shall consist of pipe provision and installation by pipe burst method, access, receiving, and intermediate bore pits, fence removal/replacement to existing conditions and temporary fence, associated surface restoration, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property, and all other required work not specifically set in a separate bid item.
 - b. This bid item shall be measured horizontally from the center of the manhole to the center of the manhole or cleanout without any deductions for the length of pipe through manholes.
 - c. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.
3. BID ITEM 103 – 15" PVC SDR 26 Pipe (By Open Cut – All Depths)
 - a. This item shall consist of trenching, backfill, embedment, pipe provision and placement, fence removal/replacement to existing conditions and temporary fence, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.
4. BID ITEM 104 – 15" PVC SDR 26 Pipe (By Other than Open Cut)
 - a. This item shall consist of pipe provision and installation by other than open cut method, excavation and backfill required for associated bore pits, fence removal/replacement to existing conditions and temporary fence, associated surface restoration, grout of void space (if required), leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.
5. BID ITEM 105 – 12" PVC SDR 35 Pipe (By Open Cut – All Depths)
 - a. This item shall consist of trenching, backfill, embedment, pipe provision and placement, removal of existing sanitary sewer manholes within pipe trench, fence removal/replacement to existing conditions and temporary fence, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.

- b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.
- 6. BID ITEM 106 – 15" SS - Contractor's Option - STA 34+99.43 to 39+55.76
 - a. This item shall consist of pipe installation by either open cut or other than open cut. The method of installation selected by the contractor shall include trenching, backfill, embedment, pipe provisions and placement, fence removal/replacement to existing conditions and temporary fence, associated surface restoration, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item. If open cut is selected, the Contractor will be responsible for drive repair and removal and replacement of existing culverts required for pipe installation. Contractor must maintain partial access to existing driveways. If other than open cut is selected the bid item shall include excavation and backfill required for associated bore pits.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment does not include work required for providing trench safety. Trench safety will be paid separate if open cut option is selected. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.
- 7. BID ITEM 107 – 15" SS PVC SDR 35 Carrier Pipe Inside 24" Steel Casing
 - a. This item shall consist of pipe provision and installation of SS carrier pipe inside casing pipe, leakage tests, deflection test, all required laboratory tests, spacers, grout of void spaces, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.
- 8. BID ITEM 108 – 14" SS HDPE SDR 21 Pipe (By Open Cut – All Depths)
 - a. This item shall consist of trenching, backfill, embedment, pipe provision and placement, removal of existing sanitary sewer manholes within pipe trench, fence removal/replacement to existing conditions and temporary fence, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80%

once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.

9. BID ITEM 109 – 14" SS HDPE SDR 21 Pipe (By Other than Open Cut)

- a. This item shall consist of trenching, backfill, embedment, pipe provision and placement, removal of existing sanitary sewer manholes within pipe trench, excavation and backfill required for associated bore pits, fence removal/replacement to existing conditions and temporary fence, associated surface restoration, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.

10. BID ITEM 110 – 14" SS HDPE SDR 21 Carrier Pipe Inside 20" Steel Casing

- a. This item shall consist of pipe provision and installation of SS carrier pipe inside casing pipe, leakage tests, deflection test, all required laboratory tests, spacers, grout of void spaces, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.

11. BID ITEM 111 – 8" PVC SDR 26 Pipe (By Open Cut – All Depths)

- a. This item shall consist of trenching, backfill, embedment, pipe provision and placement, fence removal/replacement to existing conditions and temporary fence, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.

12. BID ITEM 112 – 6" PVC Service Line

- a. This item shall consist of pipe provision and installation, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.

- b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 13. BID ITEM 113 – 20" Steel Casing (By Other than Open Cut - for 14" Carrier Pipe)
 - a. This item shall consist of casing and installation by other than open cut, excavation and backfill required for associated bore pits, and any required site repair associated with the installation of the casing pipe, fence removal/replacement to existing conditions and temporary fence, associated surface restoration, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.
- 14. BID ITEM 114 – 20" Steel Casing (By Open Cut - for 14" Carrier Pipe)
 - a. This item shall consist of casing and installation by open cut, deflection test, all required laboratory tests, spacers, grout of void spaces, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.
- 15. BID ITEM 115 – 24" Steel Casing (By Other than Open Cut - for 15" Carrier Pipe)
 - a. This item shall consist of casing and installation by other than open cut, excavation and backfill required for associated bore pits, and any required site repair associated with the installation of the casing pipe, fence removal/replacement to existing conditions and temporary fence, associated surface restoration, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 16. BID ITEM 116 – Plug Existing Sanitary Sewer (<12")
 - a. This item shall consist of cutting and plugging the existing sanitary sewer, trenching, backfill, embedment, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

17. BID ITEM 117 – Trench Safety

- a. The Contractor shall be solely responsible for trench safety provisions meeting the requirements of the United States Department of Labor Occupational Safety and Health Administration. The Contractor's trench safety system shall include all shoring and/or bracing necessary to adequately provide a safe trench situation for all construction on this project. The Contractor shall have a trench safety plan prepared, signed, and sealed by a registered professional engineer from the State of Texas.
- b. Measurement and payment for Trench Safety Systems shall be made on the basis of the price bid per linear foot for a trench depth of (5) five feet or greater for all the main line pipes installed by the open cut method, including pipe installed by open cut under Contractor's Option bid items. Payment shall be full compensation for all materials, equipment, labor and other incidentals necessary to furnish, install and remove the Trench Safety Systems. The Contractor will provide all soil borings necessary for preparation of this safety plan.

18. BID ITEM 118 – Sanitary Sewer Service Reconnection

- a. This item shall consist of reconnection of all existing sanitary sewer services, whether or not they are indicated in the plans. This item shall include all PVC pipe required to reestablish the existing connection.
- b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

19. BID ITEM 119 – Remove Existing Manhole

- a. This item shall consist of removal of existing manholes as indicated in the plans and details.
- b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

20. BID ITEM 120 – 4' Diameter Manhole (0' to 5' in Depth)

- a. This item shall consist of excavation, backfill, embedment, manhole provision and placement, water tight locking manhole insert as indicated on plans, frame and cover, grade ring as required to bring to finish grade, protective manhole coating for corrosion protection (if manhole is concrete), any necessary fence removal and repair, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

21. BID ITEM 121 – 4' Diameter Manhole Extra Depth (Over 5' in Depth)

- a. This item shall consist of depth in excess of 5 vertical feet needed for the sanitary sewer manhole.

- b. Measurement and payment shall be made on the basis of the price bid per vertical foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 22. BID ITEM 122 – 4' Diameter Watertight Manhole (0' to 5' in Depth)
 - a. This item shall consist of excavation, backfill, embedment, manhole provision and placement, water tight locking manhole insert as indicated on plans, watertight frame and cover, grade ring as required to bring to finish grade, protective manhole coating for corrosion protection (if manhole is concrete), any necessary fence removal and repair, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 23. BID ITEM 123 – 4' Diameter Watertight Manhole Extra Depth (Over 5' in Depth)
 - a. This item shall consist of depth in excess of 5 vertical feet needed for the sanitary sewer manhole.
 - b. Measurement and payment shall be made on the basis of the price bid per vertical foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 24. BID ITEM 124 – 4' Diameter Drop Manhole (0' to 5' in Depth)
 - a. This item shall consist of excavation, backfill, embedment, manhole provision and placement, water tight locking manhole insert as indicated on plans, external drop structure as indicated in plans, frame and cover, grade ring as required to bring to finish grade, protective manhole coating for corrosion protection (if manhole is concrete), any necessary fence removal and repair, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 25. BID ITEM 125 – 4' Diameter Drop Manhole Extra Depth (Over 5' in Depth)
 - a. This item shall consist of depth in excess of 5 vertical feet needed for the sanitary sewer manhole.
 - b. Measurement and payment shall be made on the basis of the price bid per vertical foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 26. BID ITEM 126 – 5' Diameter Manhole (0' to 5' in Depth)
 - a. This item shall consist of excavation, backfill, embedment, manhole provision and placement, water tight locking manhole insert as indicated on plans, frame and cover, grade ring as required to bring to finish grade, protective manhole coating for corrosion protection (if manhole is concrete), any necessary fence removal and

repair, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.

- b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

27. BID ITEM 127 – 5' Diameter Manhole Extra Depth (Over 5' in Depth)

- a. This item shall consist of depth in excess of 5 vertical feet needed for the sanitary sewer manhole.
- b. Measurement and payment shall be made on the basis of the price bid per vertical foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

28. BID ITEM 128 – 5' Diameter Drop Manhole (0' to 5' in Depth)

- a. This item shall consist of excavation, backfill, embedment, manhole provision and placement, water tight locking manhole insert as indicated on plans, external drop structure as indicated in plans, frame and cover, grade ring as required to bring to finish grade, protective manhole coating for corrosion protection (if manhole is concrete), any necessary fence removal and repair, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

29. BID ITEM 129 – 5' Diameter Drop Manhole Extra Depth (Over 5' in Depth)

- a. This item shall consist of depth in excess of 5 vertical feet needed for the sanitary sewer manhole.
- b. Measurement and payment shall be made on the basis of the price bid per vertical foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

30. BID ITEM 130 – 5' Diameter Watertight Manhole (0' to 5' in Depth)

- a. This item shall consist of excavation, backfill, embedment, manhole provision and placement, water tight locking manhole insert as indicated on plans, watertight frame and cover, grade ring as required to bring to finish grade, protective manhole coating for corrosion protection (if manhole is concrete), any necessary fence removal and repair, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

31. BID ITEM 131 – 5' Diameter Watertight Manhole Extra Depth (Over 5' in Depth)

- a. This item shall consist of depth in excess of 5 vertical feet needed for the sanitary sewer manhole.

- b. Measurement and payment shall be made on the basis of the price bid per vertical foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 32. BID ITEM 132 – Remove and Replace Existing 18" RCP
 - a. This item shall consist of removal of existing 18" RCP, pipe provision and installation by open cut method, all required tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 33. BID ITEM 133 – Remove and Replace Existing 24" RCP
 - a. This item shall consist of removal of existing 24" RCP, pipe provision and installation by open cut method, all required tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 34. BID ITEM 134 – Remove/Replace Existing Curb and Gutter
 - a. This item shall consist of removal and replacement of existing curb and gutter damaged by construction activities. The curb and gutter shall be in accordance with the City's standard details.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 35. BID ITEM 135 – Asphalt Pavement Repair – Within Trench
 - a. This item shall consist of the construction of asphalt pavement as shown on the plans. The asphalt pavement shall be in accordance with the details provided in the plans. All asphalt shall be placed to the required line and grades to match existing.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 36. BID ITEM 136 – Concrete Pavement Repair – Within Trench
 - a. This item shall consist of the construction of concrete pavement as shown on the plans. The concrete pavement shall be in accordance with the details provided in the plans. All concrete for the roadway construction shall be a minimum compressive strength of 3600 psi at 28 days. The cost for furnishing and placing reinforcement is subsidiary to the price bid. All concrete shall be placed to the required line and grades to match existing. Work shall be in compliance with TxDOT item 360.

- b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 37. BID ITEM 137 – Concrete Driveway Repair (Residential and Commercial) – Within Trench
 - a. This item shall consist of the removal and installation of concrete drive as shown on the plans. The concrete drive and curb returns shall be in accordance with the details provided in the plans. All concrete for the driveway construction shall be a minimum compressive strength of 3000 psi at 28 days. The cost for furnishing and placing reinforcement is subsidiary to the price bid. Work shall be in compliance with City standards. Access to all driveways must be maintained.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 38. BID ITEM 138 – Concrete Flume Repair
 - a. This item shall consist of the subgrade prep, furnishing and placing of reinforced concrete including formwork in accordance with the details in the plans at the locations shown on the plans. All concrete mix design shall be in accordance with Section 03 30 53 “Miscellaneous Cast-In-Place Concrete”. The cost for furnishing and placing reinforcement is subsidiary to the price bid.
 - b. Measurement and payment shall be made on the basis of the price bid per square yards and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 39. BID ITEM 139 – 6” – 12” Waterline Adjustment
 - a. This item shall consist of trenching, backfill, embedment, C-900 pipe provision and placement, removal of existing waterline within pipe trench, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 40. BID ITEM 140 – Clay Dam
 - a. This item shall consist of soil provision and installation in accordance with the plans where indicated, the width shall be determined by the limits of undisturbed soil and the height shall be the full depth of the trench to natural ground.
 - b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 41. BID ITEM 141 – Pre-Construction Video
 - a. This item shall consist of a continuous color video, with audio, recording above ground pre-construction conditions of the entire project limits.

- b. Measurement and payment shall be made on the basis of the price bid per lump sum and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

42. BID ITEM 142 –CCTV Inspection on Existing Sewer

- a. This item shall consist of CCTV inspection, all labor, materials, equipment necessary for inspection of the existing sewer lines to be abandoned and/or taken out of service to include verifying existing service locations and disposal of all waste material off City property and all other required work not specifically set in a separate bid item. The work performed as part of this bid item shall be in accordance with 33 01 30.16 “TV Inspection of Sewer Lines”.
- b. This bid item shall be measured horizontally from the center of the manhole to the center of the manhole or cleanout without out any deductions for the length of pipe through manholes.
- c. Measurement and payment shall be made on the basis of the price bid per linear feet and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

43. BID ITEM 143 – Post-Construction CCTV Inspection on Proposed Sewer

- a. This item shall consist of CCTV inspection, all labor, materials, equipment necessary for inspection of the proposed sewer and disposal of all waste material off City property and all other required work not specifically set in a separate bid item. The work performed as part of this bid item shall be in accordance with 33 01 30.16 “TV Inspection of Sewer Lines”.
- b. This bid item shall be measured horizontally from the center of the manhole to the center of the manhole or cleanout without out any deductions for the length of pipe through manholes.
- c. Measurement and payment shall be made on the basis of the price bid per linear feet and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

44. BID ITEM 144 – Concrete Encasement

- a. This item shall consist of the placement of concrete encasement as shown on the plans. The concrete shall be in accordance with the details provided in the plans.
- b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

45. BID ITEM 145 – Abandon Existing Manhole

- a. This item shall consist of abandoning the existing manhole in accordance with the plans and shall include removal of existing cone, provision and placement of flowable fill in the remaining manholes risers and plugging all penetrations to the existing manhole and disposal of all waste material off City property and all other required work not specifically set in a separate bid item.

- b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 46. BID ITEM 146 – Abandonment Grout for Existing 8" SS
 - a. This item shall consist of grouting the existing sewer lines as indicated by the plans including installation of plugs and/or bulkheads, and any removal of existing pipe necessary for a complete installation.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 47. BID ITEM 147 – Abandonment Grout for Existing 6" SS
 - a. This item shall consist of grouting the existing sewer lines as indicated by the plans including installation of plugs and/or bulkheads, and any removal of existing pipe necessary for a complete installation.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 48. BID ITEM 148– Concrete Sidewalk Repair (4' Wide)
 - a. This item shall consist of the construction of concrete sidewalk as shown on the plans. The concrete pavement shall be in accordance with the details provided in the plans. All concrete for sidewalk construction shall be a minimum compressive strength of 3000 psi at 28 days. The cost for furnishing and placing reinforcement is subsidiary to the price bid. All concrete shall be placed to the required line and grades to match existing.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 49. BID ITEM 149 – Point Repair on Existing Sanitary Sewer ($\leq 12"$)
 - a. This item shall consist of pipe provision, up to 20' per location, and installation by open cut method, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 50. BID ITEM 150 – Adjust Existing Water Meter and Service
 - a. This item shall consist of trenching, backfill, embedment, C-900 pipe provision and placement, removal of existing waterline within pipe trench, leakage tests, deflection test, meter adjustment, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.

- a. Measurement and payment shall be made on the basis of the price bid per lump sum and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
51. BID ITEM 151 – Pothole of Existing Williams Gas Line (STA 35+34.33) > 8' Deep
- a. This item shall consist of potholing the existing utility. This item shall be done prior to first payment authorization. Contractor to notify Engineer in the event of a conflict with the utility.
 - b. Measurement and payment shall be made on the basis of the price bid per lump sum and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
52. BID ITEM 152 – Pothole of Existing Explorer Gas Line (STA 46+15.79) > 8' Deep
- a. This item shall consist of This item shall consist of potholing the existing utility. This item shall be done prior to first payment authorization. Contractor to notify Engineer in the event of a conflict with the utility.
 - b. Measurement and payment shall be made on the basis of the price bid per lump sum and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
53. BID ITEM 153 – Hydromulch and Seeding or St. Augustine Sod
- a. This item shall consist of providing a uniform seeding for the areas within the easement or ROW limits or defined work space or sod to match existing conditions. Contractor shall be solely responsible for returning all disturbed areas outside of the easement or ROW limits to pre-construction conditions. Contractor shall remove all roots, debris, and rocks larger than 1½". Grades shall be uniform, with even cross sections to prevent ponding or uneven grades. Contractor shall be responsible for watering areas of seeding or sod. Subsequent watering shall continue until grass is established. If hydromulch is used, seeding areas shall be fertilized with a 16-8-8 (N-P-K). Application rate of fertilizer shall be as recommended by manufacturer of fertilizer. The Contractor shall maintain seeded areas until the grass has an established minimum height of two inches over 85 percent (85%) of the disturbed area.
 - b. Payment will be made at the unit price bid per square yard and shall be full compensation for all labor, materials, equipment, tools, fertilizer, watering and incidentals necessary to install item complete in place.
54. BID ITEM 154 – Traffic Control Plan
- a. This item shall consist of development and implementation of a traffic control plan for all portions of Segment 1 where installation may affect traffic, and temporary asphalt paving to maintain access to residents and businesses. Work performed under this item shall be completed in accordance with the "Texas Manual on Uniform Traffic Control Devices". The traffic control plan shall be prepared by a professional engineer licensed in the state of Texas and shall be submitted to the City and/or TxDOT for review and approval. This item shall include all required permits and flagmen.

- b. Measurement and payment shall be made on the basis of the price bid per lump sum and shall be full compensation for all labor, materials and equipment necessary to maintain and complete this pay item. A percentage of the lump sum amount, as indicated in the schedule of values, will be paid on a monthly basis.

55. BID ITEM 155 – Design/Implementation of SWPPP

- a. This item shall consist of construction activities resulting in less than five acres of disturbance and shall include all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per lump sum and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

56. BID ITEM 156– By-Pass Pumping

- a. This item shall consist of trenching, backfill embedment, pipe and pump provision and placement, and back-up pumps as required by TCEQ. Powered by-pass pipe shall be restrained and have a pressure rating of 150 psi. Planning and coordination with the City of North Richland Hills before system shutdown, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per lump sum and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. A percentage of the lump sum amount, as indicated in the schedule of values, will be paid on a monthly basis. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.

57. BID ITEM 157 – Remove Existing Trees

- a. This item shall consist of removal of trees as indicated in the plans. The Contractor shall use special care to protect public and private property and to prevent damage of existing utilities lines when cutting and removing trees. This item includes maintaining proper barricades, disposal of all waste material off City property, and all other required work not specifically set in a separate bid item. If any curb, sidewalk, walls, streets, etc., are damaged during the removal of the tree, the Contractor shall replace the damaged portions at his expense. Stumps shall be removed to a minimum depth of 6" below finished grade.
- b. Measurement and payment shall be made on the basis of the price bid lump sum and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

58. BID ITEM 158 – Landscape and Irrigation Allowance

- a. This shall be as defined in Section 01 23 10 "Alternates and Allowances".

Measurement and payment shall be paid as a percentage of the total lump sum amount for approved invoices only and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

59. BID ITEM 159 – Miscellaneous Utility Fund

- a. This shall be as defined in Section 01 23 10 “Alternates and Allowances”.
- b. Measurement and payment shall be paid as a percentage of the total lump sum amount for approved invoices only and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

60. BID ITEM 160 – Paving Allowance

- a. This shall be as defined in Section 01 23 10 “Alternates and Allowances”.
- b. Measurement and payment shall be paid as a percentage of the total lump sum amount for approved invoices only and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

61. BID ITEM 161 – Pond Dredging

- a. This item shall consist of pond dredging. Excavation of sediment within the pond must be completed in a one-step excavation-only method. The excavated sediment and any water within the excavated spoils must be contained and disposed at an upland site. A track hoe, excavator, or other excavating apparatus must be used from the top of the bank at an upland location. Sediment/water must be placed into a truck or container and hauled off to an upland disposal site or landfill. No excavated sediment may return, directly or indirectly, to the pond. This item shall include disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per cubic yard and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

62. BID ITEM 162 – Mobilization/Bonds/Insurance

- a. This item shall consist of all required insurance, bonds, and preparatory work and operations necessary for the movement of personnel, equipment and supplies to the project site.
- b. Measurement and payment shall be made on the basis of the price bid per lump sum, not to exceed 5% of base bid amount.

Segment 2

1. BID ITEM 201 – 30" OD DIPS DR-17 Grey Pipe (By Pipe Burst Ex. 21")

- a. This item shall consist of pipe provision and installation by pipe burst method, access, receiving, and intermediate bore pits, fence removal/replacement and temporary fence, associated surface restoration, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property, and all other required work not specifically set in a separate bid item.
- b. This bid item shall be measured horizontally from the center of the manhole to the center of the manhole or cleanout without out any deductions for the length of pipe through manholes.

- c. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.
- 2. BID ITEM 202 – 27" SS - Contractor's Option - STA 2+57.34 to 9+10.32
 - a. This item shall consist of pipe installation by either open cut or pipe burst. Open cut shall include trenching, backfill, embedment, pipe provisions and placement, fence removal/replacement to existing conditions and temporary fence, associated surface restoration, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item. Pipe burst shall include pipe provision and installation by pipe burst method, access, receiving, and intermediate bore pits, associated surface restoration, fence removal/replacement to existing conditions and temporary fence, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item. If open cut is selected, the Contractor will be responsible for drive repair and removal and replacement of existing culverts required for pipe installation.
 - b. Measurement and payment for pipe bursting shall be measured horizontally from the center of the manhole to the center of the manhole or cleanout without out any deductions for the length of pipe through manholes.
 - c. Measurement and payment for either installation method shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment does not include work required for providing trench safety. Trench safety will be paid separate if open cut option is selected. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.
- 3. BIT ITEM 203 – 27" PVC PS 116 Pipe (By Open Cut – All Depths)
 - a. This item shall consist of trenching, backfill, embedment, pipe provision and placement, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property, permanent fencing, pavement, and surface restoration, and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.
- 4. BID ITEM 204 – 27" SS - Contractor's Option - STA 28+50 to 28+57
 - a. This item shall consist of pipe installation by either open cut or other than open cut. The method of installation selected by the contractor shall include trenching, backfill, embedment, pipe provisions and placement, fence removal/replacement to existing conditions and temporary fence, associated surface restoration, leakage

tests, deflection test, all required laboratory tests, disposal of all waste material off City property, and all other required work not specifically set in a separate bid item. If open cut is selected, the Contractor will be responsible for drive repair, removal and replacement of existing culverts, and street and sidewalk repair within this segment. If other than open cut is selected, the Contractor will be responsible for excavation and backfill required for associated bore pits. Contractor is responsible for drive repair and removal and replacement of existing culverts required for pipe installation.

- b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment does not include work required for providing trench safety. Trench safety will be paid separate if open cut option is selected. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.
5. BID ITEM 205 – 27" PS 116 Carrier Pipe in 42" Steel Casing
- a. This item shall consist of pipe provision and installation of SS carrier pipe inside casing pipe, leakage tests, deflection test, all required laboratory tests, casing spacers, grouting of voids, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.
6. BID ITEM 206 – 42" Steel Casing (By Other than Open Cut - for 27" Carrier Pipe)
- a. This item shall consist of casing and installation by other than open cut, excavation and backfill required for associated bore pits, and any required site repair associated with the installation of the casing pipe, deflection test, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
7. BID ITEM 207 – 8" PVC SDR 26 Pipe (By Open Cut – All Depths)
- a. This item shall consist of trenching, backfill, embedment, pipe provision and placement, fence removal/replacement to existing conditions and temporary fence, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80%

once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.

8. BID ITEM 208 – Trench Safety

- a. The Contractor shall be solely responsible for trench safety provisions meeting the requirements of the United States Department of Labor Occupational Safety and Health Administration. The Contractor's trench safety system shall include all shoring and/or bracing necessary to adequately provide a safe trench situation for all construction on this project. The Contractor shall have a trench safety plan prepared, signed, and sealed by a registered professional engineer from the State of Texas.
- b. Measurement and payment for Trench Safety Systems shall be made on the basis of the price bid per linear foot for a trench depth of (5) five feet or greater for all the main line pipes installed by the open cut method, including pipe installed by open cut under Contractor's Option bid items. Payment shall be full compensation for all materials, equipment, labor and other incidentals necessary to furnish, install and remove the Trench Safety Systems. The Contractor will provide all soil borings necessary for preparation of this safety plan.

9. BID ITEM 209 – Remove Existing Manhole

- a. This item shall consist of removal of existing manholes as indicated in the plans and details.
- b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

10. BID ITEM 210 – 5' Diameter Manhole (0' to 5' in Depth)

- a. This item shall consist of excavation, backfill, embedment, manhole provision and placement, water tight locking manhole insert as indicated on plans, frame and cover, grade ring as required to bring to finish grade, removal of existing sanitary sewer manholes within manhole excavation, protective manhole coating for corrosion protection (if manhole is concrete), any necessary fence removal and repair, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.

11. BID ITEM 211– 5' Diameter Manhole Extra Depth (Over 5' in Depth)

- a. This item shall consist of depth in excess of 5 vertical feet needed for the sanitary sewer manhole.
- b. Measurement and payment shall be made on the basis of the price bid per vertical foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

12. BID ITEM 212 – 5' Diameter Watertight Manhole (0' to 5' in Depth)

- a. This item shall consist of excavation, backfill, embedment, manhole provision and placement, water tight locking manhole insert as indicated on plans, frame and cover, grade ring as required to bring to finish grade, protective manhole coating for corrosion protection (if manhole is concrete), any necessary fence removal and repair, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.

13. BID ITEM 213 – 5' Diameter Watertight Manhole Extra Depth (Over 5' in Depth)

- a. This item shall consist of depth in excess of 5 vertical feet needed for the sanitary sewer manhole.
- b. Measurement and payment shall be made on the basis of the price bid per vertical foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

14. BID ITEM 214 – 5' Diameter Watertight Manhole and Vent (0' to 5' in Depth)

- a. This item shall consist of excavation, backfill, embedment, manhole provision and placement, water tight locking manhole insert as indicated on plans, frame and cover, grade ring as required to bring to finish grade, protective manhole coating for corrosion protection (if manhole is concrete), any necessary fence removal and repair, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. Payment for this item shall be divided as follows: 80% once pipe is installed and backfilled, 10% once pipe has passed all tests, and 10% once surface has been restored to pre-construction conditions.

15. BID ITEM 215 – 5' Diameter Watertight Manhole and Vent Extra Depth (Over 5' in Depth)

- a. This item shall consist of depth in excess of 5 vertical feet needed for the sanitary sewer manhole.
- b. Measurement and payment shall be made on the basis of the price bid per vertical foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

16. BID ITEM 216 – 5' Diameter Drop Manhole (0' to 5' in Depth)

- a. This item shall consist of excavation, backfill, embedment, manhole provision and placement, water tight locking manhole insert as indicated on plans, external drop structure as indicated in plans, frame and cover, grade ring as required to bring to finish grade, protective manhole coating for corrosion protection (if manhole is

concrete), any necessary fence removal and repair, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.

- b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

17. BID ITEM 217 – 5' Diameter Drop Manhole Extra Depth (Over 5' in Depth)

- a. This item shall consist of depth in excess of 5 vertical feet needed for the sanitary sewer manhole.
- b. Measurement and payment shall be made on the basis of the price bid per vertical foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

18. BID ITEM 218 – 6' Diameter Drop Watertight Manhole (0' to 5' in Depth)

- a. This item shall consist of excavation, backfill, embedment, manhole provision and placement, water tight locking manhole insert as indicated on plans, external drop structure as indicated in plans, frame and cover, grade ring as required to bring to finish grade, protective manhole coating for corrosion protection (if manhole is concrete), any necessary fence removal and repair, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

19. BID ITEM 219 – 6' Diameter Drop Watertight Manhole Extra Depth (Over 5' in Depth)

- a. This item shall consist of depth in excess of 5 vertical feet needed for the sanitary sewer manhole.
- b. Measurement and payment shall be made on the basis of the price bid per vertical foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

20. BID ITEM 220– Remove and Replace Existing 18" RCP

- a. This item shall consist of removal of existing 18" RCP, pipe provision and installation by open cut method, fence removal/replacement to existing conditions and temporary fence, all required tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

21. BID ITEM 221– Remove and Replace Existing 24" RCP

- a. This item shall consist of removal of existing 24" RCP, pipe provision and installation by open cut method, fence removal/replacement to existing conditions and

temporary fence, all required tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.

- b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

22. BID ITEM 222– Remove and Replace Existing 28" RCP

- a. This item shall consist of removal of existing 28" RCP, pipe provision and installation by open cut method, fence removal/replacement to existing conditions and temporary fence, all required tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

23. BID ITEM 223 – Remove and Replace Existing 30" RCP

- a. This item shall consist of removal of existing 30" RCP, pipe provision and installation by open cut method, fence removal/replacement to existing conditions and temporary fence, all required tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

24. BID ITEM 224 – Remove/Replace Existing Curb and Gutter

- a. This item shall consist of removal and replacement of existing curb and gutter damaged by construction activities. The curb and gutter shall be in accordance with the City's standard details.
- b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

25. BID ITEM 225 – Flowable Fill

- a. This item shall consist of the placement of flowable fill as shown on the plans. The flowable fill shall be in accordance with the specifications and details provided in the plans. The cost for furnishing and placing reinforcement is subsidiary to the price bid.
- b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

26. BID ITEM 226 – Concrete Sidewalk Repair (4' Wide)

- a. This item shall consist of the construction of concrete sidewalk as shown on the plans. The concrete pavement shall be in accordance with the details provided in the plans. All concrete for sidewalk construction shall be a minimum compressive strength of 3000 psi at 28 days. The cost for furnishing and placing reinforcement is

subsidiary to the price bid. All concrete shall be placed to the required line and grades to match existing.

- b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

27. BID ITEM 227 – Clay Dam

- a. This item shall consist of soil provision and installation in accordance with the plans where indicated, the width shall be determined by the limits of undisturbed soil and the height shall be the full depth of the trench to natural ground.
- b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

28. BID ITEM 228 – Plug Existing Sanitary Sewer (<12")

- a. This item shall consist of cutting and plugging the existing sanitary sewer, trenching, backfill, embedment, seeding/sodding of disturbed areas, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

29. BID ITEM 229 – Plug Existing Sanitary Sewer (12" to 27")

- a. This item shall consist of cutting and plugging the existing sanitary sewer, trenching, backfill, embedment, seeding/sodding of disturbed areas, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per each sum and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

30. BID ITEM 230 – 24" Grouted Riprap

- a. This item shall consist of stone rip-rap, as indicated in the plans and specifications.
- b. Payment will be made at the unit price bid per square yard and shall be full compensation for all labor, materials, equipment, tools, and incidentals necessary to install item complete in place.

31. BID ITEM 231 – Pre-Construction Video

- a. This item shall consist of a continuous color video, with audio, recording pre-construction conditions.
- b. Measurement and payment shall be made on the basis of the price bid per lump sum and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

32. BID ITEM 232 – CCTV Inspection on Existing Sewer

- a. This item shall consist of CCTV inspection, all labor, materials, equipment necessary for inspection of the existing sewer lines to abandoned and/or taken out of service to include verifying existing service locations and disposal of all waste material off City property and all other required work not specifically set in a separate bid item. The work performed as part of this bid item shall be in accordance with 33 01 30.16 "TV Inspection of Sewer Lines".
 - b. This bid item shall be measured horizontally from the center of the manhole to the center of the manhole or cleanout without out any deductions for the length of pipe through manholes.
 - c. Measurement and payment shall be made on the basis of the price bid per linear feet and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
33. BID ITEM 233 – Post-Construction CCTV Inspection on Proposed Sewer
- a. This item shall consist of CCTV inspection, all labor, materials, equipment necessary for inspection of the proposed sewer and disposal of all waste material off City property and all other required work not specifically set in a separate bid item. The work performed as part of this bid item shall be in accordance with 33 01 30.16 "TV Inspection of Sewer Lines".
 - b. This bid item shall be measured horizontally from the center of the manhole to the center of the manhole or cleanout without out any deductions for the length of pipe through manholes.
 - c. Measurement and payment shall be made on the basis of the price bid per linear feet and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
34. BID ITEM 234 – Abandon Existing Manhole
- a. This item shall consist of abandoning the existing manhole in accordance with the plans and shall include removal of existing cone, provision and placement of flowable fill in the remaining manholes risers and plugging all penetrations to the existing manhole and disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
35. BID ITEM 235 – Abandonment Grout on Existing 21" SS
- a. This item shall consist of grouting the existing sewer lines as indicated by the plans including installation of plugs and/or bulkheads, and any removal of existing pipe necessary for a complete installation.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
36. BID ITEM 236 – Abandonment Grout on Existing 10" SS

- a. This item shall consist of grouting the existing sewer lines as indicated by the plans including installation of plugs and/or bulkheads, and any removal of existing pipe necessary for a complete installation.
 - b. Measurement and payment shall be made on the basis of the price bid per linear foot and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 37. BID ITEM 237 – Point Repair on Existing 27” Sanitary Sewer
 - a. This item shall consist of pipe provision, up to 20’ per location, and installation by open cut method, leakage tests, deflection test, all required laboratory tests, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per each and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.
- 38. BID ITEM 238 – Hydromulch and Seeding or St. Augustine Sod
 - a. This item shall consist of providing a uniform seeding for the areas within the easement or ROW limits or defined work space or sod to match existing conditions. Contractor shall be solely responsible for returning all disturbed areas outside of the easement or ROW limits to pre-construction conditions. Contractor shall remove all roots, debris, and rocks larger than 1½". Grades shall be uniform, with even cross sections to prevent ponding or uneven grades. Contractor shall be responsible for watering areas of seeding or sod. Subsequent watering shall continue until grass is established. If hydromulch is used, seeding areas shall be fertilized with a 16-8-8 (N-P-K). Application rate of fertilizer shall be as recommended by manufacturer of fertilizer. The Contractor shall maintain seeded areas until the grass has an established minimum height of two inches over 85 percent (85%) of the disturbed area.
 - b. Payment will be made at the unit price bid per square yard and shall be full compensation for all labor, materials, equipment, tools, fertilizer, watering and incidentals necessary to install item complete in place.
- 39. BID ITEM 239 – Traffic Control Plan
 - a. This item shall consist of development and implementation of a traffic control plan for all portions of Segment 2 where installation may affect traffic, and temporary asphalt paving to maintain access to residents and businesses. Work performed under this item shall be completed in accordance with the “Texas Manual on Uniform Traffic Control Devices”. The traffic control plan shall be prepared by a professional engineer licensed in the state of Texas and shall be submitted to the City and/or TxDOT for review and approval. This item shall include all required permits and flagmen. The 5’ paved path indicated in the plans is considered subsidiary to this bid item.
 - b. Measurement and payment shall be made on the basis of the price bid per lump sum and shall be full compensation for all labor, materials and equipment necessary

to maintain and complete this pay item. A percentage of the lump sum amount, as indicated in the schedule of values, will be paid on a monthly basis.

40. BID ITEM 240 – Design/Implementation of SWPPP

- a. This item shall consist of construction activities resulting in less than five acres of disturbance and shall include all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per lump sum and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

41. BID ITEM 241 – By-Pass Pumping

- a. This item shall consist of trenching, backfill embedment, pipe and pump provision and placement, and back-up pumps as required by TCEQ. Powered by-pass pipe shall be restrained and have a pressure rating of 150 psi. Planning and coordination with the City of North Richland Hills before system shutdown, disposal of all waste material off City property and all other required work not specifically set in a separate bid item.
- b. Measurement and payment shall be made on the basis of the price bid per lump sum and shall be full compensation for all labor, materials and equipment necessary to complete this pay item. A percentage of the lump sum amount, as indicated in the schedule of values, will be paid on a monthly basis.

42. BID ITEM 242 – Landscape and Irrigation Allowance

- a. This shall be as defined in Section 01 23 10 “Alternates and Allowances”.
- b. Measurement and payment shall be paid as a percentage of the total lump sum amount for approved invoices only and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

43. BID ITEM 243 – Miscellaneous Utility Fund

- a. This shall be as defined in Section 01 23 10 “Alternates and Allowances”.
- b. Measurement and payment shall be paid as a percentage of the total lump sum amount for approved invoices only and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

44. BID ITEM 244 – Paving Allowance

- a. This shall be as defined in Section 01 23 10 “Alternates and Allowances”.
- b. Measurement and payment shall be paid as a percentage of the total lump sum amount for approved invoices only and shall be full compensation for all labor, materials and equipment necessary to complete this pay item.

45. BID ITEM 245 – Mobilization/Bonds/Insurance

- a. This item shall consist of all required insurance, bonds, and preparatory work and operations necessary for the movement of personnel, equipment and supplies to the project site.

- b. Measurement and payment shall be made on the basis of the price bid per lump sum, not to exceed 5% of base bid amount.

2.00 PRODUCTS (NOT APPLICABLE)

3.00 EXECUTION (NOT APPLICABLE)

END OF SECTION

01 31 00 PROJECT MANAGEMENT AND COORDINATION

1.00 GENERAL

1.01 WORK INCLUDED

- A. Furnish equipment, manpower, products, and other items necessary to complete the Project with an acceptable standard of quality and within the Contract time. Construct Project in accordance with current safety practices.
- B. Manage Site to allow access to Site and control construction operations.
- C. Provide labor, materials, equipment and incidentals necessary to construct temporary facilities to provide and maintain control over environmental conditions at the Site. Remove temporary facilities when no longer needed.
- D. Construct temporary impounding works, channels, diversions, furnishing and operation of pumps, installing piping and fittings, and other construction for control of conditions at the Site. Remove temporary controls at the end of the Project.
- E. Provide temporary controls for pollutants, management of water and management of excess earth as required in Section 01 57 00 "Temporary Controls."
- F. Cost for Project Management and Coordination as described in this section are to be included in the Contract Price.

1.02 QUALITY ASSURANCE

- A. Employ competent workmen, skilled in the occupation for which they are employed. Provide Work meeting quality requirements of the Contract Documents as determined by the Engineer and Owner.
- B. Remove defective Work from the Site immediately unless provisions have been made and approved by the Engineer to allow repair of the product at the Site. Clearly mark the Work as "defective" until it is removed or allowable repairs have been completed.

1.03 SUBMITTALS

- A. Provide submittals in accordance with Section 01 33 00 "Submittal Procedures."
 - 1. Provide copies of Supplier's printed storage instructions prior to furnishing materials or products and installation instructions prior to beginning the installation. Maintain one copy of these documents at the Site until the Project is complete. Incorporate this information into submittals.
 - 2. Incorporate field notes, sketches, recordings, and computations made by the Contractor in Record Drawings.

1.04 STANDARDS

- A. Perform Work to comply with local, State and Federal ordinances and regulations.

1.05 PERMITS

- A. Obtain a building permit for the Project from the local authorities having jurisdiction. Building permit fees will be waived by the Owner.
- B. Retain copies of permits and licenses at the Site and observe and comply with all regulations and conditions of the permit or license, including additional insurance requirements.
- C. Obtain and pay for all other necessary permits including any and all necessary highway, street and road permits for transporting pipe and/or heavy equipment necessary for construction of the Project.
- D. Obtain and pay for other permits necessary to conduct any part of the Work.
- E. Arrange for inspections and certification by agencies having jurisdiction over the Work.
- F. Make arrangements with private utility companies and pay for fees associated with obtaining services, or for inspection fees.

1.06 SAFETY REQUIREMENTS

- A. Assume sole responsibility for safety at the Site. Protect the safety and welfare of persons at the Site.
- B. Provide safe access to move through the Site. Provide and maintain barricades, guard rails, covered walkways, and other protective devices to warn and protect from hazards at the Site.
- C. Comply with latest provisions of the Occupational Health and Safety Administration and other regulatory agencies in performing Work.
- D. Cooperate with accident investigations related to the Site. Provide two copies of all reports, including insurance company reports, if requested by the Owner, prepared concerning accidents, injury, or death on the Site to the Engineer as Record Data per Section 01 33 00 "Submittal Procedures."

1.07 COORDINATION

- A. Coordinate the Work of various trades having interdependent responsibilities for installing, connecting to, and placing equipment in service.
- B. Coordinate requests for substitutions to provide compatibility of space, operating elements, effect on the Work of other trades, and on the Work scheduled for early completion.

1.08 CONTRACTOR'S USE OF SITE

- A. Limit the use of Site for Work and storage to those areas designated on the Drawings or approved by the Engineer. Coordinate the use of the premises with the Engineer.
- B. Repair or correct any damage to existing facilities, including contamination, caused by the Contractor's personnel, visitors, materials, or equipment.
- C. Do not permit alcoholic beverages or illegal substances on the Site. Do not allow persons under the influence of alcoholic beverages or illegal substances to enter or remain on the Site at any time. Persons on Site under the influence of alcoholic beverages or illegal substances will be permanently prohibited from returning to the Site. Criminal or civil penalties may also apply.

- D. Park construction equipment in designated areas only and provide spill control measures as discussed in Section 01 57 00 "Temporary Controls."
- E. Park employees' vehicles in designated areas only.
- F. Obtain written permission of the Owner before entering privately-owned land outside of the Owner's property, rights-of-way, or easements.
- G. Do not allow the use of audio devices, obnoxious, vulgar or abusive language, or sexual harassment in any form. These actions will cause immediate and permanent removal of the offender from the premises. Criminal or civil penalties may also apply.
- H. Require Workers to wear clothing that is not offensive and meets safety requirements. Do not allow sleeveless shirts, shorts, exceedingly torn, ripped or soiled clothing to be worn on the project.
- I. Do not allow firearms or weapons of any sort to be brought on to the Site under any conditions. No exception is to be made for persons with concealed handgun permits. Remove any firearms or weapons and the person possessing these firearms or weapons permanently and immediately from the Site.

1.09 ACCESS TO THE SITE

- A. Maintain access to the facilities at all times. Do not obstruct roads, pedestrian walks, or access to the various buildings, structures, stairways, or entrances. Provide safe temporary walks or other structures to allow access for normal operations during construction.
- B. Provide adequate and safe access for inspections. Leave ladders, bridges, scaffolding and protective equipment in place until inspections have been completed. Construct additional safe access if required for inspections.
- C. Provide security at the Site as necessary to protect against vandalism and loss by theft.
- D. Use State, County, or City roadways for construction traffic only with written approval of the appropriate representatives of each entity. State, County, or City roadways may not all be approved for construction traffic. Obtain written approval to use State, County, City or private roads to deliver pipe and/or heavy equipment to the Site. Copies of the written approvals must be furnished to the Owner as Record Data before Work begins. No additional compensation will be paid because the Contractor is unable to gain access to the easement from public roadways.

1.10 PROPERTY PROVISIONS

- A. Make adequate provisions to maintain the flow of storm sewers and sanitary sewers encountered during the construction.
- B. Protect trees, fences, signs, poles, guy wires, and all other property unless their removal is authorized. Restore any property damaged to equal or better condition per Paragraph 1.11 of this Section.

1.11 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

- A. Examine the Site and review the available information concerning the Site. Locate utilities, streets, driveways, fences, drainage structures, sidewalks, curbs, and gutters. Verify the

elevations of the structures adjacent to excavations. Report these to the Engineer before beginning construction.

- B. Determine if existing structures, poles, piping, or other utilities at excavations will require relocation or replacement. Coordinate Work with Contractor, local utility company and others. Include cost of demolition and replacement, restoration or relocation of these structures in the Cost of Work.
- C. Protect buildings, utilities, street surfaces, driveways, sidewalks, curb and gutter, fences, wells, drainage structures, piping, valves, manholes, electrical conduits, and other systems or structures unless they are shown to be replaced or relocated on the Drawings. Restore damage to items to be protected to the satisfaction of the Engineer, utility owner and Owner without additional compensation from the Owner.
- D. Carefully support and protect all structures and/or utilities so that there will be no failure or settlement where excavation or demolition endangers adjacent structures and utilities. Do not take existing utilities out of service unless shown in the Contract Documents or approved by the Engineer. Notify and cooperate with the utility owner if it is necessary to move services, poles, guy wires, pipelines or other obstructions. Include the cost of relocation and permits required to move existing utilities in the Cost of Work.
- E. Protect existing trees and landscaping at the site.
 - 1. Visit the Site with Engineer to identify trees that may be removed during construction.
 - 2. Mark trees to be removed with paint.
 - 3. Protect trees to remain from damage by wrapping trunks with 2 x 4 timbers around the perimeter, securely wired in place, where machinery must operate around existing trees. Protect branches and limbs from damage by equipment.
- F. Protect buildings from damage when handling material or equipment. Protect finished surfaces, including floors, doors, and jambs. Remove doors and install temporary wood protective coverings over jambs.

1.12 DISRUPTION TO SERVICES / CONTINUED OPERATIONS

- A. Existing facilities are to continue in service as usual during the construction unless noted otherwise. Owner of utilities must be able to operate and maintain the facilities. Disruptions to existing utilities, piping, process piping, or electrical services shall be kept to a minimum.
 - 1. Do not restrict access to critical valves, operators, or electrical panels.
 - 2. Do not store material or products inside structures.
 - 3. Limit operations to the minimum amount of space needed to complete the specified Work.
 - 4. Maintain storm sewers and sanitary sewers in service at all times. Provide temporary service around the construction or otherwise construct the structure in a manner that the flow is not restricted.

1.13 FIELD MEASUREMENTS

- A. Perform complete field measurements for products required to fit existing conditions prior to purchasing products or beginning construction.
- B. Verify property lines, control lines, grades, and levels indicated on the Drawings.
- C. Verify pipe class, equipment capacities, existing electrical systems and power sources for existing conditions.
- D. Check Shop Drawings and indicate the actual dimensions available where products are to be installed.
- E. Include field measurements in Record Drawings as required in Section 01 31 13 "Project Coordination."

1.14 REFERENCE DATA AND CONTROL POINTS

- A. The Engineer will provide the following control points:
 - 1. Base line or grid reference points for horizontal control.
 - 2. Benchmarks for vertical control.
 - 3. Designated control points may be on an existing structure or monument.
- B. Locate and protect control points prior to starting the Work and preserve permanent reference points during construction. Do not change or relocate points without prior approval of the Engineer. Notify Engineer when the reference point is lost, destroyed, or requires relocation. Replace Project control points on the basis of the original survey.
- C. Provide complete engineering layout of the Work needed for construction.
 - 1. Provide competent personnel. Provide equipment including accurate surveying instruments, stakes, platforms, tools, and materials.
 - 2. Provide surveying with accuracy meeting the requirements established for Category 5 Construction Surveying as established in the Manual of Practice of Land Surveying in Texas published by the Texas Society of Professional Surveyors, latest revision.
 - 3. Record data and measurements per standards.

1.15 DELIVERY AND STORAGE

- A. Deliver products and materials to the Site in time to prevent delays in construction.
- B. Deliver packaged products to Site in original undamaged containers with identifying labels attached. Open cartons as necessary to check for damage and to verify invoices. Reseal cartons and store properly until used. Leave products in packages or other containers until installed.
- C. Deliver products that are too large to fit through openings to the Site in advance of the time enclosing walls and roofs are erected. Set in place, raised above floor on cribs.
- D. Assume full responsibility for the protection and safekeeping of products stored at the Site.
- E. Store products at locations acceptable to the Engineer and to allow Owner access to maintain and operate existing facilities.

- F. Store products in accordance with the Supplier's storage instructions immediately upon delivery. Leave seals and labels intact. Arrange storage to allow access for maintenance of stored items and for inspection. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.
- G. Obtain and pay for the use of any additional storage areas as needed for construction. Store products subject to damage by elements in substantial weather-tight enclosures or storage sheds. Provide and maintain storage sheds as required for the protection of products. Provide temperature, humidity control and ventilation within the ranges stated in the Supplier's instructions. Remove storage facilities at the completion of the Project.
- H. Protect the pipe interior. Keep all foreign materials such as dirt, debris, animals, or other objects out of the pipe during the Work. Cap or plug ends of installed pipe in an approved manner when pipe is not being installed. Clean or wash out pipe sections that become contaminated before continuing with installation. Take precautions to prevent the pipe from floating or moving out of the proper position during or after laying operations. Immediately correct any pipe that moves from its correct position.
- I. Provide adequate exterior storage for products that may be stored out-of-doors.
 - 1. Provide substantial platforms, blocking, or skids to support materials and products above ground; slope to provide drainage. Protect products from soiling or staining.
 - 2. Cover products subject to dislocation or deterioration from exposure to the elements, with impervious sheet materials. Provide ventilation to prevent condensation below covering.
 - 3. Store loose, granular materials on clean, solid surfaces, or on rigid sheet materials, to prevent mixing with foreign matter.
 - 4. Provide surface drainage to prevent erosion and ponding of water.
 - 5. Prevent mixing of refuse or chemically injurious materials or liquids with stored materials.
 - 6. Pipes and conduits stored outdoors are to have open ends sealed to prevent the entrance of dirt, moisture, and other injurious materials. Protect PVC pipe from ultraviolet light exposure.
 - 7. Store light weight products to prevent wind damage.
- J. Protect and maintain mechanical and electrical equipment in storage.
 - 1. Provide Supplier's service instructions on the exterior of the package.
 - 2. Service equipment on a regular basis as recommended by the Supplier. Maintain a log of maintenance services. Submit the log as Record Data at the completion of the Project.
 - 3. Provide power to and energize space heaters for all equipment for which these devices are provided.
 - 4. Provide temporary enclosures for all electrical equipment, including electrical systems on mechanical devices. Provide and maintain heat in the enclosures until equipment is energized.

- K. Maintain storage facilities. Inspect stored products on a weekly basis and after periods of severe weather to verify that:
 - 1. Storage facilities continue to meet specified requirements.
 - 2. Supplier's required environmental conditions are continually maintained.
 - 3. Surfaces of products exposed to the elements are not adversely affected.
- L. Replace any stored item damaged by inadequate protection or environmental controls.
- M. Payment may be withheld for any products not properly stored.

1.16 CLEANING DURING CONSTRUCTION

- A. Provide positive methods to minimize raising dust from construction operations and provide positive means to prevent air-borne dust from disbursing into the atmosphere. Control dust and dirt from demolition, cutting, and patching operations.
- B. Clean the Project as Work progresses and dispose of waste materials, keeping the Site free from accumulations of waste or rubbish. Provide containers on Site for waste collection. Do not allow waste materials or debris to blow around or off of the Site. Control dust from waste materials. Transport waste materials with as few handlings as possible.
- C. Comply with codes, ordinances, regulations, and anti-pollution laws. Do not burn or bury waste materials. Remove waste materials, rubbish and debris from the Site and legally dispose of these at public or private dumping areas.

1.17 MAINTENANCE OF ROADS, DRIVEWAYS, AND ACCESS

- A. Maintain roads and streets in a manner that is suitable for safe operations of public vehicle during all phases of construction unless the Owner approves a street closing. Submit a written request for Owner's approval of a street closing. The request shall state:
 - 1. The reason for closing the street.
 - 2. How long the street will remain closed.
 - 3. Procedures to be taken to maintain the flow of traffic.
 - 4. Do not close public roads overnight.
- B. Construct temporary detours, including by-pass roads around construction, with adequately clear width to maintain the free flow of traffic at all times. Maintain barricades, signs, and safety features around the detour and excavations.
- C. Maintain barricades, signs, and safety features around the Work in accordance with all provisions of the latest edition of the Texas Manual on Uniform Traffic Control Devices (TMUTCD).
- D. Assume responsibility for any damage resulting from construction along roads or drives.

1.18 BLASTING

- A. Blasting is not allowed for any purpose.

1.19 ARCHAEOLOGICAL REQUIREMENTS

- A. Cease operations immediately and contact the Owner for instructions if an historical or archaeological find is made during construction.
- B. Conduct all construction activities to avoid adverse impact on the Sites where significant historical or archaeological Sites have been identified at the Site.
 - 1. Obtain details for Working in these areas.
 - 2. Maintain confidentiality regarding the Site.
 - 3. Adhere to the requirements of the Texas Historical Commission.
 - 4. Notify the Owner and the Texas Historical Commission.
- C. Do not disturb Archaeological Sites.
 - 1. Obtain the services of a qualified archaeological specialist to instruct construction personnel on how to identify and protect archaeological finds on an emergency basis.
 - 2. Coordinate activities to permit Archaeological Work to take place within the area.
 - a. Attempt to archaeologically clear areas needed for construction as soon as possible.
 - b. Provide a determination of priority for such areas.
- D. Assume responsibility for any unauthorized destruction that might result to such Sites by construction personnel, and pay all penalties assessed by the State or Federal agencies for non-compliance with these requirements.
- E. Contract time will be modified to compensate for delays caused by such archaeological finds. No additional compensation shall be paid for delays.

1.20 CUTTING AND PATCHING

- A. Perform cutting, fitting, and patching required to complete the Work or to:
 - 1. Uncover Work to provide for installation of new Work or the correction of defective Work.
 - 2. Provide routine penetrations of non-structural surfaces for installation of mechanical, electrical, and plumbing Work.
 - 3. Uncover Work that has been covered prior to observation by the Engineer.
- B. Submit written notification to the Engineer in advance of performing any cutting which affects:
 - 1. Work of any other Contractor or the Owner.
 - 2. Structural integrity of any structure or system of the project.
 - 3. Integrity or effectiveness of weather exposed or moisture resistant structure or systems.
 - 4. Efficiency, operational life, maintenance, or safety of any structure or system.
 - 5. Appearance of any structure or surfaces exposed occasionally or constantly to view.
- C. The notification shall include:
 - 1. Identification of the Project.
 - 2. Location and description of affected Work.

3. Reason for cutting, alteration, or excavation.
 4. Effect on the Work of any separate contractor or Owner.
 5. Effect on the structural or weatherproof integrity of the project.
 6. Description of proposed Work, including:
 - a. Scope of cutting, patching, or alteration.
 - b. Trades that will perform the Work.
 - c. Products proposed for use.
 - d. Extent of refinishing to be performed.
 - e. Cost proposal, when applicable.
 7. Alternatives to cutting and patching.
 8. Written authorization from any separate Contractor whose Work would be affected.
 9. Date and time Work will be uncovered or altered.
- D. Examine the existing conditions, including structures subject to damage or to movement during cutting or patching.
1. Inspect conditions affecting installation of products or performance of the Work after uncovering the Work.
 2. Provide a written report of unacceptable or questionable conditions to the Engineer. The Contractor shall not proceed with Work until Engineer has provided further instructions. Beginning Work will constitute acceptance of existing conditions by the Contractor.
- E. Protect the structure and other parts of the Work and provide adequate support to maintain the structural integrity of the affected portions of the Work. Provide devices and methods to protect adjacent Work and other portions of the Project from damage. Provide protection from the weather for portions of the Project that may be exposed by cutting and patching Work.
- F. Execute cutting and demolition by methods which will prevent damage to other Work, and will provide proper surfaces to receive installation of repairs.
- G. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.
- H. Cut, remove, and legally dispose of selected mechanical equipment, components, and materials as indicated, including but not limited to, the removal of mechanical piping, heating units, plumbing fixtures and trim, and other mechanical items made obsolete by the modified Work.
- I. Restore Work which has been cut or removed. Install new products to provide completed Work per the Contract Documents.
- J. Fit Work air-tight to pipes, sleeves, ducts, conduit, and other penetrations through the surfaces. Where fire rated separations are penetrated, fill the space around the pipe or insert with materials with physical characteristics equivalent to fire resistance requirements of penetrated surface.

- K. Patch finished surfaces and building components using new products specified for the original installation.
- L. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
 - 1. For continuous surfaces, refinish to the nearest intersection.
 - 2. For an assembly, refinish the entire unit.

1.21 PRELIMINARY OCCUPANCY

- A. Owner may deliver, install and connect equipment, furnishings, or other apparatus in buildings or other structures. These actions do not indicate acceptance of any part of the building or structure and does not affect the start of warranties or correction periods.
- B. Protect the Owner's property after installation is complete.
- C. Owner or Engineer may use any product for testing or determine that the product meets the requirements of the Contract Documents. This use does not constitute acceptance by either the Owner or Engineer. These actions do not indicate acceptance of any part of the product and does not affect the start of warranties or correction periods.

1.22 INITIAL MAINTENANCE AND OPERATION

- A. Maintain equipment until the Project is accepted by the Owner. Ensure that mechanical equipment is properly maintained as recommended by the Supplier.
- B. Do not operate air handling equipment unless filters are in place and are clean. Change filters weekly during construction.
- C. Provide maintenance and start-up services prior to acceptance of equipment, per Section 01 75 00 "Starting and Adjusting."
- D. Remove and clean screens and strainers in piping systems.
- E. Clean insects from intake louver screens.
- F. Provide documentation of maintenance and operations when Owner takes over operation and control of the Project.

1.23 ENDANGERED SPECIES RESOURCES

- A. No activity is authorized that is likely to jeopardize the continued existence of a threatened or endangered species as listed or proposed for listing under the Federal Endangered Species Act (ESA), and/or the State of Texas Parks and Wildlife Code on Endangered Species, or to destroy or adversely modify the habitat of such species.
- B. If a threatened or endangered species is encountered during construction, the Contractor shall immediately cease Work in the area of the encounter and notify the Owner, who will immediately implement actions in accordance with the ESA and applicable State statutes. These actions shall include reporting the encounter to the Texas Water Development Board, the U. S. Fish and Wildlife Service, and the Texas Parks and Wildlife Department, obtaining any necessary approvals or permits to enable the Work to continue, or implement other mitigative actions. The Contractor shall not resume construction in the area of the encounter until authorized to do so by the Owner.

2.00 PRODUCTS

2.01 MATERIALS

- A. Provide materials in accordance with the requirements of the individual Sections.

3.00 EXECUTION

3.01 PERFORMANCE OF WORK

- A. Perform the Work per the Supplier's published instructions. Do not omit any preparatory step or installation procedure unless specifically exempted or modified by Field Order.

END OF SECTION

01 31 13 PROJECT COORDINATION

1.00 GENERAL

1.01 WORK INCLUDED

- A. Administer contract requirements to construct the Project. Provide documentation per the requirements of this Section. Provide information as requested by the Engineer or Owner.

1.02 SUBMITTALS

- A. Provide submittals in accordance with Section 01 33 00 "Submittal Procedures."

1.03 COMMUNICATION DURING THE PROJECT

- A. The Engineer is to be the first point of contact for all parties on matters concerning this project.
- B. The Engineer will coordinate correspondence concerning:
 - 1. Submittals, including Applications for Payment.
 - 2. Clarification and interpretation of the Contract Documents.
 - 3. Contract modifications.
 - 4. Observation of Work and testing.
 - 5. Claims.
- C. The Engineer will normally communicate only with the Contractor. Any required communication with Subcontractors or Suppliers will only be with the direct involvement of the Contractor.
- D. Direct written communications to the Engineer at the address indicated at the Pre-construction Conference. Include the following with communications as a minimum:
 - 1. Name of the Owner.
 - 2. Project name.
 - 3. Contract title.
 - 4. Project number.
 - 5. Date.
 - 6. A reference statement.
- E. Submit communications on the forms referenced in this Section or in Section 01 33 00 "Submittal Procedures."

1.04 PROJECT MEETINGS

- A. Pre-construction Conference:
 - 1. Attend a pre-construction conference.
 - 2. The location of the conference will be determined by the Engineer.

3. The time of the meeting will be determined by the Engineer but will be after the Notice of Award is issued and not later than 15 days after the Notice to Proceed is issued.
 4. The Owner, Engineer, Contractor's project manager and superintendent, representatives of utility companies, and representatives from major Subcontractors and Suppliers may attend the conference.
 5. Provide and be prepared to discuss:
 - a. Preliminary construction schedule per Section 01 32 16 "Construction Progress Schedule."
 - b. Preliminary submittal schedule per Section 01 33 00 "Submittal Procedures."
 - c. Schedule of values and anticipated schedule of payments per Section 01 29 00 "Payment Procedures."
 - d. List of Subcontractors and Suppliers.
 - e. Contractor's organizational chart as it relates to this Project.
 - f. Letter indicating the agents of authority for the Contractor and the limit of that authority with respect to the execution of legal documents, contract modifications and payment requests.
- B. Progress Meetings:
1. Attend meetings with the Engineer and Owner.
 - a. Meet on a monthly basis or as requested by the Engineer to discuss the Project.
 - b. Meet at the Site or other location as designated by the Engineer.
 - c. Contractor's superintendent and other key personnel are to attend the meeting. Other individuals may be requested to attend to discuss specific matters.
 - d. Notify the Engineer of any specific items to be discussed a minimum of 1 week prior to the meeting.
 2. Provide information as requested by the Engineer or Owner concerning this Project. Prepare to discuss:
 - a. Status of overall project schedule.
 - b. Contractor's detailed schedule for the next month.
 - c. Anticipated delivery dates for equipment.
 - d. Coordination with the Owner.
 - e. Status of submittals.
 - f. Information or clarification of the Contract Documents.
 - g. Claims and proposed modifications to the Contract.
 - h. Field observations, problems, or conflicts.
 - i. Maintenance of quality standards.
 3. Engineer will prepare minutes of meetings. Review the minutes of the meeting and notify the Engineer of any discrepancies within ten days of the date of the meeting

memorandum. The minutes will not be corrected after the ten days have expired. Corrections will be reflected in the minutes of the following meeting or as an attachment to the minutes.

C. Pre-submittal and Pre-installation Meetings:

1. Conduct pre-submittal and pre-installation meetings as required in the individual technical Specifications or as determined necessary by the Engineer (for example, instrumentation, roofing, concrete mix design, etc.).
2. Set the time and location of the meetings when ready to proceed with the associated Work. Submit a Notification by Contractor in accordance with Paragraph 1.07 for the meeting 2 weeks before the meeting. Engineer and Owner must approve of the proposed time and location.
3. Attend the meeting and require the participation of appropriate Subcontractors and Suppliers in the meeting.
4. Prepare minutes of the meeting and submit to the Engineer and Owner for review. Owner and Engineer will review the minutes of the meeting and notify the Contractor of any discrepancies within ten days of the date of the meeting memorandum. The minutes will not be corrected after the ten days have expired. Corrections will be reflected in a revised set of meeting minutes.

1.05 REQUESTS FOR INFORMATION

- A. Submit Request for Information (RFI) to the Engineer to obtain additional information or clarification of the Contract Documents.
 1. Submit a separate RFI for each item on the form provided by the Engineer.
 2. Attach adequate information to permit a written response without further clarification. Engineer will return requests that do not have adequate information to the Contractor for additional information. Contractor is responsible for all delays resulting from multiple submittals due to inadequate information.
 3. A response will be made when adequate information is provided. Response will be made on the RFI form or in attached information.
- B. Response to an RFI is given to provide additional information, interpretation, or clarification of the requirements of the Contract Documents, and does not modify the Contract Documents.
- C. Engineer will initiate a Contract Modification Request per Paragraph 1.08 if the RFI indicates that a contract modification is required.
- D. Use the Project Issues Log to document decisions made at meetings and actions to be taken in accordance with Paragraph 1.06.

1.06 PROJECT ISSUES LOG

- A. Engineer will maintain a project issues log to document key decisions made at meeting and track action on these issues:
 1. Review the log prior to each regular meeting.

2. Report actions taken subsequent to the previous progress meeting on items in the log assigned to the Contractor or through the Contractor to a Subcontractor or Supplier to the Engineer. Report on status of progress 1 week prior to each progress meeting established in Paragraph 1.04 to allow Engineer to update the log prior to the Progress meetings.
 3. Be prepared to discuss the status at each meeting.
- B. Decisions or action items in the log that require a change in the Contract Documents will have the preparation of a contract modification as an action items if appropriate. The Contract Documents can only be changed by a Change Order or Field Order.

1.07 NOTIFICATION BY CONTRACTOR

- A. Notify the Engineer of:
1. Need for testing.
 2. Intent to work outside regular working hours.
 3. Request to shut down facilities or utilities.
 4. Proposed utility connections.
 5. Required observation by Engineer or inspection agencies prior to covering Work.
 6. Training.
- B. Provide notification a minimum of 2 weeks in advance in order to allow Owner and Engineer time to respond appropriately to the notification.
- C. Use "Notification by Contractor" form provided by the Engineer.

1.08 REQUESTS FOR MODIFICATIONS

- A. Submit a request to the Engineer for any change in the Contract Documents.
1. Use the "Contract Modification Request" (CMR) form provided by the Engineer.
 2. Assign a number to the Contract Modification Request when issued.
 3. Include with the Contract Modification Request:
 - a. A complete description of the proposed modification.
 - b. The reason the modification is requested.
 - c. A detailed breakdown of the cost of the change (necessary only if the modification requires a change in contract amount). The itemized breakdown is to include:
 - 1). List of materials and equipment to be installed.
 - 2). Man hours for labor by classification.
 - 3). Equipment used in construction.
 - 4). Consumable supplies, fuels, and materials.
 - 5). Royalties and patent fees.
 - 6). Bonds and insurance.

- 7). Overhead and profit.
- 8). Field office costs.
- 9). Home office cost.
- 10). Other items of cost.
- d. Provide the level of detail outlined in the paragraph above for each Subcontractor or Supplier actually performing the Work if Work is to be provided by a Subcontractor or Supplier. Indicate appropriate Contractor mark-ups for Work provided through Subcontractors and Suppliers. Provide the level of detail outlined in the paragraph above for self-performed Work.
- e. Provide a revised schedule indicating the effect on the critical path for the Project and a statement of the number of days the Project may be delayed by the modification.
- 4. Submit a Contract Modification Request to the Engineer to request a field change.
- 5. A Contract Modification Request is required for all substitutions or deviations from the Contract Documents.
- 6. Engineer will evaluate the request for a contract modification.
- B. Owner will initiate changes through the Engineer.
 - 1. Engineer will prepare a description of proposed modifications to the Contract Documents.
 - 2. Engineer will use the Contract Modification Request form. Engineer will assign a number to the Contract Modification Request when issued.
 - 3. Return the Contract Modification Request with a proposal to incorporate the requested change. Include a breakdown of costs into materials and labor in detail outlined above to allow evaluation by the Engineer.
- C. Engineer will issue a Field Order or a Change Order per the General Conditions if a contract modification is appropriate.
 - 1. Modifications to the contract can only be made by a Field Order or a Change Order.
 - 2. Changes in the Project will be documented by a Field Order or by a Change Order.
 - 3. Field Orders may be issued by the Engineer for contract modifications that do not change the Contract Price or Contract Time.
 - 4. Any modifications that require a change in Contract Price or Contract Time can only be approved by Change Order.
 - a. Proposals issued by the Contractor in response to a Contract Modification Request will be evaluated by the Engineer.
 - b. If a Change Order is recommended, the Engineer will prepare the Change Order.
 - c. The Change Order will be sent to the Contractor for execution with a copy to the Owner recommending approval.
 - d. Change Orders can only be approved by the Owner.

- 1). Work performed on the proposed contract modifications prior to the approval of the Change Order will be performed at the Contractor's risk.
 - 2). No payment will be made for Work on Change Orders until approved by the Owner.
- D. The Contractor may be informed that the Contract Modification Request is not approved and construction is to proceed in accordance with the Contract Documents.

1.09 RECORD DRAWINGS

- A. Maintain at the site one complete record copy of:
1. Drawings.
 2. Specifications.
 3. Addenda.
 4. Contract modifications.
 5. Approved Shop Drawings and record data.
 6. One set of construction photographs.
 7. Test records.
 8. Clarifications and other information provided in Request for Information responses.
 9. Reference standards.
- B. Store documents and Samples in the Contractor's field office.
1. Documents are to remain separate from documents used for construction. Do not use these documents for construction.
 2. Provide files and racks for the storage of documents.
 3. Provide a secure storage space for the storage of Samples.
 4. Maintain documents in clean, dry, legible conditions, and in good order.
 5. Make documents and Samples available at all times for inspection by the Engineer and Owner.
- C. Marking Drawings:
1. Label each document as "Project Record" in large printed letters.
 2. Record information as construction is being performed.
 - a. Do not conceal any Work until the required information is recorded.
 - b. Mark Drawings to record actual construction, including the following:
 - 1). Horizontal and vertical locations of underground utilities and appurtenances constructed and existing utilities encountered during construction.
 - 2). Changes of dimension and detail.
 - 3). Changes made by Field Order and Change Order.

- 4). Details not on the original Drawings. Include field verified dimensions and clarifications, interpretations, and additional information issued in response to RFIs.
- c. Mark Specifications and Addenda to identify products provided.
 - 1). Record product name, trade name, catalog number, and each Supplier (with address and phone number) of each product and item of equipment actually installed.
 - 2). Record changes made by Field Order and Change Order.
- d. Mark additional Work or information in erasable pencil.
 - 1). Use red for new or revised indication.
 - 2). Use purple for Work deleted or not installed (lines to be removed).
 - 3). Highlight items constructed per the Contract Documents in yellow.
- e. Submit record documents to Engineer for review and acceptance 30 days prior to final completion of the Project.
 - 1). Provide one set of marked up Drawings.
 - 2). Provide six sets of Specifications.
- D. Applications for Payment will not be recommended for payment if record documents are found to be incomplete or not in order. Final payment will not be recommended without complete record documents.

2.00 PRODUCTS (NOT APPLICABLE)

3.00 EXECUTION (NOT APPLICABLE)

END OF SECTION

01 31 13.13 FORMS

1.00 GENERAL

1.01 PROJECT FORMS

- A. Use the forms provided by the Engineer for contract administration, applications for payment, submittals, documentation of test results, equipment installation and documentation, and project closeout.
- B. A digital copy of the required forms will be provided to the Contractor before or at the pre-construction conference.

2.00 PRODUCTS (NOT APPLICABLE)

3.00 EXECUTION (NOT APPLICABLE)

END OF SECTION

01 32 16 CONSTRUCTION PROGRESS SCHEDULE

1.00 GENERAL

1.01 REQUIREMENTS

- A. Prepare and submit a Progress Schedule for the Work and update the schedule on a monthly basis for the duration of the Project.
- B. Provide schedule in adequate detail to allow Owner to monitor the Work progress, to anticipate the time and amount of Applications for Payment, and to relate submittal processing to sequential activities of the Work.
- C. Incorporate and specifically designate the dates of anticipated submission of submittals and the dates when submittals must be returned to the Contractor into the schedule.
- D. Assume complete responsibility for maintaining the progress of the Work per the schedule submitted.

1.02 SUBMITTALS

- A. Submit Progress Schedules in accordance with Section 01 33 00 "Submittal Procedures." Submit schedules within the following times:
 - 1. Preliminary schedule within 10 days after the Notice of Award. The schedule is to be available at the pre-construction conference.
 - 2. Detailed schedule at least 10 days prior to the first payment request.
- B. Submit Progress Schedules with Applications for Payment. Schedules may be used to evaluate the Applications for Payment. Failure to submit the schedule may cause delay in the review and approval of Applications for Payment.

1.03 SCHEDULE REQUIREMENTS

- A. Schedule is to be in adequate detail to:
 - 1. Assure adequate planning, scheduling, and reporting during the execution of the Work.
 - 2. Assure the coordination of the Work of the Contractor and the various Subcontractors and Suppliers.
 - 3. Assist in monitoring the progress of the Work.
 - 4. Assist in evaluating proposed changes to Contract Time and project schedule.
 - 5. Assist the Owner in review of Contractor's Application for Payment.
- B. Provide personnel with 5 years' minimum experience in scheduling construction work comparable to this Project.
- C. Provide the schedule in the form of a time scaled horizontal bar chart which indicates graphically the Work scheduled at any time during the Project. The graph is to indicate:
 - 1. Complete sequence of construction by activity.
 - 2. Identification of the activity by structure, location, and type of Work.

3. Chronological order of the start of each item of Work.
 4. The activity start and stop dates.
 5. The activity duration.
 6. Successor and predecessor relationships for each activity. Group related activities or use lines to indicate relationships.
 7. A clearly indicated critical path. Indicate only one critical path on the schedule. The subsystem with the longest time of completion is the critical path where several subsystems each have a critical path. Float time is to be assigned to other subsystems.
 8. Project percentage of completion, based on dollar value of the Work included in each activity to the last day of the pay period for each Application for Payment.
- D. Submit a separate submittal schedule indicating the dates when the submittals are to be sent to the Engineer.
1. List specific dates submittal is to be sent to the Engineer.
 2. List specific dates submittal must be processed in order to meet the proposed schedule.
 3. Allow a reasonable time to review submittals, taking into consideration the size and complexity of the submittal, the submission of other submittals, and other factors that may affect review time.
 4. Allow time for re-submission of the submittals for each item. Contractor is responsible for delays associated with additional time required to review incomplete or erroneous submittals and for the time lost when submittals are submitted for products that do not meet specification requirements.
- E. Update the schedule at the end of each monthly partial payment period to indicate the progress made on the Project to that date.

1.04 SCHEDULE REVISIONS

- A. Submit a written report if the schedule indicates that the Project is more than 30 days behind schedule. The report is to include:
1. Number of days Project is behind schedule.
 2. Narrative description of the steps to be taken to bring the Project back on schedule.
 3. Anticipated time required to bring the Project back on schedule.
 4. Submit a revised schedule indicating the action that the Contractor proposes to take to bring the Project back on schedule.
- B. Revise the schedule to indicate any adjustments in Contract Time approved by Change Order.
1. Revised schedule is to be included with Contract Modification Request for which an extension of time is requested.
 2. Failure to submit a revised schedule indicates that the modification shall have no impact on the ability of the Contractor to complete the Project on time and that the cost

associated with the change of additional plant or work force have been included in the cost proposed for the modification.

- C. Updating the project schedule to reflect actual progress is not considered a revision to the project schedule.
- D. Applications for Payment will not be recommended for payment without a revised schedule and if required, the report indicating the Contractor's plan for bringing the Project back on schedule.

1.05 FLOAT TIME

- A. Define float time as the amount of time between the earliest start date and the latest start date of a chain of activities on the construction schedule.
- B. Float time is not for the exclusive use or benefit of either the Contractor or Owner.
- C. Contract time cannot be changed by the submission of this schedule. Contract Time can only be modified by approved Change Order.
- D. Schedule completion date must be the same as the contract completion date. Time between the end of construction and the contract final completion date is to be indicated as float time.

2.00 PRODUCTS (NOT APPLICABLE)

3.00 EXECUTION (NOT APPLICABLE)

END OF SECTION

01 32 34 VIDEO AND PHOTOGRAPHIC DOCUMENTATION

1.00 GENERAL

1.01 WORK INCLUDED

- A. Provide a video recording of the Site prior to the beginning of construction.
 - 1. Record the condition of all existing facilities in or abutting the construction area (right-of-way) including but not limited to streets, curb and gutter, utilities, driveways, fencing, landscaping, etc.
 - 2. Record after construction staking is complete but prior to any clearing.
 - 3. Provide one copy of the recording, dated and labeled to the Construction Manager before the start of construction. Provide additional recording as directed by the Construction Manager if the recording provided is not considered suitable for the purpose of recording pre-existing conditions.
- B. Furnish an adequate number of photographs of the Site to clearly depict the completed Project.
 - 1. Provide a minimum of ten different views.
 - 2. Photograph a panoramic view of the entire Site.
 - 3. Photograph all significant areas of completed construction.
 - 4. Completion photographs are not to be taken until all construction trailers, excess materials, trash and debris have been removed.
 - 5. Employ a professional photographer approved by the Construction Manager to photograph the Project.
 - 6. Provide one aerial photograph of the Site from an angle and height to include the entire Site while providing adequate detail.
- C. All photographs, video recordings and a digital copy of this media are to become the property of the Owner. Photographs or recordings may not be used for publication, or public or private display without the written consent of the Owner.

1.02 QUALITY ASSURANCE

- A. Provide clear photographs and recordings taken with proper exposure. View photographs and recordings in the field and take new photographs or recordings immediately if photos of an adequate print quality cannot be produced or video quality is not adequate. Provide photographs with adequate quality and resolution to permit enlargements.

1.03 SUBMITTALS

- A. Submit photographic documentation as record data in accordance with Section 01 33 00 "Submittal Procedures."
- B. Submit two DVDs of the video recording as record data in accordance with Section 01 33 00 "Submittal Procedures."

2.00 PRODUCTS

2.01 PHOTOGRAPHS

- A. Provide photographs in digital format with a minimum resolution of 1280 x 960, accomplished without a digital zoom.
- B. Take photographs at locations acceptable to the Construction Manager.
- C. Provide two color prints of each photograph and a digital copy on a DVD of each photograph taken.
- D. Identify each print on back with:
 - 1. Project name.
 - 2. Date, time, location, and orientation of the exposure.
 - 3. Description of the subject of photograph.
- E. Submit photograph in clear plastic sheets designed for photographs. Place only one photograph in each sheet to allow the description on the back to be read without removing the photograph.
- F. Final photographs are to include two 8-by-10-inch glossy color prints for each of ten photographs selected by the Owner. These photographs are in addition to normal prints.

2.02 VIDEO RECORDING

- A. Provide digital format on DVD that can be played with Windows Media Player in common format in full screen mode.
- B. Identify Project on video by audio or visual means.
- C. Video file size should not exceed 400 MB.
- D. Video resolution shall be 1080p.
- E. The quality of the video must be sufficient to determine the existing conditions of the construction area. Camera panning must be performed while at rest, do not pan the camera while walking or driving. Camera pans should be performed at intervals sufficient to clearly view the entire construction area.
- F. DVD shall be labeled with construction stationing and stationing should be called out, voice recorded, in the video.
- G. The entire construction area recording shall be submitted at once. Sections submitted separately will not be accepted.
- H. Pipeline projects should be recorded linearly from beginning to end.

3.00 EXECUTION (NOT APPLICABLE)

END OF SECTION

01 33 00.01 TABLE OF REQUIRED SUBMITTALS

1.00 GENERAL

1.01 REQUIRED SUBMITTALS

- A. The following tabulation list the submittals required for each Submittal Section. Each Specification section may provide more detailed information regarding the data to be provided for each product, materials, equipment or component required by the specification. Provide additional documentation as required by the Contract Documents in accordance with Section 01 33 00 "Submittal Procedures" and each Specification section and as reasonably requested by the Owner, Construction Manager and Engineer.
- B. Incorporate each submittal in the Construction Schedule and Indicate the date each submittal is anticipated to be submitted.

2.00 PRODUCTS (NOT APPLICABLE)

3.00 EXECUTION (NOT APPLICABLE)

SUBMITTAL SCHEDULE													
Spec Number	Description	Shop Drawing	Sample	Certified Test Report	Certification of Local Field Service	Extended Warranty	Extended Service Agreement	Certificate of Adequacy of Design	Certification of Applicator/Subcontractor	Record Data	Operation and Maintenance Manuals	Equipment Installation Report	Process Performance Bond
02 96 00	Temporary By-Pass Pumping	X						X					
03 21 00	Reinforcing Steel	X		X						X			
03 30 53	Miscellaneous Cast-In-Place Concrete	X		X									
31 10 00.02	Site Clearing [Civil]												
31 11 00	Clearing and Grubbing [Civil]												
31 23 23.33	Flowable Fill		X										
31 23 33	Trenching and Backfill [Utilities]			X									
31 23 33.14	Trench Safety [Civil]												
31 37 00	Riprap			X									
32 12 16	Asphalt Paving									X			
32 16 13	Curbs and Gutter												
32 92 13	Hydro-Mulching									X			
33 01 30.16	TV Inspection of Sewer Pipelines									X			
33 01 30.73	Pipebursting	X								X			
33 05 01.13	Sanitary Sewer Pipe (PVC) [Civil]	X										X	

SUBMITTAL SCHEDULE													
Spec Number	Description	Shop Drawing	Sample	Certified Test Report	Certification of Local Field Service	Extended Warranty	Extended Service Agreement	Certificate of Adequacy of Design	Certification of Applicator/Subcontractor	Record Data	Operation and Maintenance Manuals	Equipment Installation Report	Process Performance Bond
33 05 23.33	Pipeline Crossing [Highways, Streets, and Railroads by Boring, Tunneling, or Open Cut]	X											
33 39 13	Sanitary Utility Sewage Manholes, Frames and Covers	X		X						X			

END OF SECTION

01 40 00 QUALITY REQUIREMENTS

1.00 GENERAL

1.01 CONTRACTOR'S RESPONSIBILITIES

- A. Control the quality of the Work and verify that the Work meets the standards of quality established in the Contract Documents.
 - 1. Inspect the Work of the Contractor, Subcontractors and Suppliers. Correct defective Work.
 - 2. Inspect products and materials to be incorporated into the Project. Ensure that Suppliers of raw materials, parts, components, assemblies, and other products have adequate quality control system to ensure that quality products are produced. Provide only products that comply with the Contract Documents.
 - 3. Provide and pay for the services of an approved professional materials testing laboratory acceptable to the Owner to ensure that products proposed for use fully comply with the Contract Documents.
 - 4. Provide all facilities and calibrated equipment required for quality control tests.
 - 5. Provide consumable construction materials of adequate quality to provide a finished product that complies with the Contract Documents.
 - 6. Perform tests as indicated in this and other sections of the Specifications. Schedule the time and sequence of testing with the Owner. All quality control testing is to be observed by the Owner or designated representative.
 - 7. Maintain complete inspection and testing records at the Site and make them available to Owner, Engineer and Construction Manager.
- B. Technical specifications govern if any requirements of this section conflicts with the requirements of the technical specifications.

1.02 QUALITY ASSURANCE ACTIVITIES BY THE OWNER

- A. Owner may perform its own quality assurance test independent of the Contractor's Quality Control Program or as otherwise described in the Contract Documents. Provide labor, materials, tools, equipment, and related items for testing by the Owner including, but not limited to temporary construction required for testing and operation of new and existing utilities. Assist the Owner, Engineer, and testing organizations in performing quality assurance activities.
 - 1. Provide access to the Work and to the Supplier's operations at all times Work is in progress.
 - 2. Cooperate fully in the performance of sampling, inspection, and testing.
 - 3. Furnish labor and facilities to:
 - a. Provide access to the Work to be tested.
 - b. Obtain and handle Samples for testing at the Site or at the source of the product to be tested.

- c. Provide calibrated scales and measuring devices for the Owner's use.
 - d. Facilitate inspections and tests.
 - e. Provide adequate lighting to allow Owner observations.
 - f. Store and cure test Samples.
- 4. Furnish copies of the tests performed on materials and products.
- 5. Provide adequate quantities of representative product to be tested to the laboratory at the designated location.
- 6. Give the Owner adequate notice before proceeding with Work that would interfere with testing.
- 7. Notify the Owner and the testing laboratory prior to the time that testing is required. Lead time is to be adequate to allow arrangements to be made for testing.
- 8. Do not proceed with any Work until testing services have been performed and results of tests indicate that the Work is acceptable.
- 9. Provide complete access to the Site and make Contract Documents available.
- 10. Provide personnel and equipment needed to perform sampling or to assist in making the field tests.
- 11. Quality assurance testing performed by the Owner will be paid for by the Owner, except for verification testing performed by the Owner, which shall be paid for by the Contractor as described in Paragraph 1.06.
- B. Quality assurance activities of the Owner or Engineer through their own forces or through contracts with materials testing laboratories and survey crews are for the purpose of monitoring the results of the Contractor's Work to see that it is in compliance with the requirements of the Contract Documents.
- C. Quality assurance activities of the Owner and Engineer or non-performance of quality assurance activities:
 - 1. Do not relieve the Contractor of its responsibility to perform Work and furnish materials and products and constructed Work conforming to the requirements of the Contract Documents.
 - 2. Do not relieve the Contractor of its responsibility for providing adequate quality control measures.
 - 3. Do not relieve the Contractor of its responsibility for damage to or loss of the material, product or Work before Owner's acceptance.
 - 4. Do not constitute or imply Owner's acceptance.
 - 5. Do not affect the continuing rights of the Owner after Owner's acceptance of the completed Work.
- D. The presence or absence of the Owner's Resident Representative or Engineer does not relieve the Contractor from any contract requirement, nor is the Owner's Resident Representative or Engineer authorized to change any term or condition of the Contract Documents without the Owner's written authorization in a Field Order or Change Order.

- E. Failure on the part of the Owner, Engineer or Construction Manager to perform or test products or constructed Works in no way relieves the Contractor of the obligation to perform Work and furnish materials conforming to the Contract Documents.
- F. All materials and products are subject to Owner's quality assurance observations or testing at any time during preparation or use. Material or products which have been tested or observed or approved by Owner at a supply source or staging area may be re-observed or re-tested by Owner before or during or after incorporation into the Work, and rejected if they do not comply with the Contract Documents.

1.03 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 "Submittal Procedures" and shall include:
 - 1. A written Quality Management Plan that establishes the methods of assuring compliance with the Contract Documents. Submit this program as Record Data.
 - 2. A Statement of Qualifications for the proposed testing laboratory. The statement of qualifications is to include a list of the engineers and technical staff that will provide testing services on the Project, descriptions of the qualifications of these individuals, list of tests that can be performed, equipment used with date of last certification and a list of recent projects for which testing has been performed with references for those projects.
 - 3. Test reports per Paragraph 1.07 of this Specification. Reports are to certify that products or constructed Works are in full compliance with the Contract Documents or indicate that they are not in compliance and describe how they are not in compliance.
 - 4. Provide Certified Test Reports on materials or products to be incorporated into the Project. Reports are to indicate that material or products are in full compliance with the Contract Documents or indicate that they are not in compliance and describe how they are not in compliance.

1.04 STANDARDS

- A. Provide a testing laboratory that complies with the ACIL (American Council of Independent Laboratories) "Recommended Requirements for Independent Laboratory Qualifications."
- B. Perform testing per recognized test procedures as listed in the various sections of the Specifications, standards of the Texas Department of Transportation, American Society of Testing Materials (ASTM), or other testing associations. Perform tests in accordance with published procedures for testing issued by these organizations.

1.05 DELIVERY AND STORAGE

- A. Handle and protect test specimens of products and construction materials at the Site in accordance with recognized test procedures.

1.06 VERIFICATION TESTING

- A. Provide verification testing when tests indicate that materials or the results of construction activities are not in conformance with Contract Documents.

- B. Verification testing is to be provided at the Contractor's expense to verify products or constructed works are in compliance after corrections have been made.
- C. Tests must comply with recognized methods or with methods recommended by the testing laboratory and approved by the Engineer.

1.07 TEST REPORTS

- A. Test reports are to be prepared for all tests.
 - 1. Tests performed by testing laboratories may be submitted on their standard test report forms. These reports must include the following:
 - a. Name of the Owner, project title and number, equipment installer and general contractor.
 - b. Name of the laboratory, address, and telephone number.
 - c. Name and signature of the laboratory personnel performing the test.
 - d. Description of the product being sampled or tested.
 - e. Date and time of sampling, inspection, and testing.
 - f. Date the report was issued.
 - g. Description of the test performed.
 - h. Weather conditions and temperature at time of test or sampling.
 - i. Location at the Site or structure where the test was taken.
 - j. Standard or test procedure used in making the test.
 - k. A description of the results of the test.
 - l. Statement of compliance or non-compliance with the Contract Documents.
 - m. Interpretations of test results, if appropriate.
 - 2. Submit reports on tests performed by Contractor or his suppliers or vendors on the forms provided by the Engineer.
 - 3. Engineer will prepare test reports on test performed by the Engineer.
- B. Distribute copies of the test reports to the Owner within 24 hours of completing the test. Flag test reports with results that do not comply with Contract Documents for immediate attention. Hard copies of test reports are to be distributed to individuals designated at the pre-construction conference:

Recipient	No. of Copies
Owner	2
Engineer	1
Construction Manager	1
Contractor	1

- C. Payment for Work subject to testing may be withheld until the Contractor's quality control test reports of the Work are submitted to the Engineer or the Owner's Resident Representative.

1.08 NON-CONFORMING WORK

- A. Immediately correct any Work that does not comply with the Contract Documents or submit a written explanation of why the Work is not to be corrected immediately and when corrective action to the Work will be performed.
- B. Payment for non-conforming Work shall be withheld until Work is brought into compliance with the Contract Documents.

1.09 LIMITATION OF AUTHORITY OF THE TESTING LABORATORY

- A. The testing laboratory representatives are limited to providing consultation on the test performed and to an advisory capacity.
- B. The testing laboratory is not authorized to:
 - 1. Alter the requirements of the Contract Documents.
 - 2. Accept or reject any portion of the Work.
 - 3. Perform any of the duties of the Contractor.
 - 4. Stop the Work.

1.10 QUALITY CONTROL PLAN

- A. Submit Contractor's Quality Control Plan that identifies personnel, procedures, control, instructions, tests, records, and forms to be used. Construction will be permitted to begin only after acceptance of the Quality Control Plan or acceptance of an interim plan applicable to the particular feature of Work to be started. Work outside of the features of Work included in an accepted interim plan will not be permitted to begin until acceptance of a Quality Control Plan or another interim plan containing the additional features of Work to be started.
- B. Content of the Quality Control Plan. The Quality Control Plan shall include, as a minimum, the following to address all construction operations, both on-site and off-site, including work by Subcontractors and Suppliers:
 - 1. A description of the quality control organization, including a chart showing lines of authority and acknowledgement that the quality control staff shall implement the quality control program for all aspects of the Work specified.
 - 2. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a quality control function.
 - 3. A copy of the letter to the Quality Control Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the Quality Control Manager, including authority to stop Work which does not comply with the Contract Documents or will result in Work that does not comply with the Contract Documents. The Quality Control Manager shall issue letters of direction to all other various quality control representatives outlining

duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Owner.

4. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of Subcontractors and Suppliers.
 5. Control, verification, and acceptance testing procedures for each specific test is to include the test name, specification paragraph requiring test, feature of Work to be tested, test frequency, person responsible for each test, applicable industry testing standards and laboratory facilities to be used for the test.
 6. Procedures for tracking phases of quality control, verification, and acceptance tests including documentation.
 7. Procedures for tracking construction deficiencies from identification through acceptable corrective action. Indicate how documentation of the verification process for deficiencies will be made.
 8. Reporting procedures, including proposed reporting formats.
 9. The name of the proposed testing laboratory along with documentation of qualifications, a list of tests that can be performed, and a list of recent projects for which similar testing has been performed with references from those projects.
- C. Notification of Changes. After submittal of the Quality Control Plan, the Contractor shall notify the Owner in writing of any proposed changes.
- D. Coordination Meeting. After the Pre-construction Meeting and before start of construction, the Contractor shall meet with the Owner and Engineer to discuss the Contractor's Quality Control Plan. The Quality Control Plan shall be submitted a minimum of 14 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the Quality Control operations, testing, administration of the system for both on-site and off-site Work, and the interrelationship of Contractor's management and control with the Owner's Quality Assurance. Revise the Quality Management Plan to reflect comments and recommended changes resulting from this meeting.

2.00 PRODUCTS

2.01 TESTING APPARATUS

- A. Furnish testing apparatus and related accessories necessary to perform the tests.

3.00 EXECUTION

3.01 QUALITY CONTROL PROGRAM

- A. Perform quality control observations and testing as required in each section of the Specifications and where indicated on the Drawings.
- B. Provide a quality control program that includes the following phases for each definable Work task. A definable Work task is one which is separate and distinct from other tasks, has separate control requirements, may be provided by different trades or disciplines, or may be Work by the same trade in a different environment.

1. Planning Phase: Perform the following before beginning each definable Work task:
 - a. Review the contract drawings.
 - b. Review submittals and determine that they are complete in accordance with the Contract Documents.
 - c. Check to assure that all materials and/or equipment have been tested, submitted, and approved.
 - d. Examine the work area to assure that all required preliminary Work has been completed and complies with the Contract Documents.
 - e. Examine required materials, equipment, and sample Work to assure that they are on hand, conform to submittals, and are properly stored.
 - f. Review requirements for quality control inspection and testing.
 - g. Discuss procedures for controlling quality of the Work. Document construction tolerances and workmanship standards for the Work task.
 - h. Check that the portion of the plan for the Work to be performed incorporates submittal comments.
 - i. Discuss results of planning phase with the Construction Manager. Conduct a meeting attended by the Quality Control Manager, the Construction Manager, superintendent, other quality control personnel as applicable, and the foreman responsible for the Work task. Instruct applicable workers as to the acceptable level of workmanship required in order to meet the requirements of the Contract Documents. Document the results of the preparatory phase actions by separate meeting minutes prepared by the Quality Control Manager and attached to the quality control report.
 - j. Do not move to the next phase unless results of investigations required for the planning phase indicate that requirements have been met.
2. Work Phase: Complete this phase after the Planning Phase:
 - a. Notify the Construction Manager at least 24 hours in advance of beginning the Work and discuss the review of the planning effort to indicate that requirements have been met.
 - b. Check the Work to ensure that it is in full compliance with the Contract Documents.
 - c. Verify adequacy of controls to ensure full compliance with Contract Documents. Verify required control inspection and testing is performed.
 - d. Verify that established levels of workmanship meet acceptable workmanship standards. Compare with required sample panels as appropriate.
 - e. Repeat the Work phase for each new crew to work on-site, or any time acceptable specified quality standards are not being met.
3. Follow-up Phase: Perform daily checks to assure control activities, including control testing, are providing continued compliance with contract requirements:
 - a. Make checks daily and record observations in the quality control documentation.

- b. Conduct follow-up checks and correct all deficiencies prior to the start of additional Work tasks that may be affected by the defective Work. Do not build upon nor conceal non-conforming Work.
 - c. Conduct a review of the Work 1 month prior to the expiration of the correction period prescribed in the General Conditions with the Owner and Construction Manager. Correct defects as noted during the review.
- C. Conduct additional planning and Work phases if:
 - 1. The quality of on-going Work is unacceptable.
 - 2. Changes are made in applicable quality control staff, on-site production supervision or work crew.
 - 3. Work on a task is resumed after a substantial period of inactivity.
 - 4. Other quality problems develop.

3.02 CAST-IN-PLACE CONCRETE TESTING

- A. Test cast-in-place concrete in accordance with Section 03 30 00 "Cast-In-Place Concrete."
- B. Hydrostatic Leak Test-Gravity Flow Sewer Lines:
 - 1. Perform hydrostatic leak tests after backfilling.
 - 2. The length of the pipe to be tested shall be such that the head over the crown of the upstream end is not less than 2 feet or 2 feet above the ground water level whichever is higher and the head over the downstream crown is not more than 6 feet.
 - 3. Plug the pipe by pneumatic bags or mechanical plugs so that the air can be released from the pipe while it is being filled with water.
 - 4. Continue the test for 1 hour and make provisions for measuring the amount of water required to maintain the water at a constant level during this period.
 - 5. Remove the jointing material, and remake the joint if any joint shows any visible leakage or infiltration.
 - 6. Remove and replace any defective or broken pipes.
 - 7. Determine the maximum allowable leakage or infiltration by the following formula:

$$L = \frac{CDS}{126720}$$

Equation Term	Represents	Measure
L	Maximum allowable leakage	gallons per hour
S	Length of pipe tested	feet
D	Nominal diameter of the pipe	inches
C	Infiltration / exfiltration rate	
	Use 50 for C outside of 25-year floodplain.	

	Use 10 for C within 25-year floodplain.
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8. Determine the rates of infiltration by means of V-Notch weirs, pipe spigot, or plugs in the end of the pipe. Methods, times, and locations are subject to the Engineer's approval.
9. Pipe with visible leaks or infiltration or exceeds the maximum allowable leakage or infiltration is considered defective and must be corrected.

C. Low Pressure Air Test-Gravity Flow Sewer Lines:

1. Use air test in lieu of the hydrostatic test if desired, or if pipeline grades do not allow filling the entire pipeline segment or manhole to the indicated depth.
2. Perform low-pressure air tests, using equipment specifically designed and manufactured for the purpose of testing sewer pipelines using low-pressure air. Test is to conform to procedure described in ASTM F1417 except for testing times. The following test times are required:

Pipe Diameter (inches)	Minimum Time (seconds)	Length for Minimum Time (feet)	Time for Long Length (seconds)
6	340	398	0.855 (L)
8	454	298	1.520 (L)
10	567	239	2.374 (L)
12	680	199	3.419 (L)
15	850	159	5.342 (L)
18	1020	133	7.693 (L)
21	1190	114	10.471 (L)
24	1360	100	13.676 (L)
27	1530	88	17.309 (L)
30	1700	80	21.369 (L)
33	1870	72	25.856 (L)

- a. Provide the equipment with an air regulator valve or air safety valve set to an internal air pressure in the pipeline that cannot exceed 6 psig.
- b. Pass air through a single control panel.
- c. Provide pneumatic plugs that have a sealing length equal to or greater than the circumference of the pipe to be tested.
- d. Provide pneumatic plugs that resist internal test pressures without requiring external bracing or blocking.
- e. Provide an air compressor of adequate capacity for charging the system.
3. Perform air test only on lines less than 36 inches in diameter. Air tests for pipes larger than 36 inches may be air tested at each joint.

4. Check connections for leakage with a soap solution. Release the air pressure, repair the leak, and retest with soap solution until results are satisfactory, before resuming air test if leaks are found.
5. Determine the shortest allowable time for the pressure to drop from 3.5 pounds per square inch to 2.5 pounds per square inch by the following formula:

$$T = \frac{0.0850DK}{Q}$$

Equation Term	Represents	Measure
T	Time for the pressure to drop 1.0 pound per square inch gauge	seconds
K	Factor equal to 0.000419DL, but not less than 1.0	
D	Average inside diameter of the pipe	inches
L	Length of line of the same pipe size	feet
Q	Rate of loss. Use 0.0015 cubic feet per minute per square foot of internal surface	

D. Air Test for Individual Joints:

1. Lines 36 inches and larger may be tested at individual joints.
2. The shortest allowable time for the pressure to drop from 3.5 pounds per square inch gauge to 2.5 pounds per square inch gauge is 10 seconds for all pipe sizes.

E. Deflection Testing for Pipe:

1. Perform deflection tests on flexible and semi-rigid pipe in accordance with TCEQ requirements.
 - a. The maximum allowable deflection of pipe measured as the reduction in vertical inside diameter is 5.0 percent unless specified otherwise.
 - b. Conduct test after the final backfill has been in place a minimum of 30 days.
 - c. Thoroughly clear the lines before testing.
2. Perform test by pulling a properly sized mandrel through lines smaller than 27" Measure deflection from the inside of the pipe for lines 27" or larger.
3. Excavate and repair pipe with deflections in excess of the maximum allowable deflection.

F. Manhole Testing: Test manholes for leakage separately and independently of the wastewater lines by hydrostatic exfiltration testing, vacuum testing or other approved methods acceptable to TCEQ. Test manholes after installation with all connections (existing and/or proposed) in place. Plug lift holes with an approved non-shrink grout prior to testing. Install drop-connections and gas sealing connections prior to testing.

1. Vacuum Test – Temporarily plug lines entering the manhole with the plugs braced to prevent them from being drawn into the manhole. Install plugs in the lines beyond

drop-connections, gas sealing connections, etc. Place the test head inside the frame at the top of the manhole and inflate in accordance with the manufacturer's recommendations. Draw a vacuum of 10 inches of mercury, then turn off the vacuum pump. Read the level of vacuum after the required test time with the valve closed. The manhole will pass the test if the drop in the level is less than 1 inch of mercury (final vacuum greater than 9 inches of mercury). The required test time for 48-, 60-, and 72-inch manholes with depths up to 30 feet is 2 minutes. Test times for manholes of greater size and depths will be determined by the Engineer.

2. Manhole Repairs – Manholes will be accepted in accordance with the criteria above. Repair any manhole which fails the initial test with non-shrink grout or other suitable material as determined for the material from which the manhole is constructed. Retest the manhole as described above until a successful test is achieved. Remove all temporary plugs and grout after a successful test.

G. Tests for Plumbing Drainage and Vent Systems:

1. Plug openings as necessary.
2. Test drainage and venting systems by filling piping with water to the level of the highest vent stack for 30 minutes.
3. Make the examination for leakage at joints and connections.
4. Test fails if there is any drop-in water level.

END OF SECTION

01 57 23 TEMPORARY STORM WATER POLLUTION CONTROL

1.00 GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, and incidentals necessary to provide storm water pollution prevention for the duration of the construction period including furnishing, installing, and maintaining erosion and sediment control structures and procedures and properly removing the features when no longer required.
- B. Develop, implement, and maintain a storm water pollution prevention plan in compliance with Local, State, and Federal requirements. Provide preventive measures to keep sediment and other pollutants from the construction activity from entering any storm water system, including open channels. Comply with the Texas Commission on Environmental Quality General Permit (TXR150000) for storm water discharges from construction activities under the Texas Pollutant Discharge Elimination System (TPDES) program. The plan shall be prepared by a licensed engineer in the State of Texas
- C. This Section provides guidelines and Best Management Practices (BMPs) information for the Contractor to use in adhering to all Local, State, and Federal environmental regulations with respect to storm water pollution prevention during construction activity.

1.02 QUALITY ASSURANCE

- A. Comply with applicable requirements of all governing authorities having jurisdiction. The Specifications and the Drawings are not intended to be prescriptive but rather to convey the intent to provide complete slope protection, erosion control, and storm water pollution prevention for both the Owner's property and adjacent properties.
- B. The Contractor shall develop and implement a storm water pollution prevention plan in accordance with TCEQ General Permit TXR150000 prior to the beginning of construction activity.
- C. Storm water pollution prevention measures shall be established prior to the beginning of construction and maintained during the entire length of construction until final stabilization has been achieved for the area protected.
- D. All land-disturbing activities shall be planned and conducted to minimize the area to be exposed at any one time as well as time of exposure, off-site erosion, sedimentation, and adverse water quality impacts.
- E. Surface water runoff originating upgrade of an exposed area shall be managed to minimize erosion and sediment loss during the period of exposure.

- F. Install measures to control both the velocity and rate of release so as to minimize erosion and sedimentation of the receiving water body (i.e., ditch, channel, stream) in accordance with regulatory requirements and as directed by the Owner, the Engineer, or the Owner's representative.
- G. Periodically clean out and dispose of all sediment and other pollutants as necessary to maintain adequate treatment capacity of each pollution control feature. Clean out and properly dispose of all sediment and other storm water pollutants at the time of completion of the Work.

1.03 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 "Submittals."
- B. Small Construction Activity (≥ 1 Acre but < 5 Acres):
 - 1. On small construction projects (disturbed area equal to or greater than 1 acre and less than 5 acres) submit a copy of the Construction Site Notice to the Operator of any Municipal Separate Storm Sewer System (MS4) receiving construction site discharge at least 2 days prior to beginning construction activity.
 - 2. Post a copy of the Construction Site Notice at the construction site in a location where it is readily available for viewing by the general public and Local, State, and Federal authorities prior to starting construction activities and maintain the posting until completion of the construction activities.
- C. Large Construction Activity (≥ 5 Acres):
 - 1. On large construction projects (5 acres or more of disturbed area) submit the following to the TCEQ and the Operator of any Municipal Separate Storm Sewer System (MS4) receiving storm water discharge from the Site:
 - a. Notice of Intent (NOI) at least 7 days prior to beginning construction activity. When submitting an NOI electronically, construction activity may commence immediately upon receipt of confirmation from the TCEQ.
 - b. Notice of Change (NOC) letter within 14 days after the discovery that incorrect information was submitted in the NOI or if relevant information in the NOI changes during the course of construction activity.
 - c. Notice of Termination (NOT) within 30 days following a change in operational control or upon final stabilization and completion of the construction project.
 - 2. Post a copy of the NOI and a Construction Site Notice at the Site in a location where it is readily available for viewing by the general public and Local, State, and Federal

authorities prior to starting construction activities and maintain the posting until completion of the construction activities.

- D. For small and large projects, maintain copies of a schedule of major construction activities, inspection reports, and revision documentation with the storm water pollution prevention plan (SWPPP) required under the TPDES General Permit (TXR150000) for Storm Water Discharges from Construction Activities.
- E. Schedule in accordance with Paragraph 3.05.

1.04 JOB CONDITIONS, CODES, AND ORDINANCES

- A. Comply with the local codes and ordinances. If local codes and ordinances require more stringent or additional storm water pollution prevention measures during construction beyond those required by State and Federal regulations, the Contractor shall provide such measures at no additional cost.

2.00 PRODUCTS

2.01 MATERIALS

- A. All materials used for storm water pollution prevention shall meet the minimum design and specification requirements identified below for commonly used sediment loss prevention practices (referenced from the North Central Texas Council of Governments (NCTCOG) integrated Storm Water Management (iSWM) Design Manual for Construction). The Contractor shall use appropriate control devices to protect against storm water pollution from construction site activity.
- B. Erosion control blankets (ECBs) to hold seed and soil in place until vegetation is established on disturbed areas are subject to the following design criteria:
 - 1. The type and class of erosion control mat must be specified as appropriate for the slope of the area to be protected, the flow rate (sheet flow on cut/fill slopes) or velocity (concentrated flow in swales) of stormwater runoff in contact with the ECB, and the anticipated length of service.
 - 2. Erosion control blankets must meet the applicable Texas Department of Transportation (TxDOT) Minimum Performance Standards for TxDOT as provided in its Erosion Control Report and/or be listed on the most current annual Approved Products List for TxDOT applicable to TxDOT Item 169 Soil Retention Blanket and its Special Provisions.
- C. Silt fences for perimeter controls located downstream of disturbed areas are subject to the following design criteria:
 - 1. If 50 percent or less soil by weight passes the U.S. Standard sieve No. 200, select the apparent opening size (A.O.S.) to retain 85 percent of the soil.

2. If 85 percent or more of soil by weight passes the U.S. Standard sieve No. 200, silt fences shall not be used unless the soil mass is evaluated and deemed suitable by a soil scientist or geotechnical engineer concerning the erodibility of the soil mass, dispersive characteristics, and the potential grain-size characteristics of the material that is likely to be eroded.
 3. Silt fence fabric must meet the following minimum criteria:
 - a. Tensile Strength, ASTM D4632 Test Method for Grab Breaking Load and Elongation of Geotextiles, 90 pounds.
 - b. Puncture Rating, ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products, 60 pounds.
 - c. Mullen Burst Rating, ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, 280 psi.
 - d. Apparent Opening Size, ASTM D4751 Test Method for Determining Apparent Opening Size of a Geotextile, U.S. Sieve No. 70 (max) to No. 100 (min).
 - e. Ultraviolet Resistance, ASTM D4355. Minimum 70 percent.
 4. Filter stone for an overflow structure shall be 1-1/2-inch washed stone containing no fine material. Angular shaped stone is preferable to rounded shaped stone.
 5. Fence posts shall be galvanized steel or equivalent and may be T-section or L-section, 1.3 pounds per linear foot minimum, and 4 feet in length minimum. Wood posts may be used depending on anticipated length of service and provided they are 4 feet in length minimum and have a nominal cross-section of 2 inches by 4 inches for pine or 2 inches by 2 inches for hardwoods.
 6. Silt fence shall be supported by galvanized steel wire fence fabric as follows:
 - a. 4-inch-by-4-inch mesh size, W1.4/1.4, minimum 14-gauge wire fence fabric;
 - b. Hog wire, 12-gauge wire, small openings installed at bottom of silt fence;
 - c. Standard 2-inch-by-2-inch chain link fence fabric; or
 - d. Other welded or woven steel fabrics consisting of equal or smaller spacing as that listed herein and appropriate gauge wire to provide support.
- D. Inlet protection used in new developments that include new inlets or roads with new curb inlets or during repairs to existing roadways are subject to the following design criteria:
1. Filter fabric protection shall be designed and maintained in a manner similar to a silt fence.

2. Where applicable, filter fabric, posts, and wire backing shall meet the material requirements specified in Paragraph 2.01.C.
 3. Filter gravel shall be 3/4-inch washed stone containing no fines. Angular shaped stone is preferable to rounded shapes.
 4. Concrete blocks shall be standard 8-inch-by-8-inch-by-16-inch concrete masonry units.
 5. When organic filter tubes are used, the designer shall specify the type of material to be used (or excluded) on a particular site:
 - a. Straw filter material shall be Certified Weed Free Forage. The straw must be in good condition, air-dried, and not rotten or moldy.
 - b. Compost shall conform to the requirements for Erosion Control Compost in TxDOT Special Specification 1001 Compost (2004). Compost may provide some oil and grease removal; however, the large percentage of fines in compost will result in less filtering and more ponding of stormwater.
 - c. Wood chips shall be 100 percent untreated chips and free of inorganic debris, such as plastic, glass, metal, etc. Wood chip size shall not be smaller than 1 inch and shall not exceed 3 inches in diameter. Shavings shall not be more than 5 percent of the total mass.
 6. Bags used to secure inlet protection devices on pavement shall be filled with aggregate, filter stone, or crushed rock that is less likely than sand to be washed into an inlet if the bag is broken. Filled bags shall be 24 to 30 inches long, 16 to 18 inches wide, and 6 to 8 inches thick. Bags shall be polypropylene, polyethylene, or polyamide woven fabric with a minimum unit weight of 4 ounces per square yard and meet the following criteria:
 - a. Greater than 300 psi Mullen Burst Strength using ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method.
 - b. Greater than 70 percent UV Stability using ASTM D4355 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus.
- E. Stone outlet sediment traps (bermed or excavated) used in situations where flows are concentrated in a drainage swale or channel are subject to the following design criteria:
1. The embankment shall be placed on geotextile fabric meeting the following minimum criteria:
 - a. Tensile Strength, ASTM D4632 Text Method for Grab Breaking Load and Elongation of Geotextiles, 250 pounds.

- b. Puncture Rating, ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products, 135 pounds.
 - c. Mullen Burst Rating, ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, 420 psi.
 - d. Apparent Opening Size, ASTM D4751 Test Method for Determining Apparent Opening Size of a Geotextile, U.S. Sieve No. 20 (max).
 - 2. Fill placed to constrict the swale for construction of the excavated stone outlet sediment trap and fill placed for the berm in the bermed stone outlet sediment trap shall consist of clay material, minimum Plasticity Index of 30, using ASTM D4318 Standard Test for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - 3. The embankment shall be comprised of well graded stone riprap with a size range of 6 to 12 inches in diameter.
- F. Sediment basins used as treatment devices for sites with disturbed areas of 10 acres and larger that are part of a common drainage area are subject to the following design criteria:
- 1. The embankment shall be constructed with clay soil, minimum Plasticity Index of 30 using ASTM D4318 Standard Test for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - 2. Texas Administrative Code Title 30, Chapter 299 (30 TAC 299), Dams and Reservoirs, contains specific requirements for dams that:
 - a. Have a height greater than or equal to 25 feet and a maximum storage capacity greater than or equal to 15 acre-feet;
 - b. Have a height greater than 6 feet and a maximum storage capacity greater than or equal to 50 acre feet;
 - c. Are a high- or significant-hazard dam as defined in Chapter 299, regardless of height or maximum storage capacity; or
 - d. Are used as a pumped storage or terminal storage facility.
 - 3. If the size of the detention basin meets or exceeds the above applicability, the design must be in accordance with state criteria, and the final construction plans and specifications must be submitted to the TCEQ for review and approval.
- G. Check dams used for long drainage swales or ditches to reduce erosive velocities are subject to the following design criteria:
- 1. Use geotextile filter fabric under check dams exceeding 12 inches in height. The fabric shall meet the material specified for the Stone Outlet Sediment Trap discussed above.

2. Loose, unconfined soil, wood chips, compost, and other material that can float or be transported by runoff shall not be used to construct check dams.
3. Sand bags shall not be used for check dams, due to their propensity to break and release sand that is transported by the concentrated flow in the drainage swale or ditch.
4. Rock Check Dams:
 - a. Stone shall be well graded with stone size ranging from 3 to 6 inches in diameter for a check dam height of 24 inches or less.
 - b. The stone size range for check dams greater than 24 inches is 4 to 8 inches in diameter.
5. Rock Bag Check Dams Bags:
 - a. Fill material should be pea gravel, filter stone or aggregate that is clean and free of deleterious material.
 - b. Bag material shall comply with the requirements of Inlet Protection above.
6. Sack Gabion Check Dams:
 - a. Sack gabions shall be wrapped in galvanized steel, woven wire mesh. The wire shall be 20 gauge with 1-inch diameter, hexagonal openings.
 - b. Stone shall be well graded with a minimum size range from 3 to 6 inches in diameter.
7. Organic Filter Tube Check Dams:
 - a. Filter material used within tubes to construct check dams shall be limited to coir, straw, aspen fiber and other organic material with high cellulose content.
 - b. The material should be slow to decay or leach nutrients in standing water and comply with the requirements for Inlet Protection above.
- H. Stabilized construction exits used for sites in which significant truck traffic occurs on a daily basis are subject to the following design criteria:
 1. The construction exit material shall be a minimum thickness of 6 inches. The stone or recycled concrete used shall be 3 to 5 inches in size with little or no fines.
 2. The geotextile fabric must meet the following minimum criteria:
 - a. Tensile Strength, ASTM D4632 Test Method for Grab Breaking Load and Elongation of Geotextiles, 300 pounds.

- b. Puncture Strength, ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products, 120 pounds.
 - c. Mullen Burst Rating, ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, 600 psi.
 - d. Apparent Opening Size, ASTM D4751 Test Method for Determining Apparent Opening Size of a Geotextile, U.S. Sieve No. 40 (max).
- I. Alternative pollution prevention measures selected by the Contractor shall be identified from the following reference sources, as appropriate for the region of the construction activity:
 - 1. United States Army Corps of Engineers (USACE), Nationwide 12 requirements
 - 2. North Central Texas Council of Governments (NCTCOG) integrated Storm Water Management (iSWM) Design Manual for Construction.

3.00 EXECUTION

3.01 PREPARATION

- A. Prepare a storm water pollution prevention plan (SWPPP) in accordance with applicable permit requirements for construction activity. Develop the SWPPP in conformance with TPDES General Permit (TXR150000) for Storm Water Discharges from Construction Activities and any applicable Local requirements. The Plan shall be prepared by a licensed engineer in the State of Texas.
- B. Prepare and implement the SWPPP prior to the beginning of construction activity in accordance with Local, State, and Federal requirements.
- C. Owner's representative may require Contractor to install storm water pollution prevention devices and/or practices during construction in addition to those required under the approved storm water pollution plan. Contractor shall remain solely responsible for complying with all Local, State, and Federal requirements.

3.02 INSTALLATION

- A. Erosion control blankets to hold seed and soil in place until vegetation is established on disturbed areas are subject to the following installation criteria:
 - 1. Prior to the installation of any erosion control matting, all rocks, dirt clods, stumps, roots, trash, and any other obstructions that would prevent the mat from lying in direct contact with the soil shall be removed.

2. Anchor trenching shall be located along the entire perimeter of the installation area, except for small areas with less than 2 percent slope.
 3. Installation and anchoring shall conform to the recommendations shown within the manufacturer's published literature for the erosion control blanket.
 4. Anchors (staples) shall be a minimum of 6 inches in length and 1 inch wide. They shall be made of 11-gauge wire, or equivalent, unless the ECB is intended to remain in place with final stabilization and biodegrade.
 5. Particular attention must be paid to joints and overlapping material. Overlap along the sides and at the ends of ECBs should be per the manufacturer's recommendations for site conditions and the type of ECB being installed. At a minimum, the end of each roll of ECB shall overlap the next roll by 3 feet and the sides of rolls shall overlap 4 inches.
 6. After installation, check blankets for uniform contact with the soil, security of the lap joints, and flushness of the staples with the ground.
- B. Silt fences for perimeter controls located downstream of disturbed areas are subject to the following installation criteria:
1. Construct fences along a line of constant elevation (along a contour line if possible).
 2. Maximum drainage area shall be 0.25 acre per 100 linear feet of silt fence.
 3. Maximum flow to any 20-foot section of silt fence shall be 1 cfs.
 4. Maximum distance of flow to silt fence shall be 200 feet or less. If the slope exceeds 10 percent, the flow distance shall be less than 50 feet.
 5. Maximum slope adjacent to the fence shall be 2:1.
 6. Stone overflow structures or other outlet control devices shall be installed at all low points along the fence or spaced at approximately 300 feet if there is no apparent low point.
 7. A 6-inch wide trench is to be cut 6 inches deep at the toe of the fence to allow the fabric to be laid below the surface and backfilled with compacted earth or gravel to prevent bypass of runoff under the fence. Fabric shall overlap at abutting ends a minimum of 3 feet and shall be joined such that no leakage or bypass occurs. If soil conditions prevent a minimum toe-in depth of 6 inches or installation of support post to depth of 12 inches, silt fences shall not be used.
 8. Sufficient room for the operation of sediment removal equipment shall be provided between the silt fence and other obstructions in order to properly maintain the fence.

9. The last 10 feet (or more) at the ends of a line of silt fence shall be turned upslope to prevent bypass of stormwater. Additional upslope runs of silt fence may be needed every 200 to 400 linear feet, depending on the traverse slope along the line of silt fence.
- C. Inlet protection for new developments that include new inlets or roads with new curb inlets or during repairs to existing roadways are subject to the following installation criteria:
1. Maintain barricades, signs, and safety features around the Work in accordance with all provisions of the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD), when installing inlet protection on publicly traveled streets or in developed areas. Ensure that inlet protection is properly designed, installed, and maintained to avoid flooding of the roadway or adjacent properties and structures.
 2. Maximum depth of flow shall be 8 inches or less.
 3. A 2-inch overflow gap or weir is required on all curb inlet protection devices.
 4. Positive drainage is critical in the design of inlet protection. If overflow is not provided for at the inlet, excess flows shall be routed through established swales, streets, or other watercourses to minimize damage due to flooding.
 5. Filter Fabric Protection:
 - a. Filter fabric protection is appropriate where the drainage area is less than 1 acre and the basin slope is less than 5 percent.
 - b. Filter fabric, posts, and wire mesh shall meet the material requirements specified in Paragraph 2.01.C.
 - c. A 6-inch-wide trench is to be cut 6 inches deep at the toe of the fence to allow the fabric to be laid below the surface and backfilled with compacted earth or gravel. This entrenchment prevents any bypass of runoff under the fence.
 - d. Stone overflow structures shall be installed where flow to the inlet is concentrated and more than 1 cfs according to the criteria in Paragraph 2.01.
 6. Block and Gravel Protection (Curb and Drop Inlets):
 - a. Concrete blocks are to be placed on their sides in a single row around the perimeter of the inlet, with ends abutting.
 - b. Openings in the blocks should face outward, not upward. $\frac{1}{2}$ " x $\frac{1}{2}$ " wire mesh shall then be placed over the outside face of the blocks covering the holes.
 - c. Filter stone shall then be piled against the wire mesh to the top of the blocks with the base of the stone being a minimum of 18 inches from the blocks.

- d. Alternatively, where loose stone is a concern (streets, etc.), the filter stone may be placed in appropriately sized geotextile fabric bags.
- 7. Excavated Impoundment Protection:
 - a. Excavated impoundment protection is only applicable to drop inlets.
 - b. It should not be applied to Y inlets because it will undermine the concrete pad surrounding the inlet opening. Nor can it be used for inlets on pavement.
 - c. With this protection method, it is necessary to install weep holes to allow the impoundment to drain completely.
 - d. The impoundment shall be sized such that the volume of excavation is equal to or exceeds the runoff volume from the temporary control design storm (2-year, 24-hour) for the inlet's drainage area.
 - e. The trap shall have a minimum depth of one foot and a maximum depth of 2 feet as measured from the top of the inlet and shall have side slopes of 2:1 or flatter.
- 8. Organic Filter Tube Protection (Curb and Drop Inlets):
 - a. Organic filter tubes may be used on paved or unpaved surfaces. On paved surfaces, tubes shall be secured in place by rock bags. On unpaved surfaces, the tubes shall be embedded in the ground a minimum of 3 inches and staked at 4 foot spacing.
 - b. Designer shall provide calculations and specify the diameter of tube to be used based on the inlet's drainage area and the flow rate of runoff to the inlet.
 - c. The minimum allowable diameter is 12 inches.
 - d. For curb protection, the diameter of the tube shall be at least 2 inches less than the height of the inlet opening. The tube should not be allowed to block the entire opening, since it will clog.
 - e. The tube shall be placed on 4-inch-by-4-inch or 2-inch-by-4-inch wire mesh to prevent the tube from sagging into the inlet. The tube should be long enough to extend a minimum of 12 inches past the curb opening on each side of the inlet.
- D. Stone outlet sediment traps (excavated or bermed) for situations where flows are concentrated in a drainage swale or channel are subject to the following installation criteria:
 - 1. The maximum drainage area contributing to the trap shall be less than 10 acres for the excavated trap, and 5 acres or less for the bermed trap. For larger drainage areas, a sediment basin shall be used.

2. The minimum storage volume shall be the volume of runoff from the temporary control design storm (2-year, 24-hour) for the sediment trap's drainage area.
 3. The surface area of the design storage shall be 1 percent of the area draining to the device.
 4. The maximum embankment height shall be 6 feet as measured from the toe of the slope on the downstream side.
 5. Minimum width of the embankment at the top shall be 2 feet.
 6. Embankment slope shall be 1:5:1 or flatter.
 7. The embankment shall have a depressed area to serve as the outlet with a minimum width of 4 feet.
 8. A 6-inch minimum thickness layer of 1-1/2-inch filter stone shall be placed on the upstream face of the embankment when stormwater runoff contains fine silt and clay particles.
 9. The embankment shall consist of stone riprap or a combination of compacted fill with stone riprap. The stone may be enclosed in wire mesh or a gabion basket and anchored to the channel bottom to prevent washing away.
 10. Fill shall be placed in 8-inch loose lifts (maximum) and compacted to 95 percent Standard Proctor Density at optimum moisture content using ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.
 11. Geotextile fabric, covered with a layer of stone, shall extend past the base of the embankment on the downstream side a minimum of 2 feet.
 12. The outlet shall be designed to have a minimum freeboard of 6 inches at design flow.
- E. Sediment basins for treatment devices for sites with disturbed areas of 10 acres and larger that are part of a common drainage area are subject to the following installation criteria:
1. Design of the sediment basin should be coordinated with design of the permanent drainage infrastructure for the development. Sediment basin sizing and discharge volumes should be calculated using the NCTCOG iSWM Technical Manual or similar technical manual in accordance with the design criteria of the locality where the basin is constructed.
 2. Minimum capacity of the basin shall be the calculated volume of runoff from a 2-year, 24-hour duration storm event plus sediment storage capacity of at least 1000 cubic feet.

3. The basin must be laid out such that the effective flow length to width ratio of the basin is a minimum of 4:1. The effectiveness of sediment basins may be increased by using baffles to prevent short-circuiting of flow through the basin.
 4. Top width of the embankment shall be determined by the Engineer based on the total height of the embankment as measured from the toe of the slope on the downstream side.
 5. Embankment side slopes shall be 3:1 or flatter.
 6. Clay soil for the embankment shall be placed in 8-inch lifts and compacted to 95 percent Standard Proctor Density at optimum moisture content using ASTM D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort.
 7. The primary outlet shall have a minimum design dewatering time of 36 hours for the temporary control design storm (2-year, 24-hour).
 8. Whenever possible, the outlet shall be designed to drain the basin in less than 72 hours to minimize the potential for breeding mosquitoes.
 9. The basin's primary outlet and spillway shall be sized to pass the difference between the conveyance storm (25-year, 24-hour) and the temporary control design storm without causing damage to the embankment and structures.
 10. Unless infeasible, the primary outlet structure should withdraw water from the surface of the impounded water. Outlet structures that do this include surface skimmers, solid risers (non-perforated), flashboard risers, and weirs.
 11. The outlet of the outfall pipe (barrel) shall be stabilized with riprap or other materials designed using the conveyance storm flow rate and velocity. Velocity dissipation measures shall be used to reduce outfall velocities in excess of 5 feet per second.
 12. Risers used to discharge high flows shall be equipped with an anti-vortex device and trash rack.
 13. Spillways shall be constructed in undisturbed soil material (not fill) and shall not be placed on the embankment that forms the basin.
- F. Check dams for long drainage swales or ditches to reduce erosive velocities are subject to the following installation criteria:
1. Typically, the dam height should be between 9 inches and 36 inches, depending on the material of which they are made. The height of the check dam shall always be less than one-third the depth of the channel.

2. Dams should be spaced such that the top of the downstream dam is at the same elevation as the toe of the upstream dam. On channel grades flatter than 0.4 percent, check dams should be placed at a distance that allows small pools to form between each check dam.
3. The top of the side of the check dam shall be a minimum of 12 inches higher than the middle of the dam. In addition, the side of the dams shall be embedded a minimum of 18 inches into the side of the drainage ditch, swale or channel to minimize the potential for flows to erode around the side of the dam.
4. Larger flows (greater than 2-year, 24-hour design storm) must pass the check dam without causing excessive upstream flooding.
5. Check dams should be used in conjunction with other sediment reduction techniques prior to releasing flow offsite.
6. Rock Check Dams:
 - a. Rock check dams shall have a minimum top width of 2 feet with side slopes of 2:1 or flatter.
7. Rock Bag Check Dams:
 - a. Rock bag check dams should have a minimum top width of 16 inches.
 - b. Bag length shall be 24 inches to 30 inches, width shall be 16 inches to 18 inches and thickness shall be 6 inches to 8 inches and having a minimum weight of 40 pounds.
 - c. Minimum rock bag dam height of 12 inches would consist of one row of bags stacked on top of two rows of bag. The dam shall always be one more row wide than it is high, stacked pyramid fashion.
 - d. PVC pipes may be installed through the dam to allow for controlled flow through the dam. Pipe should be schedule 40 or heavier polyvinyl chloride (PVC) having a nominal internal diameter of 2 inches.
8. Sack Gabion Check Dams:
 - a. Sack gabion check dams may be used in channels with a contributing drainage area of 5 acres or less.
 - b. Wire mesh shall be one piece, wrapped around the rock, and secured to itself on the downstream side using wire ties or hog rings.
 - c. Sack gabions shall be staked with $\frac{3}{4}$ inch rebar at a maximum spacing of 3 feet. Each wire sack shall have a minimum of two stakes.

9. Organic Filter Tube Check Dams:
 - a. Organic filter tubes may be used as check dams in channels with a contributing drainage area of 5 acres or less.
 - b. Organic filter tubes shall be a minimum of 12 inches in diameter.
 - c. Staking of filter tubes shall be at a maximum of 4-foot spacing and shall alternate through the tube and on the downstream face of the tube.

- G. Stabilized construction exits for sites in which significant truck traffic occurs on a daily basis are subject to the following installation criteria:
 1. Limit site access to one route during construction, if possible; two routes for linear and larger projects.
 2. Prevent traffic from avoiding or shortcutting the full length of the construction exit by installing barriers. Barriers may consist of silt fence, construction safety fencing, or similar barriers.
 3. Design the access point(s) to be at the upslope side of the construction site. Do not place construction access at the lowest point on the construction site.
 4. Stabilized Construction Exits are to be constructed such that drainage across the entrance is directed to a controlled, stabilized outlet on-Site with provisions for storage, proper filtration, and removal of wash water.
 5. The exit must be sloped away from the paved surface so that storm water is not allowed to leave the Site onto roadways.
 6. Minimum width of exit shall be 15 feet.
 7. Vehicles shall not be permitted to track or drop sediment onto paved roads, streets, or parking lots. When necessary, vehicles must be cleaned to remove sediment prior to exit onto paved areas. When washing is required, it shall be done on a constructed wheel wash facility that drains into an approved sediment trap or sediment basin or other sedimentation/filtration device.
 8. Minimum dimensions for the exit shall be as follows:

Tract Area	Minimum Width of Exit	Minimum Length of Exit
<1 Acre	15 feet	20 feet
≥ 1 acre but <5 Acres	25 feet	50 feet
≥5 Acres	30 feet	50 feet

- H. Install pollution control devices in a manner consistent with their designed intent.

3.03 MAINTENANCE

- A. Maintain pollution prevention control structures and procedures in full working order at all times during construction. This shall include any necessary repair or replacement of items which have become damaged or ineffective. Remove sediment and other pollutants which accumulate in pollution control devices as necessary to maintain the intended design efficiency for the pollution prevention measure.
- B. Dispose properly of trash, debris, and other pollutants.
- C. Place sediment material in approved earth spoil areas or return the sediment material to the area from which it eroded.
- D. Maintain pollution prevention structures and procedures until construction is complete for the area protected and until the Site achieves final stabilization. Unless more stringently defined by Local, State, or Federal requirements, final stabilization is defined as achieving 70 percent of background vegetative cover or placement of permanent cover, such as concrete or asphalt.
- E. Upon completion of construction and achievement of final stabilization, properly remove the temporary pollutant control structures and complete the area as indicated. Pollution control devices made of organic materials designed to degrade naturally in place will not require removal, unless specifically required by the Owner, Engineer, or Owner's representative.
- F. Erosion control blankets shall be inspected regularly (at least as often as required by the TPDES Construction General Permit) for bare spots caused by weather related events. Missing or loosened blankets must be replaced or re-anchored. Also check for excess sediment deposited from runoff. Remove sediment and/or replace blanket as necessary. In addition, determine the source of excess sediment and implement appropriate Best Management Practices (BMPs) to control the erosion.
- G. Silt fences shall be inspected regularly (at least as often as required by the TPDES Construction General Permit) for buildup of excess sediment, undercutting, sags, and other failures. Sediment should be removed when it reaches approximately one-half the height of the fence. In addition, determine the source of excess sediment and implement appropriate Best Management Practices (BMPs) to control the erosion. If the fabric becomes damaged or clogged, it shall be repaired or replaced as necessary.
- H. Inlet protection shall be inspected regularly (at least as often as required by the TPDES Construction General Permit). Floatable debris and other trash caught by the inlet protection should be removed after each storm event. Sediment should also be removed from curb inlet protection after each storm event because of the limited storage area

associated with curb inlets. Sediment collected at inlet protection should be removed before it reaches half the height of the protection device. Sediment should be removed from inlets with excavated impoundment protection before the volume of the excavation is reduced by 50 percent. In addition, the weep holes should be checked and kept clear of blockage. Concrete blocks, 2-inch-by-4-inch boards, stakes, and other materials used to construct inlet protection should be checked for damaged and repaired or replaced if damaged. When filter fabric or organic filter tubes are used, they should be cleaned or replaced when the material becomes clogged. For systems using filter stone, when the filter stone becomes clogged with sediment, the stones must be pulled away from the inlet and cleaned or replaced.

1. Because of the potential for inlet protection to divert runoff or cause localized flooding, remove inlet protection as soon as the drainage area contributing runoff to the inlet is stabilized. Ensure that all inlet protection devices are removed at the end of the construction.
- I. The stone outlet sediment trap should be inspected regularly (at least as often as required by the TPDES Construction General Permit) to check for clogging of the void spaces between stones. If the filter stone appears to be clogged, such that the basin will not completely drain, then the filter stone will require maintenance. If the filter stone is not completely clogged it may be raked with a garden rake to allow the water to release from the basin. If filter stone is completely clogged with mud and sediment, then the filter stone will have to be removed and replaced. Failure to keep the filter stone material properly maintained will lead to clogging of the stone riprap embankment. When this occurs, the entire stone rip-rap structure will need to be replaced. If the aggregate appears to be silted in such that efficiency is diminished, the stone should be replaced.
1. Trash and debris should be removed from the trap after each storm event to prevent it from plugging the rock. Deposited sediment shall be removed before the storage capacity is decreased by one-third, or sediment has reached a depth of 1 foot, whichever is less. The removed sediment shall be stockpiled or redistributed in areas that are protected with erosion and sediment controls.
- J. Sediment basins should be inspected regularly (at least as often as required by the TPDES Construction General Permit) to check for damage and to insure that obstructions are not diminishing the effectiveness of the structure. Sediment shall be removed and the basin shall be re-graded to its original dimensions when the sediment storage capacity of the impoundment has been reduced by 20 percent. The removed sediment may be stockpiled or redistributed onsite in areas that are protected by erosion and sediment controls.
1. Inspect temporary stabilization of the embankment and graded basin and the velocity dissipaters at the outlet and spillway for signs of erosion. Repair any eroded areas that are found. Install additional erosion controls if erosion is frequently evident.

- K. Check dams should be inspected regularly (at least as often as required by the TPDES Construction General Permit). Silt must be removed when it reaches approximately 1/3 the height of the dam or 12 inches, whichever is less. Inspectors should monitor the edges of the dam where it meets the sides of the drainage ditch, swale or channel for evidence of erosion due to bypass or high flows. Eroded areas shall be repaired. If erosion continues to be a problem, modifications to the check dam or additional controls are needed.
 - 1. Care must be used when taking out rock check dams in order to remove as much rock as possible. Loose rock can create an extreme hazard during mowing operations once the area has been stabilized.
- L. Stabilized construction exits should be inspected regularly (at least as often as required by the TPDES Construction General Permit). The stabilized construction exit shall be maintained in a condition that prevents tracking or flow of sediment onto paved surfaces. Periodic re-grading and top dressing with additional stone must be done to keep the efficiency of the exit from diminishing. The rock shall be re-graded when ruts appear. Additional rock shall be added when soil is showing through the rock surface.
 - 1. Additional controls are needed if inspections reveal a properly installed and maintained exit, but tracking of soil outside the construction area is still evident. Additional controls may be daily sweeping of all soil spilled, dropped, or tracked onto public rights-of-way or the installation of a wheel cleaning system.

3.04 FIELD QUALITY CONTROL

- A. In the event of conflict between the specified requirements and storm water pollution control laws, rules, or regulations, or other Local, State, or Federal agencies, the more restrictive laws, rules, or regulations shall apply.

3.05 SCHEDULES

- A. Prior to start of construction, submit schedules to the Owner and Engineer for accomplishment of temporary and permanent erosion control work in connection with required clearing and grubbing, grading, construction, and paving. Include a proposed method of erosion and dust control on haul roads and borrow pits and a plan for disposal of waste materials in the submittal.

END OF SECTION

01 60 00 PRODUCT REQUIREMENTS

1.00 GENERAL

1.01 WORK INCLUDED

- A. Provide products for this Project that comply with the requirements of this section. Specific requirements of the detailed equipment specification govern in the case of a conflict with the requirements of this Section.
- B. Comply with applicable specifications and standards.
- C. Comply with size, make, type, and quality specified or as modified per Section 01 31 13 "Project Coordination."

1.02 QUALITY ASSURANCE

- A. Design Criteria:
 - 1. Assume responsibility for the design of the products to include structural stability and operational capability.
 - 2. Design members to withstand all loads imposed by installation, erection, and operation of the product without deformation, failure, or adversely affecting the operational requirements of the product. Size and strength of materials for structural members are specified as minimums only.
 - 3. Design mechanical and electrical components for all loads, currents, stresses, and wear imposed by start-up and normal operations of the equipment without deformation, failure, or adversely affecting the operation of the unit. Mechanical and electrical components specified for equipment are specified as the minimum acceptable for the equipment.
- B. Coordination:
 - 1. Provide coordination of the entire Project, including verification that structures, piping, and equipment components to be furnished and installed for this Project are compatible.
 - 2. Determine that the equipment furnished for this Project is compatible with the Contract Document requirements and with the equipment and materials furnished by others.
 - 3. Electrical components provided for equipment shall comply with all provisions of the Contract Documents.
 - 4. Protective coatings and paints applied to equipment shall be fully compatible with the final coatings to be field applied in accordance with the Contract Documents.
- C. Adaptation of Equipment:
 - 1. Drawings and Specifications are prepared for the specified products. Make modifications to incorporate the products into the Project at no cost to the Owner, if a substitution for a product is requested and approved in accordance with Section 01 31 13 "Project Coordination."

2. Do not provide a product with a physical size that exceeds the available space. Consideration may be given to the acceptance of these products or equipment if the Contractor assumes all costs necessary to incorporate the item and the Engineer approves such revisions.
3. Coordinate electrical requirements for the products to be installed in the Project, including revisions in electrical equipment components wiring and other factors necessary to incorporate the component.

1.03 SUBMITTALS

- A. Provide Submittals in accordance with Section 01 33 00 "Submittal Procedures," and shall include:
 1. Certificates of Adequacy of Design, as described in Section 01 33 00 "Submittal Procedures."
 2. Equipment Installation Reports per Section 01 75 00 "Starting and Adjusting."
 3. Other documentation as required by detailed equipment specifications.

1.04 STANDARDS

- A. The applicable industry standards referenced in the Specifications shall apply as if written here in its entirety.
- B. Except where otherwise indicated, structural and miscellaneous fabricated steel used in items of equipment shall conform to the Standards of the American Institute of Steel Construction.

1.05 GUARANTEES AND WARRANTIES

- A. Guarantee and or Warranty products furnished by the Contractor under this Contract against:
 1. Faulty or inadequate design.
 2. Improper assembly or erection.
 3. Defective workmanship or materials.
 4. Leakage, breakage, or other failure.
- B. Guarantee and or Warranty the products installed under this Contract, including products furnished by the Owner, against leakage, breakage, or other failure due to improper assembly or erection and against improper installation of the equipment. The guarantee and or Warranty period shall be as defined in the General Conditions. Individual specification sections may have more stringent warranty requirements than stated in the General Conditions. The most stringent warranty will be required in the event of any difference in the two aforementioned locations.

2.00 PRODUCTS

2.01 MATERIALS

- A. Design, fabricate, assemble, deliver and install according to normally accepted engineering and shop practices, except where a higher standard of quality is required by the Contract Documents.
- B. Manufacture like parts of duplicate units to standard sizes and gages. Like parts are to be interchangeable.
- C. Two or more items of the same kind are to be identical and made by the same Supplier.
- D. Provide products suitable for the intended service.
- E. Adhere to the equipment capacities, sizes, and dimensions indicated by the Contract Documents.
- F. Do not use products for any purpose other than that for which it is designed.
- G. Provide new products unless previously used products are specifically allowed in the Contract Documents.
- H. Equipment shall not have been in service at any time prior to delivery, except as required by tests.
- I. Materials shall be suitable for service conditions.
- J. Iron castings shall be tough, close-grained gray iron free from blowholes, flaws, or excessive shrinkage and shall conform to ASTM A48.
- K. Structural members shall be considered as subject to shock or vibratory loads.
- L. Unless otherwise indicated, steel which will be submerged, all or in part, during normal operation of the equipment shall be at least 1/4-inch thick. All edges are to be chamfered to preclude any sharp exposed edges.

3.00 EXECUTION

3.01 INSTALLATION

- A. Install equipment including equipment pre-selected or furnished by the Owner. Assume responsibility for proper installation, start-up and making the necessary adjustments so that the equipment is placed in proper operating condition per Section 01 75 00 "Starting and Adjusting."

3.02 LUBRICATION

- A. Lubricate all products provided or installed for this Project, including products furnished by the Owner, per the Supplier's written recommendations until the product is accepted by the Owner.

END OF SECTION

01 70 00 EXECUTION AND CLOSEOUT REQUIREMENTS

1.00 GENERAL

1.01 WORK INCLUDED

- A. Comply with requirements of the General Conditions and specified administrative procedures in closing out the Construction Contract.

1.02 SUBMITTALS

- A. Submit affidavits and releases on forms provided by the Engineer.

1.03 SUBSTANTIAL COMPLETION

- A. Submit written notification that the Work or designated portion of the Work is substantially complete to the Engineer when the Work is considered to be substantially complete per the General Conditions. Include a list of the items remaining to be completed or corrected before the Project will be considered to be complete.
- B. Engineer shall visit the Site to observe the Work within a reasonable time after notification is received to determine the status of completion.
- C. Engineer shall issue notification to the Contractor that the Work is either substantially complete or that additional Work must be performed before the Project may be considered substantially complete.
 - 1. Engineer shall notify the Contractor in writing of items that must be completed before the Project can be considered substantially complete.
 - a. Correct the noted deficiencies in the Work.
 - b. Issue a second written notice with a revised list of deficiencies when Work has been completed.
 - c. Engineer shall revisit the Site and the procedure shall begin again.
 - 2. Engineer shall issue a Certificate of Substantial Completion to the Owner when the Project is considered to be substantially complete. Certificate shall include a tentative list of items to be corrected before final payment.
 - a. Owner will review and revise the list of items and notify the Engineer of any objections or other items that are to be included in the list.
 - b. Engineer shall prepare and send to the Contractor a definite Certificate of Substantial Completion with a revised tentative list of items to be corrected or completed.
 - c. Review the list and notify the Engineer in writing of any objections within 10 days of receipt of the Certificate of Substantial Completion.

1.04 FINAL INSPECTION

- A. Submit written certification in the form provided by the Engineer when the Project is complete and:

1. Contract Documents have been reviewed.
 2. Work has been completed in compliance with the Contract Documents.
 3. Equipment and systems have been tested per Contract Documents and are fully operational.
 4. Final Operations and Maintenance Manuals have been provided to the Owner and all operator training has been completed.
 5. Specified spare parts and special tools have been provided.
 6. Work is complete and ready for final inspection.
- B. Engineer shall make an inspection with the Owner and appropriate regulatory agencies to determine the status of completeness within a reasonable time after the receipt of the Certificate.
- C. Engineer shall issue notice that the Project is complete or notify the Contractor that Work is not complete or is defective.
1. Submit the request for final payment with Closeout submittals described in Paragraph 1.07 if notified that the Project is complete and the Work is acceptable.
 2. Upon receipt of notification from the Engineer that Work is incomplete or defective, take immediate steps to remedy the stated deficiencies. Send a second certification to the Engineer when Work has been completed or corrected.
 3. Engineer shall re-visit the Site and the procedure will begin again.

1.05 REINSPECTION FEES

- A. Pay fees to the Owner to compensate the Engineer for reinspection of the Work required by the failure of the Work to comply with the claims of status of completion made by the Contractor.
- B. Owner may withhold the amount of these fees from the Contractor's final payment.
- C. Cost for additional inspections will be billed to the Owner by the Engineer for the actual hours required for the reinspection and preparation of related reports in accordance with the rates provided in the Supplemental Conditions.

1.06 CLOSEOUT SUBMITTALS TO THE ENGINEER

- A. Record Drawings per Section 01 31 00 "Project Coordination."
- B. Keys and keying schedule.
- C. Warranties and bonds.
- D. Evidence of payment or release of liens on the forms provided by the Engineer and as required by the General Conditions.
- E. Consent from Surety to Final Payment.
- F. Equipment installation reports on equipment.
- G. Shop drawings, record data, Operations and Maintenance Manuals, and other submittals as required by the Contract Documents.

- H. Specified spare parts and special tools.
- I. Certificates of Occupancy, operating certificates, or other similar releases required to allow the Owner unrestricted use of the Work and access to services and utilities.
- J. Evidence of final, continuing insurance, and bond coverage as required by the Contract Documents.
- K. Final Photographs per Section 01 32 33 "Photographic Documentation."

1.07 FINAL APPLICATION FOR PAYMENT REQUEST

- A. Submit a preliminary final Application for Payment. This application is to include adjustments to the Contract Amount for:
 - 1. Approved Change Orders.
 - 2. Allowances not previously adjusted by Change Order.
 - 3. Unit prices.
 - 4. Deductions for defective Work that has been accepted by the Owner.
 - 5. Penalties and bonuses.
 - 6. Deductions for liquidated damages.
 - 7. Deductions for re-inspection payments per Paragraph 1.05.
 - 8. Other adjustments.
- B. Engineer shall prepare a final Change Order, reflecting the approved adjustments to the contract amount which have not been covered by previously approved Change Orders.
- C. Submit the final Application for Payment per the General Conditions, including the final Change Order.

1.08 TRANSFER OF UTILITIES

- A. Transfer utilities to the Owner when the Certificate of Substantial Completion has been issued, final cleaning has been completed per Section 01 74 23 "Final Cleaning," and the Work has been occupied by the Owner.
- B. Submit final meter readings for utilities and similar data as of the date the Owner occupied the Work.

1.09 WARRANTIES, BONDS, AND SERVICES AGREEMENTS

- A. Provide warranties, bonds, and service agreements required by Section 01 33 00 "Submittal Procedures" or by the individual sections of the Specifications.
- B. The date for the start of warranties, bonds, and service agreements is established per the General Conditions.
- C. Compile warranties, bonds, and service agreements and review these documents for compliance with the Contract Documents.
 - 1. Each document is to be signed by the respective Supplier or Subcontractor.

2. Each document is to include:
 - a. The product or Work item description.
 - b. The firm, with the name of the principal, address, and telephone number.
 - c. Scope of warranty, bond or services agreement.
 - d. Date, duration, and expiration date for each warranty bond and service agreement.
 - e. Procedures to be followed in the event of a failure.
 - f. Specific instances that might invalidate the warranty or bond.
- D. Submit two copies of each document to the Engineer for review and transmittal to the Owner.
 1. Submit duplicate sets.
 2. Documents are to be submitted on 8-1/2 x 11 paper, punched for a standard three-ring binder.
 3. Submit each set in a commercial quality three-ring binder with a durable and cleanable plastic cover. The title "Warranties, Bonds, and Services Agreements", the Project name and the name of the Contractor are to be typed and affixed to the cover.
- E. Submit warranties, bonds and services agreements:
 1. At the time of final completion and before final payment.
 2. Within 10 days after inspection and acceptance for equipment or components placed in service during the progress of construction.

1.10 CLAIMS AND DISPUTES

- A. Claims and disputes must be resolved prior to recommendations of final Application for Payment. Acceptance and final payment by the Contractor will indicate that any outstanding claims or disputed issues have been resolved to the full satisfaction of the Contractor.

2.00 PRODUCTS (NOT APPLICABLE)

3.00 EXECUTION (NOT APPLICABLE)

END OF SECTION

01 74 23 FINAL CLEANING

1.00 GENERAL

1.01 This section specifies administrative and procedural requirements for final cleaning at Substantial Completion.

1.02 WORK INCLUDED

- A. Perform a thorough cleaning of the Site, buildings, or other structures prior to Owner occupancy of the buildings, and prior to Final Completion. Leave the Project clean and ready for occupancy.

1.03 SUBMITTALS

- A. Provide data for maintenance per Section 01 78 23 "Operation and Maintenance Data."

1.04 QUALITY CONTROL

- A. Use experienced workmen or professional cleaners for final cleaning.

2.00 PRODUCTS

2.01 MATERIALS

- A. Furnish the labor and products needed for cleaning and finishing as recommended by the Manufacturer of the surface material being cleaned.
- B. Use cleaning products only on the surfaces recommended by the Supplier.
- C. Use only those cleaning products which will not create hazards to health or property and which will not damage surfaces.

3.00 EXECUTION

3.01 FINAL CLEANING

- A. Thoroughly clean the entire Site and make ready for occupancy.
 - 1. Remove construction debris, boxes, and trash from the Site.
 - 2. Remove construction storage sheds and field offices.
 - 3. Restore grade to match surrounding condition and remove excess dirt.
 - 4. Sweep all drives and parking lots clean of dirt and debris. Use water truck or hose down paved site to like new appearance.
- B. Clean floors and inspect for damage.
 - 1. Remove oil, grease, paint drippings, and other contaminants from floors, then mop repeatedly until thoroughly clean. Replace damaged flooring.

2. Clean resilient flooring with an approved cleaner and provide one coat liquid floor polish as recommended by the flooring Supplier. Polish to a buffed appearance with powered floor buffer.
 3. Vacuum all carpets with powered floor sweeper to remove dirt and dust. Remove glue or other substances from nap of carpet.
- C. Clean and polish inside and outside glass surfaces. Wash with window cleaner and water, apply a coat of high quality glass polish and wipe clean. Do not scratch or otherwise mar glass surfaces.
 - D. Clean wall surfaces to remove dirt or scuff marks. Remove excess adhesive along top edges of wall base. Remove adhesive from surfaces of vinyl wall coverings.
 - E. Align tile to fit properly in grid and replace cracked or damaged tile. Remove smear marks and other dirt from tile and clean surface of grid system.
 - F. Spot paint nicks and other damage. If spot-painting does not blend into the existing color and texture of the surrounding surfaces, repaint wall from inside corner to inside corner. Touch up damaged surfaces on factory finished equipment using special paint furnished by the Manufacturer.
 - G. Clean plumbing fixtures, valves, and trim. Clean toilet seats and covers. Remove labels and adhesive from fixtures. Remove floor drains and clean baskets or buckets. Polish strainers and exposed chrome or brass.
 - H. Remove dirt, oil, grease, dust and other contaminants from floors, equipment and apparatus in mechanical and electrical rooms with vacuum.
 - I. Clean and polish ceramic tile floors and wall surfaces to remove mildew or other stains. Tuck point defective joints.
 - J. Inspect exterior painted surfaces. Spot paint any damaged surfaces.
 - K. Clean permanent filters and replace disposable filters on heating, ventilating, and air conditioning systems. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - L. Clean roof areas of debris; flush roof drainage systems with water until clear.
 - M. Broom clean exterior paved surfaces and rake clean other surfaces of the grounds.
 - N. Clean and polish all electrical equipment and exposed conduits. Remove paint overspray. Provide a blemish free appearance on all exposed equipment and conduits.

END OF SECTION

DIVISION 02
EXISTING CONDITIONS

02 96 00 TEMPORARY BYPASS PUMPING

1.00 GENERAL

1.01 WORK included

- A. Furnish labor, materials, equipment and incidentals necessary to implement a temporary bypass pumping system for the purpose of diverting existing sewer flows around the work area for the duration of the project.
- B. References to Technical Specifications:
 - 1. Section 01 29 00 "Payment Procedures"
 - 2. Section 01 33 00 "Submittal Procedures"

1.02 MEASUREMENT AND PAYMENT

- A. Measurement for the Work specified herein will be by lump sum, as the Work progresses, and as required by the plans and specifications, in accordance with Section 01 29 00 "Payment Procedures". Partial payment of the lump sum bid item for temporary bypass pumping shall be in accordance with the following: (Multiple set-ups and operations shall be included in the lump sum price)
 - 1. When initial set-up and operation of the temporary bypass pumping system begins, 40% of the line item will be paid.
 - 2. The remaining portion of the line item will be paid when the temporary bypass pumping system operations for the entire job are completed.
- B. Temporary Bypass Pumping not specifically required on plans, but directed by the Engineer and/or the Inspector, will not be measured separately for payment and will be considered incidental. Repair or replacement of manhole sections disturbed as a part of the temporary bypass pumping operations is considered incidental to the line item and will not be measured separately for payment.

1.03 QUALITY ASSURANCE

- A. The Contractor shall demonstrate that the temporary bypass pumping system is in good working order and is sufficiently sized to successfully handle all sanitary sewer flows by performing a test run for a period of 24 hours prior to beginning Work.
- B. The Contractor shall be required to have all materials, equipment and labor necessary to complete the repair or replacement on the job site prior to isolating the wet well, sewer manhole, or line segment and beginning flow diversion or pumping operations.
- C. The Contractor shall provide both a strobe light type high-level alarm, as well as alarm notification to their pager(s) and/or cell phones, as well as other appointed personnel to be identified by the Owner, and insure adequate alarm notification is attained prior to actual startup of the test period.
- D. The Contractor shall coordinate all activities through a schedule agreed upon by the Owner.

1.04 SUBMITTALS

- A. Make Submittals required by this Section under the provisions of Section 01 33 00 "Submittal Procedures".
- B. Manufacturer's Product Data, instructions, recommendations, shop drawings, and necessary certifications in order for the proposed Temporary Bypass Pumping Plan to be reviewed and acknowledged. The plan shall include but not be limited to the following:
 - 1. Staging areas for pumps
 - 2. Sewer plugging method and types of plugs
 - 3. Number, size, material, location and method of installation of suction piping
 - 4. Number, size, material, location and method of installation of discharge piping
 - 5. Bypass pump sizes, capacity, number of each size to be on site, including spare pump, and power requirements
 - 6. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted based on bypass pumping schedule at the end of this section)
 - 7. Standby power generator size, location
 - 8. Downstream discharge plan
 - 9. Calculations for selection of bypass pumping pump size
 - 10. Method of noise control for each pump and/or generator
 - 11. Method of protecting discharge manholes or structures from erosion and damage
 - 12. Schedule for installation of and maintenance of bypass pumping lines

2.00 PRODUCTS

2.01 MATERIALS

- A. The Contractor shall provide all necessary pumping equipment, piping and all other necessary appurtenances in order to maintain adequate and reliable sanitary sewer flow in the sewer system (excluding manholes) at all times during construction. All materials, equipment, etc., must be in good condition and should not have visible damage such as cracks, holes, foreign material, blisters, etc.
- B. High-Density Polyethylene (HDPE) is the preferred pipe material for all bypass piping. HDPE must be used when bypass discharge piping will be going through streams, storm water culverts, and/or environmentally sensitive areas.
 - 1. HDPE pipe must be assembled and joined using couplings, flanges or fusion welding in order to avoid joint leakage.
 - 2. HDPE fusion welding must be performed by personnel certified as fusion technician(s) by the manufacturer of HDPE pipe and/or fusing equipment.
 - 3. The bypass pumping plan shall indicate the proposed DR of the pipe to be used.

- C. Pipe material other than HDPE shall be submitted to the Engineer for approval. Neither 'irrigation type' pipe nor glued PVC pipe will be permitted.
- D. Plugs must be selected and installed according to the size of the line to be plugged. An additional plug must be onsite and ready to be installed in the event a plug fails or becomes dislodged. Plug(s) will be reviewed by the Inspector and/or Engineer for defects that might lead to failure prior to being installed. It is also imperative that the Contractor notify the Inspector at the completion of the work in order to verify that all plugs have been removed from the system.

2.02 EQUIPMENT

- A. Pumps must be fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps to prime the system. Pumps may be electric or diesel powered. The primary pump must be a grinder or chopper pump, in order to reduce the potential for debris to complicate the safe operation of the pumps.
- B. Contractor shall have one backup pump, equal in capacity to the largest pump in the system, connected to the temporary bypass pumping system, and ready for operation in case any of the primary pumps fail. The backup pump shall not be used in Contractor's calculations for determining the pumping capacity requirements for the stated flow conditions.
- C. Sound-attenuated pump enclosures shall be required on all projects where the bypass pumps are located within 100 feet of any residence, business, park, or other presence of people.

3.00 EXECUTION

3.01 PREPARATION

- A. Obtain Engineer's approval of location of bypass pipelines prior to installation.
- B. Obtain approvals for placement within public or private property.

3.02 CONSTRUCTION, INSTALLATION, AND REMOVAL

- A. During construction, it will be the Contractor's responsibility to maintain a safe and secure environment at all times. All provisions and/or requirements of the temporary bypass pumping plan must be followed throughout the course of any bypass flow operations. Contractor must notify the Owner 72 hours prior to commencing the bypass pumping operations.
- B. Contractor shall provide continuous supply on-site fuel storage sufficient for 24-hour operation of the bypass pumping installation.
- C. Contractor shall protect all components of the bypass operations from vandalism and vehicular damage by making the site secure.
- D. Contractor shall minimize sewer odors by using lids, shroud covers, or any method approved by the Inspector or Engineer.
- E. Contractor shall be solely responsible for any and all damages to private and/or public property caused by, or during, the installation, operation, and/or removal of the bypass pumping system.

- F. All piping, joints and accessories shall be designed to withstand at least twice the maximum system pressure, or a minimum of 50 psi, whichever is greater.
- G. During flow diversion and/or pumping, no sewerage shall be leaked, dumped, or spilled in or onto, any area outside of the existing sanitary sewer system.
- H. When flow diversion and/or pumping operations are complete, all pumping shall be drained into the sanitary sewer prior to disassembly and all flow management components shall be removed from the site.

3.03 BYPASS PUMPING SCHEDULE

- A. Flows shown below are based on City of North Richland Hills GIS Manhole IDs and modeled flows.

Parameter	Segment 1	Segment 2
Minimum Flow (MGD)	0.089	1.345
Average Dry Weather (MGD)	0.640	3.326
Peak Wet Weather (MGD)	2.222	7.154

END OF SECTION

DIVISION 03
CONCRETE

03 21 00 REINFORCING STEEL

1.00 GENERAL

1.01 WORK INCLUDED

- A. Furnish labor and reinforcing materials required to cut, bend, tie, splice, place and support the reinforcement in the material grades, sizes, quantities and locations specified.

1.02 QUALITY ASSURANCE

- A. Tolerances:
1. Reinforcement shall be placed where specified, with the following maximum tolerances, plus or minus:
 - a. Concrete Cover: 1/4 inch.
 - b. Rebar Spacing: 1/4 inch in 12 inches.

1.03 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 "Submittal Procedures" and shall include:
1. Shop Drawings:
 - a. Reinforcing bar layout drawing with bar lists clearly marked and referenced to the Drawings.
 2. Record Data:
 - a. Manufacturers' literature for specified products.
 3. Certified Test Reports:
 - a. Certification of steel quality, size, grade and manufacturer's origin.

1.04 STANDARDS

- A. The applicable provisions of the following standards shall apply as if written here in their entirety:
1. American Society for Testing and Materials (ASTM) Standards:

ASTM A1064	Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM A615	Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

2. American Concrete Institute (ACI) Publications:

ACI 301	Specification for Structural Concrete
ACI SP-66	ACI Detailing Manual
ACI 318	Building Code Requirements for Structural Concrete

3. Concrete Reinforcing Steel Institute (CRSI) Publications:

CRSI	Manual of Standard Practice
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1.05 DELIVERY AND STORAGE

- A. Store steel reinforcement above the surface of the ground upon platform skids or other supports. Protect from mechanical and chemical injury and surface deterioration caused by exposure to conditions producing rust. When placed in the Work, steel reinforcement shall be free from dirt, scale, dust, paint, oil and other foreign material. Tag and store steel reinforcement for ease of correlation with Shop Drawings.

1.06 JOB CONDITIONS

- A. Proposed deviations from reinforcing indicated on the Drawings or Specifications shall be approved in writing by the Engineer prior to fabrication.
- B. Lap lengths shall be of the length shown on the Drawings or noted in lap and embedment table, and shall be in compliance with ACI 318.
- C. Specified cover for reinforcing shall be maintained throughout construction. Bars shall be cut to lengths necessary to allow for proper clearances. Cover of concrete shall be measured from face of forms to outside face of reinforcement.
- D. Stirrups shall be hooked.

2.00 PRODUCTS

2.01 MATERIALS

- A. Steel Reinforcing Bars: Billet-Steel bars for concrete reinforcement conforming to ASTM A615; Grade 60, with minimum yield strength of 60,000 psi. Steel reinforcing bars shall be produced in the United States of America.
- B. Welded Wire Fabric: Cold-drawn steel wire conforming to ASTM A1064; flat sheets fabricated in accordance with ASTM A1064.
- C. Supports (Chairs): Bar supports shall be of the proper type for the intended use.
- D. Spacers: Precast mortar blocks with a 28-day compressive strength that is greater than the specified concrete strength in which the blocks are being placed.
- E. Mechanical Bar Splices: Cadweld splices as manufactured by Erico Products, Inc., or approved equal, installed in strict accordance with the manufacturer's instructions and recommendations. The mechanical devices shall develop at least 125 percent of the specified yield of the spliced bars.
- F. Mechanical Threaded Splices: Mechanical threaded connections shall utilize a metal coupling sleeve with internal threads which engage threaded ends of the bars to be spliced and shall develop in tension or compression 125 percent of the specified yield strength of the bar.

2.02 FABRICATIONS

- A. Bending: Reinforcement shall be bent cold by machine to shapes indicated on the Drawings; true to shapes indicated; irregularities in bending shall be cause for rejection. Unless otherwise noted, all hook and bend details and tolerances shall conform to the requirements of ACI SP-66 and ACI 318.

3.00 EXECUTION

3.01 PREPARATION

- A. Before any concrete is placed, all mortar blocks to be used for holding steel in position adjacent to formed surfaces shall be cast in individual molds, after which time the blocks shall be immersed in water for the remainder of at least a 4-day curing period. The blocks shall be cast with the sides beveled and in such a manner that the size of the block increases away from the surface to be placed against the forms. Blocks shall be in the form of a frustum of a cone or pyramid. Suitable tie wires shall be provided in each block for anchoring the block to the reinforcing steel, and to avoid displacement when placing the concrete. The size of the surface to be placed adjacent to the forms shall not exceed 2-1/2 inches square or the equivalent thereof when circular or rectangular areas are provided. Blocks shall be accurately cast to the thickness required, and the surface to be placed adjacent to the forms shall be a true plane free of surface imperfections.

3.02 INSTALLATION

- A. General: Place the reinforcement carefully and accurately in the concrete structures. Rigidly tie and support the reinforcement. Welding of any type of reinforcement shall not be permitted.
- B. Splices:
 - 1. Splicing of bars, except where indicated on the Drawings, shall not be permitted unless approved by the Engineer prior to fabrication. Splices shall be kept to a minimum. Splices shall preferably occur at points of minimum stress. Lap splices which are permitted shall have a lap in accordance with ACI 318. Rigidly clamp or wire the bars at all splices, in accordance with ACI. Overlap sheets of wire fabric sufficiently to maintain a uniform strength and securely fasten.
 - 2. Welding of reinforcing steel splices shall not be permitted.
 - 3. Make mechanical splices where shown on the Drawings using Cadweld splices or approved equal, installed in accordance with the manufacturer's instructions and recommendations. The mechanical device shall develop at least 125 percent of the specified yield strength of the bar.
- C. Placement:
 - 1. Place steel reinforcement, as indicated on the Drawings with the specified tolerances. Hold securely in place during the placing of the concrete. The minimum clear distance between bars shall be per ACI 318 unless noted otherwise. Always pass vertical stirrups around the main tension members and securely attach thereto. Wire reinforcing together at a sufficient number of intersections to produce a sound, sturdy mat or cage

of reinforcement that will maintain the reinforcement in correct positions when the concrete is placed.

2. Hold the reinforcing steel in concrete slabs firmly in place with wire supports or “chairs.” Sizing and spacing of the chairs shall be sufficient to properly support the steel, and shall be in accordance with CRSI Publications “Manual of Standard Practice in.”
3. Space the reinforcing steel in concrete walls the proper distance from the face of the forms, as indicated on the Drawings:
 - a. For wall surfaces exposed to view, use chairs.
 - b. For wall surfaces not exposed to view, use chairs or precast mortar blocks.
4. Where reinforcing conflicts with location of anchor bolts, inserts, etc., submit prompt notifications so that revisions can be made before concrete is placed. No cutting of reinforcing shall be permitted without the prior approval of the Engineer.
5. Welded wire shall be fabricated flat sheets, in longest practical lengths. Lap joints one mesh. Do not locate end laps over beams of continuous structures or midway between supporting beams. Offset end laps of adjacent widths to prevent continuous lap. Fasten ends and sides of welded wire fabric at 48 inches O.C. with tie wire.
6. Reinforcing shall extend through construction joints.

3.03 FIELD QUALITY CONTROL

- A. Concrete shall not be placed until the Engineer has observed the final placing of the reinforcing steel, and has given permission to place concrete.

END OF SECTION

03 30 53 MISCELLANEOUS CAST-IN-PLACE CONCRETE

1.00 GENERAL

1.01 SUMMARY

- A. This Section specifies cast-in-place concrete, including reinforcement, concrete materials, mixture design, placement procedures, and finishes.

1.02 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete mixture.
 - 1. Submit mix design supporting documentation and calculations as required.

1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
- B. Source Limitations: Obtain each type of cement of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.
- C. Comply with ACI 301, "Specification for Structural Concrete," including the following sections, unless modified by requirements in the Contract Documents:
 - 1. "General Requirements."
 - 2. "Formwork and Formwork Accessories."
 - 3. "Reinforcement and Reinforcement Supports."
 - 4. "Concrete Mixtures."
 - 5. "Handling, Placing, and Constructing."
- D. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

2.00 PRODUCTS

2.01 FORMWORK

- A. Furnish formwork and formwork accessories according to ACI 301.

2.02 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.
- B. Plain-Steel Welded Wire Reinforcement: ASTM A1064, fabricated from as-drawn steel wire into flat sheets.

2.03 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:
1. Portland Cement: ASTM C150, Type I.
 2. Fly Ash: ASTM C618, Class F. No more than 20 percent of the cement may be replaced with fly ash.
- B. Coarse Aggregate: ASTM C33, graded, uniformly graded, of the size scheduled and as follows:
1. Class: Moderate weathering region, but not less than 3M.
- C. Fine Aggregate:
1. Washed and screened natural sands or sands manufactured by crushing stones; conforming to ASTM C33. The gradation in ASTM C33 is:

Sieve Size	Percent Retained	Percent Passing
3/8"	0	100
#4	0-5	95-100
#8	0-20	80-100
#16	15-50	50-85
#30	40-75	25-60
#50	70-90	10-30
#100	90-98	2-10

2. Fine aggregate shall have not more than 45 percent retained between any two consecutive sieves. Its fineness modulus, as defined in ASTM C125, shall be not less than 2.3 nor more than 3.1.

- D. Water: ASTM C94/C94M; potable.

2.04 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

Water-Reducing Admixture	ASTM C494/C494M, Type A
Retarding Admixture	ASTM C494/C494M, Type B
Water-Reducing and Retarding Admixture	ASTM C494/C494M, Type D
High-Range, Water-Reducing Admixture	ASTM C494/C494M, Type F
High-Range, Water-Reducing and Retarding Admixture	ASTM C494/C494M, Type G

Plasticizing and Retarding Admixture	ASTM C1017/C1017M, Type II
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2.05 RELATED MATERIALS

- A. Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber, or ASTM D1752, cork or self-expanding cork.

2.06 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C309, Type 1, Class B.

2.07 CONCRETE MIXTURES

- A. Comply with ACI 301 requirements for concrete mixtures.
- B. Normal-Weight Concrete: Prepare design mixes, proportioned according to ACI 301, as follows:

Use	Min. 28-Day Compressive Strength (psi)	Maximum Size of Coarse Aggregate	Maximum Water/Cement Ratio	Maximum Slump (in.)	Minimum Sacks of Cement per cubic yard
General	3000	1-1/2"	0.45	5	5.5
Utility blocking, cradling and encasement	1500	1-1/2" Size No. 467	0.70	4	4.0
Pavement	3600	1-1/2"	0.45	3	6

1. Air Content: Maintain within range permitted by ACI 301. Do not allow air content of floor slabs to receive troweled finishes to exceed 3 percent.

2.08 CONCRETE MIXING

- A. Ready-Mixed Concrete:
1. Measure, batch, mix, and deliver concrete according to ASTM C94/C94M, and furnish batch ticket information.
 2. When air temperature is above 90 F, reduce mixing and delivery time to 60 minutes.

3.00 EXECUTION

3.01 FORMWORK

- A. Design, construct, erect, brace, and maintain formwork according to ACI 301.

3.02 STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

3.03 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Locate and install so strength and appearance of concrete are not impaired.
- C. Isolation Joints: Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
- D. Extend joint fillers full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

3.04 CONCRETE PLACEMENT

- A. Comply with ACI 301 for measuring, batching, mixing, transporting, and placing concrete.
- B. Do not add water to concrete during delivery, at the Site, or during placement.
- C. Consolidate concrete with mechanical vibrating equipment.

3.05 BLOCKING OF PIPE FITTINGS

- A. Concrete blocking shall be placed at bends, tees, wyes, crosses, plugs, etc. The concrete blocking shall be placed so as to rest against firm undisturbed trench walls. The supporting area for each block shall be sufficient to withstand the thrusts, shall rest on a firm, undisturbed earth.
- B. The concrete blocking shall be placed against undisturbed trench walls, with a minimum of 18 inches between trench wall and pipe. Blocking shall extend a minimum of 0.75 x pipe diameters below and above the centerline of pipe and shall not extend beyond any joints.
- C. If requested by the Owner's representative or where upward thrusts are present, the ends of the thrust blocks shall be contained in wood or metal forms.

3.06 FINISHING FORMED SURFACES

- A. No Finish: After forms are removed, repair or patch tie holes and defects. Otherwise, no additional finish is required. Apply to surfaces which are not visible from the inside or outside of the completed structure or less than 12 inches below finish grade (i.e. back of retaining walls below embankment, etc.).
- B. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching

adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.07 FINISHING UNFORMED SURFACES

- A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface. Do not further disturb surfaces before starting finishing operations.
- C. Nonslip Broom Finish: Apply a nonslip broom finish to exterior concrete traffic surfaces. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.08 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with ACI 301 for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- D. Curing Methods:
 - 1. Cure formed and unformed concrete for at least 7 days by one or a combination of the following methods:
 - a. Moisture Curing:
 - 1). Keep surfaces continuously moist for not less than 7 days with the following materials:
 - a). Water.
 - b). Continuous water-fog spray.
 - c). Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
 - b. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than 7 days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

- c. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.09 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article.
- B. Tests: Perform according to ACI 301.
 - 1. Testing Frequency: One composite Sample shall be obtained for each day's pour of each concrete mix exceeding 5 cubic yards but less than 25 cubic yards, plus one set for each additional 50 cubic yards or fraction thereof.

3.10 REPAIRS

- A. Remove and replace concrete that does not comply with requirements in this Section.

END OF SECTION

DIVISION 31
EARTHWORK

31 10 00.02 SITE CLEARING [CIVIL]

1.00 GENERAL

1.01 WORK INCLUDED

- A. Provide labor, materials, equipment and incidentals necessary for site grading, including site preparation, clearing and grubbing, site excavation, and fills.
- B. Grade to the subgrade elevations required for pavements, driveways, curbs, gutters, steps, sidewalks, and similar use areas.

1.02 QUALITY ASSURANCE

- A. Classification: Excavation shall be unclassified without regard to materials encountered.
- B. Quality Control Testing:
 - 1. The Owner will provide for quality control tests on the materials incorporated in the work, including classification testing of borrow materials from on-site sources. Copies of the results of the tests performed will be furnished to the Contractor upon request. The testing performed by the Owner in no way relieves the Contractor of the responsibility of completing the work in accordance with the specifications. The Contractor shall assist the testing personnel in taking tests to the extent of furnishing labor and equipment to prepare the areas for testing and curtailing operations in the vicinity of the test area during testing.
 - 2. The Contractor has the right to conduct such tests as deemed necessary to assure compliance with the contract specifications. Conflicting results between the Owner's tests and those made by the Contractor will be resolved by the Engineer, and his decision shall be final.
 - 3. The Contractor shall have the sole responsibility for seeing that the appropriate class of earth fill is placed in each zone. To this end, the Contractor will be responsible for determining any changes in materials from borrow sources, excavations, and stockpiles, and see that appropriate classification tests are requested in a timely manner. Any earth fill which does not meet the classification requirements for the zone in which it is placed, shall be removed and properly replaced with conforming material by the Contractor at no additional cost to the Owner.
- C. Protection:
 - 1. Protection of Existing Improvements:
 - a. Provide protection to prevent damage to existing improvements and structures to remain in place on the Owner's property and adjoining properties.
 - b. Restore damaged improvements to their original condition, as acceptable to parties having jurisdiction.
 - c. Land areas outside the limits of permanent work performed under this contract shall be preserved in their present condition. Confine construction activities to areas defined for work or specifically assigned by the Owner's representative for his use.

2. Protection of Existing Utilities:
 - a. Verify all existing utility locations.
 - b. Immediately notify the Owner's representative and applicable utility company of any damages to existing utilities.
 - c. Make repairs to damaged utilities in accordance with the requirements of the Owner's representative and applicable utility company at no additional cost to the Owner.
 - d. Coordinate with the Owner and the applicable utility company for shut-off of or connection to active utilities. Do not interrupt existing utility services except as authorized in writing by the Owner's representative.
3. Protection of Work Site: Provide barricades or other types of protectors necessary to warn and prevent unauthorized personnel.

1.03 JOB CONDITIONS

A. Classification of Excavation:

1. No classification shall be made to differentiate the various surface and subsurface conditions.
2. It is the Contractor's sole responsibility to verify the site surface and subsurface conditions.

B. Dewatering:

1. Perform excavation and embankment so that the area of the site and the area immediately surrounding the site drains continually and effectively by gravity or temporary pumps.
2. Drain excavations by methods which prevent the softening of subgrades and embankments.

2.00 PRODUCTS

2.01 MATERIALS

A. Fill and Backfill:

1. Materials shall be free of debris, roots, organic or frozen materials, stones having a maximum dimension of 4 inches in the upper 6 inches of the fill and stones having a maximum dimension of 6 inches in the remainder of the fill.
2. Otherwise suitable material which is unsuitable due to excess moisture content shall not be classified as unsuitable material unless it cannot be dried by manipulation, aeration, or blending with other materials to the satisfaction of the Owner's representative.
3. Unsuitable materials shall include those materials that are determined by the Owner's representative to be inadequate for providing a stable slope, fill, subgrade, or foundation for structure.

4. Expansive clay soils shall be classified as unsuitable unless treated or mixed in a manner approved by the Owner's representative.
- B. Spot Subgrade Reinforcement Material:
1. Spot subgrade reinforcement material shall consist of sound, tough, durable crushed stone or gravel with a filler of broken stone chips or sand.
 2. Material shall meet the requirements of the following gradation:

Sieve Size Square Opening	Percent Passing
1"	100
1/2"	75-95
3/8"	40-75
No. 4	30-60
No. 10	20-45
No. 40	15-30
No. 200	5-20

2.02 SELECTION OF BORROW MATERIAL

- A. Select borrow material to meet requirement and conditions of the particular fill used. For borrow material obtained outside the limits of the project site, obtain the right to procure material and pay all royalties, transportation, and other charges involved.

3.00 EXECUTION

3.01 EXCAVATION

- A. Perform excavation regardless of material encountered to the lines and grades indicated.
- B. Transport and place excavated material in fill areas within the limits of the work. Excavate unsuitable material encountered within the limits of the work below the grade indicated and replace with suitable material as directed by the Owner's representative.
- C. Excavated material shall not be wasted without the authorization of the Owner's representative. Disposal of surplus excavated material and unsuitable material shall be the Contractor's responsibility and at no additional expense to the Owner. Dispose of surplus and unsuitable materials at the waste areas indicated. Dispose of authorized waste material so that there is no obstruction to the flow characteristics of any stream or impairment to the efficiency or appearance of any structure.
- D. Excavated material shall not be deposited in a manner that endangers a partly finished structure by direct pressure or by overloading banks contiguous to the operations or that may otherwise be detrimental to the completed work.

3.02 BACKFILL

- A. Place and compact backfill adjacent to structures uniformly to prevent wedging action or eccentric loading upon or against the structures.
- B. Step or serrate slopes bounding or within areas to be backfilled to prevent sliding of the fill.
- C. During backfilling operations and in formation of embankments, equipment that will overload the structure in passing over and compacting these fills shall not be used.

3.03 PREPARATION OF GROUND SURFACE FOR FILL

- A. Clear and grub areas upon which fills are to be placed before the fill is started.
- B. Plow, step, bench, and break-up sloped ground surfaces steeper than one vertical to four horizontal (1:4) on which fill is to be placed as directed by the Owner's representative, so that the fill material bonds with the existing surface.
- C. When surfaces on which fills are to be placed do not meet the specified density requirements, break-up, pulverize, and compact the ground surface to the indicated density.
- D. When surfaces on which fills are to be placed do not meet the specified moisture content requirements, wet, aerate, and dry the ground to the appropriate moisture content.
- E. When subgrade is part fill and part excavation, scarify the excavated portion to a depth of 12 inches and compact as indicated for the adjacent fill, unless directed otherwise by the Owner's representative.

3.04 FILL

- A. Construct fills and embankments at the locations and to the lines and grades indicated, allowing for surfacing, base courses and topsoil.
- B. Place material in successive horizontal layers of 8 to 12 inches in loose depth for the full width of the cross section and compact.

3.05 COMPACTION

- A. Over-all and pavement subgrade compaction densities shall be in accordance with plan details.
- B. Accomplish compaction by sheepfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or power-driven hand tampers well suited to the soil being compacted. Aerate and moisten material to maintain the required moisture content.

3.06 SPOT SUBGRADE REINFORCEMENT

- A. The use of spot subgrade reinforcement shall be at the direction of and subject to the approval of the Owner's representative.
- B. Remove unsuitable subgrade materials, uniformly shape and firmly compact the bottom of the resulting excavation to the density indicated for subgrade, and make the necessary provisions for adequate drainage.
- C. Place the subgrade reinforcement material in the prepared excavation in layers not exceeding 5-inch thickness. Spread and compact the material until level with the surrounding subgrade surface.

- D. Fill the voids with the necessary finer selected material and roll the area, or tamp if a roller is not accessible. Continue to fill and roll or tamp until the entire mass is thoroughly compacted to not less than the density of the surrounding or adjacent areas.
- E. Finish the surface to conform accurately to the grade and cross section indicated.

END OF SECTION

31 11 00 CLEARING AND GRUBBING [CIVIL]

1.00 GENERAL

1.01 WORK INCLUDED

- A. Provide labor, materials, equipment and incidentals necessary to perform operations in connection with clearing, grubbing, and disposal of cleared and grubbed materials.

1.02 QUALITY ASSURANCE; DEFINITIONS

- A. Clearing: Clearing is defined as the removal of trees, shrubs, bushes, and other organic matter at or above original ground level.
- B. Grubbing: Grubbing is defined as the removal of stumps, roots, boards, logs, and other organic matter found at or below ground level.

2.00 PRODUCTS (NOT APPLICABLE)

3.00 EXECUTION

3.01 PREPARATION

- A. Mark areas to be cleared and grubbed prior to commencing clearing operations. The Owner's Representative shall approve clearing and grubbing limits prior to commencement of clearing operations.
- B. Trees and shrubs outside of the clearing limits, which are within 10 feet of the clearing limits, shall be clearly marked to avoid damage during clearing and grubbing operations.
- C. Remove trees and brush outside the clearing limits, but within the immediate vicinity of the work, upon receipt of approval by the Owner's Representative, when the trees or brush interfere with the progress of construction operations.
- D. Clearly mark trees and shrubs within the clearing limits, which are to remain, and protect the trees and shrubs from damage during the clearing and grubbing operations.
- E. The clearing limits shall not extend beyond the project limits.
- F. Establish the clearing limits as follows:
 - 1. Excavations plus 5 feet beyond the top of the excavation.
 - 2. Concrete structures plus 10 feet beyond the edge of the footing.
 - 3. Underground utility trench top width plus 6 feet.
- G. Establish the grubbing limits as follows:
 - 1. Embankments plus 2 feet beyond the toe of the embankment.
 - 2. Concrete structures plus 2 feet beyond the edge of the footing.

3.02 INSTALLATION

- A. Clearing: Clearing shall consist of the felling, cutting up, and the satisfactory disposal of trees and other vegetation, together with the down timber, snags, brush, rubbish, fences, and debris occurring within the area to be cleared.
- B. Grubbing:
 - 1. Grubbing shall consist of the removal and disposal of stumps and roots larger than 1 inch in diameter.
 - 2. Extend grubbing to the depth indicated below: In the case of multiple construction items, the greater depth shall apply.
 - a. Footings: 18 inches below the bottom of the footing.
 - b. Walks: 12 inches below the bottom of the walk.
 - c. Roads and Taxiways: 18 inches below the bottom of the subgrade.
 - d. Embankments: 24 inches below existing ground.
 - e. Concrete Structures: 18 inches below the bottom of the concrete.

3.03 FIELD QUALITY CONTROL

- A. Completely remove timber, logs, roots, brush, rotten wood, and other refuse from the Owner's property. Disposal of materials in streams shall not be permitted and no materials shall be piled in stream channels or in areas where it might be washed away by floods. Timber within the area to be cleared shall become the property of the Contractor, and the Contractor may cut, trim, hew, saw, or otherwise dress felled timber within the limits of the Owner's property, provided timber and waste material is disposed of in a satisfactory manner. Materials shall be removed from the site daily, unless permission is granted by the Engineer to store the materials for longer periods.

END OF SECTION

31 23 23.33 FLOWABLE FILL

1.00 GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, and incidentals necessary to place and mix a flowable mortar fill, consisting of Portland cement, fine aggregate, fly ash, and water in the proper proportions as specified hereinafter. Controlled Low-Strength Material (Flowable Fill) shall be used to bed and backfill around piping and utilities where indicated.

1.02 QUALITY ASSURANCE

A. Design Criteria; Concrete Proportions and Consistency:

1. Concrete shall be proportioned to give the necessary workability and strength and shall conform to the following governing requirements:

28-Day Compressive Strength-psi	Min. Cement Pounds Per Cu. Yd.	Fine Aggregate Pounds Per Cu. Yd.	Max. Water Pounds Per Cu. Yd.	Max. Fly Ash Pounds per Cu. Yd.
70-150	50	2720	290	150

2. Fluidity of the flowable mortar shall be measured by the Corps of Engineers flow cone method, according to their specification CRD-C611-80. Prior to filling the flow cone with flowable mortar, the mixture shall be passed through a 1/4-inch screen. Time of efflux shall be approximately 12 seconds.
- B. Factory Testing: The Contractor shall be responsible for the design of the material. A trial mix shall be designed by an independent testing laboratory, retained by the Contractor. The testing laboratory shall submit verification that the materials and proportions of the trial mix design meets the requirement of the specifications. Concrete mix additive such as "Darafill" manufactured by Grace Construction Products or equal products may be required to achieve the low strength and the flowability requirements. In lieu of trial mix design, Contractor may submit a mix design used successfully in previous similar work, for similar materials for approval by Engineer. The Contractor shall not make changes in materials, either in gradation, source, or brand, or proportions of the mixture after having been approved, except by specific approval of the Engineer.
- C. Pre-Job Testing: Pre-job testing for excavatability with actual equipment and intended configuration of concrete sample is required. The testing equipment and configuration of concrete sample shall be determined by the Owner's representative.
- D. Owner Testing: It is the responsibility of the Contractor to achieve and maintain the quality of material required by this Section of the specifications. However, the Owner may secure the services of an independent testing laboratory to verify the quality of the concrete. The Owner shall have the right to require additional testing, strengthening, or replacement of concrete which has failed to meet the minimum requirements of this Section.

1.03 SUBMITTALS

- A. Submit trial mix design on material.

1.04 STANDARDS AND REFERENCES

- A. Materials shall meet recommendation for mix design and placement, as published by National Ready Mixed Concrete Association.
- B. The applicable provisions of the following references and standards shall apply to this Section as if written herein in their entirety.

- 1. American Society for Testing and Materials (ASTM) Standards:

ASTM C33	Specification for Concrete Aggregates
ASTM C40	Test Method for Organic Impurities in Fine Aggregates for Concrete
ASTM C150	Specification for Portland Cement
ASTM C618	Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as Mineral Admixture in Portland Cement Concrete

- 2. Federal Specifications (Fed Spec):

- a. COE – (CRD-C611-80).

2.00 PRODUCTS

2.01 MATERIALS

- A. Cement: Portland cement conforming to the specifications and test for Type I Portland cement of the American Society for Testing and Materials, Designation C-150.
- B. Fine Aggregate: Fine aggregate consisting of natural, washed and screened sand having clean, hard, strong, durable, uncoated grains complying with the requirements for ASTM C33. The sand shall generally be of such size that all will pass a 3/8-inch sieve, at least 95 percent pass a 1/4-inch screen and at least 80 percent pass a No. 8 sieve. Aggregate shall not contain strong alkali, or organic material which gives a color darker than the standard color when tested in accordance with ASTM Specification Designation C40.
- C. Fly Ash/Pozzolans: Fly ash shall be an ASTM C618, Class “C” fly ash. The fly ash may be used in controlled low-strength material.
- D. Water: Water for concrete shall be clean and free from oil, acid, alkali, organic matter or other harmful impurities. Water which is suitable for drinking or for ordinary household use will be acceptable for concrete. Where available, water shall be obtained from mains of a waterworks system.
- E. Additive: “Darafill” may be required to meet these specifications.

2.02 MIXES

- A. In the determination of the amount of water required for mix, consideration shall be given to the moisture content of the aggregate. The net amount of water in the mix will be the amount added at the mixer; plus the free water in the aggregate; and minus the absorption of the aggregate, based on a 30 minute absorption period. No water allowance shall be made for evaporation after batching.

- B. The methods of measurement of materials shall be such that the proportions of water to cement can be closely controlled during the progress of the work and easily checked at any time by the Owner's representative. To avoid unnecessary or haphazard changes in consistency, the aggregate shall be obtained from sources which will insure a uniform quality and grading during any single day's operation and they shall be delivered to the work and handled in such a manner that the variation in moisture content will not interfere with the steady production of concrete of reasonable degree of uniformity. Sources of supply shall be approved by the Owner's representative.
- C. All material shall be separately and accurately measured. Measurement may be made by weight or by volume, as determined by the Contractor; however; all equipment for measurement of materials shall be subject to approval by the Owner's representative.
- D. The proportions of the mix shall be such as to produce material that can be placed readily into the void area without spading or vibrating, and without segregation or undue accumulation of water or laitance of the surface.
- E. When additive is contained in the concrete mix, the additive ingredients, proportions and placement of the additive shall be per manufacturer's recommendations.

3.00 EXECUTION

3.01 INSTALLATION

- A. Contractor shall give the Owner's representative sufficient advance notice before starting to place material in any area, to permit inspection of the area, and preparation for pouring.
- B. Conduct the operation of depositing and compacting the material so as to form a compact, dense, impervious mass.
- C. Flowable mortar shall be uniformly placed to the depth shown on the plans. The fill shall be brought up uniformly to the top of excavation elevation. Placement of mortar fill shall then cease and the fill protected from traffic for a period of 72 hours.
- D. The material shall be placed against undisturbed trench walls, and shall not be placed on or against frozen ground.
- E. Material shall be placed in lifts or other measures shall be taken to prevent pipe flotation. Material shall be allowed to harden before placing next lift.

END OF SECTION

31 23 33 TRENCHING AND BACKFILL [UTILITIES]

1.00 GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment and incidentals necessary to perform operations in trenching, pipe bedding, backfilling, clearing, grubbing and site preparation; handling, storage, transportation and disposal of excavated material; pumping and dewatering; preparation of subgrades; protection of adjacent property; fills, grading; and other appurtenant work. Trenching, backfilling, and pipe embedment procedures shall be in full compliance with Section 31 23 33.14 "Trench Safety." Earth removed from excavations and which is not required for backfill shall be removed from the Site by the Contractor at his own expense, unless arrangements are made with the Owner through his representative to allow disposal on Site. If permitted, the Contractor shall dump and spread excess earth in a manner agreed upon by the Contractor and the Owner. Excavations, other than trench excavation, are not part of this Section.

1.02 QUALITY ASSURANCE

- A. Classification:
 - 1. Excavations shall include material of whatever nature encountered, including but not limited to clays, sands, gravels, conglomeritic boulders, weathered clay shales, rock, debris and abandoned existing structures. Excavation and trenching shall include the removal and subsequent handling of materials excavated or otherwise handled in the performance of the Work.
 - 2. Bidders must satisfy themselves as to the actual existing subsurface conditions prior to the submittal of a proposal to complete the proposed Work.
 - 3. Trench excavation shall consist of excavation to the lines and grades indicated, required for installation of the pipe, pipe bedding, backfill, and to accommodate trench safety systems.

1.03 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 "Submittal Procedures" and shall include:
 - 1. Sieve analysis on embedment materials.

1.04 REFERENCE SPECIFICATIONS

- A. Section 01 33 00 "Submittal Procedures."
- B. Section 03 30 53 "Miscellaneous Cast-In-Place Concrete."
- C. Section 31 23 33.14 "Trench Safety."

1.05 STANDARDS

- A. The following publications, referred to hereafter by basic designation only, form a part of this Section to the extent indicated by the references thereto:

1. American Society for Testing and Materials (ASTM) Standards:

ASTM C33	Standard Specification for Concrete Aggregates
ASTM C88	Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C125	Standard Terminology Relating to Concrete and Concrete Aggregates
ASTM C131	Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C535	Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM D448	Standard Classification for Size of Aggregate for Road Bridge Construction
ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft ³ (600 kN-m/m ³))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D4253	Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
ASTM D4254	Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
ASTM D6938	Standard Test Method for In-Place Density and Water Content of Soil and Soil-aggregate by Nuclear Methods (Shallow Depth)
ASTM G57	Standard Test Method for Field Measurement of Soil Resistivity Using the Wenner Four-Electrode Method

- B. Any other testing required by these specifications and not specifically referenced to a standard shall be performed under ASTM or other appropriate standards as designated by the Engineer.
- C. Reference herein or on the Drawings to soil classifications shall be understood to be according to ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

1.06 DELIVERY AND STORAGE

- A. Excavated materials to be used for backfill may be deposited in stockpiles at points convenient for rehandling the material during the backfilling process. The location of stockpiles shall be within the limits of construction easements or public right-of-way. The location of stockpiles is subject to the approval of the Owner or the Owner's representative. Keep drainage channels clear of stockpiled materials.

1.07 JOB CONDITIONS

- A. Place no embedment or backfill material during freezing weather or upon frozen subgrades or previously placed frozen embedment or backfill materials.

2.00 PRODUCTS

2.01 MATERIALS

- A. Concrete for Backfill, Blocking, Cradling and Encasement: Unless other strength requirements are designated, concrete used shall be 1500 psi as specified in Section 03 30 53 "Miscellaneous Cast-In-Place Concrete."
- B. Class 1 Earth Fill: Limited to clays and sandy clays classified as CH material with a liquid limit greater than or equal to 50, a plasticity index greater than or equal to 25, and a minimum of 60 percent passing the No. 200 sieve, which are free of organic materials.
- C. Class 3 Earth Fill: Consist of any materials classified as CH, CL, SM, SP, SP-SM, SC, and GC, which have a minimum plasticity index of 4, which are free of organic materials.
- D. Class 12 Earth Fill: Consist of soils suitable for topsoil which are relatively free of stones or other objectionable debris, which have sufficient humus content to readily support vegetative growth. The suitability of soils for topsoil shall be subject to the approval of the Engineer.
- E. Class 10 Aggregate Fill: Consists of washed and screened natural sands or sands manufactured by crushing stones complying with the requirements and tests of "Standard Specifications for Concrete Aggregates", ASTM C33. The gradation as included in ASTM C33 is as follows:

Sieve Size Square Opening	Percent Passing
3/8"	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-60
No. 50	10-30
No. 100	2-10

- 1. Class 10 Aggregate Fill shall have not more than 45 percent passing any sieve and retained on the next consecutive sieve of those shown above, and its fineness modulus, as defined in ASTM C125, shall be not less than 2.3 nor more than 3.1.
- F. Cement: Type I Portland Cement.
- G. Flowable Fill: Flowable fill shall be in accordance with Section 31 23 23.33 "Flowable Fill."
- H. Modified Flowable Fill: Modified flowable backfill in areas of possible future excavation shall consist of a mixture of native soils or manufactured materials, cement and/or fly ash, air entraining material and water which produces a material with unconfined compressive strength of between 250 and 450 psi after 28 days. Any materials used shall be primarily

granular, with a plasticity index less than 12 and with 100 percent passing a 3/4-inch sieve. The flowable mixture shall be mixed in a pug mill, concrete mixer, or transit mixer and shall have a minimum slump of 5 inches. The flowable mixture must be allowed to set prior to the placement of any overlying materials. Modified flowable backfill in permanent areas such as abandoned pipe closures shall contain the same materials and have an unconfined compressive strength greater than 250 psi after 28 days.

- I. Utility Detection Tape: Utility pipe detection tape, green in color for sewer, blue in color for water, with black non-degradable printing reading "CAUTION SANITARY SEWER LINE BURIED BELOW" or "CAUTION WATER LINE BURIED BELOW" shall be installed over all PVC, HDPE, or fiberglass pipelines 8 inches and larger. The tape shall be bright-colored, continuous-printed plasticized aluminum tape, intended for direct-burial service; not less than 6 inches wide by 5 mils thick. Detection tape must be installed above the pipe zone, 12 inches above pipe.
- J. Tracer Wire: All piping shall be installed with a continuous, insulated TW, THW, THWN or HMWPE insulated copper, 10 gauge or thicker wire for pipeline location purposes by means of an electronic line tracer. The wire shall be installed along the entire length of pipe. The insulation color shall match the color of the pipe being installed. Sections of wire shall be spliced together using approved splice caps and water proof seals. Twisting the wires together is not acceptable.

2.02 MIXES; SAND-CEMENT BACKFILL

- A. A minimum sand and cement mixture of 25 parts sand and 2 parts cement will be required.
 - 1. Fine Sand: 25 Cubic Feet.
 - 2. Cement: 2 Bags (minimum).
 - 3. Water: Optimum moisture.
- B. Sand shall be free of any cohesive material and shall meet the following gradation and plasticity index requirements:

Sieve Size	Percent Passing
1"	100
1/2"	95-100
No. 40	80-100

- C. PI and LL Amounts:
 - 1. Plasticity Index: 10 Maximum.
 - 2. Liquid Limit: 25 or less.

3.00 EXECUTION

3.01 PREPARATION

- A. Site:
 - 1. Clear sites of logs, trees, roots, brush, tree trimmings and other objectionable materials and debris which are to be occupied by pipe trenches, and grub stumps. Designate

material not salvaged for reuse as surface material as spoiled and dispose of material in accordance with Paragraph 3.01E, Disposal of Spoil Material.

2. Do not remove trees outside of the required working area unless their removal is authorized in writing by the Engineer and with the approval of the local governing authority. Adequately protect the trees left standing from permanent damage by construction operations. Standing trees may be trimmed where necessary to facilitate construction, but only with written authorization from the Engineer.

B. Dewatering:

1. Provide and maintain adequate dewatering equipment to remove and dispose of surface and ground water entering the excavations, trenches, or other parts of the Work. Keep each excavation dry during subgrade preparation and continually thereafter until the proposed pipe is installed. Maintain the proper procedures necessary to protect against damage to the proposed Work from hydrostatic pressure, flotation, or other water related causes.
2. Dewater excavations which extend down to or below ground water elevation by lowering and keeping the ground water level a minimum of 2 feet below the bottom of the excavation.
3. Divert surface water or otherwise prevent water from entering excavated areas to the fullest extent possible without causing damage to adjacent property.
4. Provide and maintain any piping or conduit necessary to facilitate drainage. Do not alter area drainage patterns to the extent that adjacent property and landowners become threatened with localized flooding and/or water damage. Should such a situation occur, the Contractor shall be responsible for repairing the damage at no additional cost to the Owner.

C. Protection of Existing Structures and Utilities:

1. Prior to the start of construction, communicate with the representatives of the local utility companies, including the oil, gas, telephone and communications companies, and local water and sewer utilities operating in the location of the proposed construction area. Seek the utility companies' assistance in locating existing facilities to avoid conflicts during construction. The location, number, depth, and owner of utilities indicated are for information purposes only, and all utilities and structures may not be shown or may not be in the location shown.
2. Where construction endangers adjacent structures, utilities, embankments and/or roadways, the Contractor shall, at this own expense, carefully support and protect such structures so that no damage occurs throughout the construction process. In case damage should occur, the Contractor shall be responsible for restoring the damaged structure to a condition acceptable to the Owner of that structure and shall bear all cost of such reparations.
3. Repair or replace damaged street surfaces, driveways, sidewalks, curbs, gutters, fences, drainage structures, or other such facilities to the satisfaction of the Owner. Structures shall be returned to a condition equal to or better than the original condition and of same or better material and quality.

D. Blasting: Blasting shall not be allowed in any instance.

E. Disposal of Spoil Material:

1. Suitable material from excavations which meets the requirements for pipe backfill material as indicated, except stripping excavation, may be reused. Designate the remaining excavated materials as spoiled material and dispose of material off the Site in accordance with all applicable laws, ordinances, and codes. Contractor shall be responsible for the storage, transportation, and deposition of spoiled material and shall be responsible for acquiring the necessary permits, and the payment of fees and duties at no additional cost to the Owner.
2. No burning of materials shall be permitted on the Site.

3.02 TRENCH EXCAVATION

- A. General: The trenches shall be excavated to the alignment and depth indicated or as necessary for the proper installation of the pipe and appurtenances. Brace and dewater the trench if necessary so that the workmen may work therein safely and efficiently. Any specific requirement listed in Paragraph 3.00, Execution, may be modified as necessary to meet OSHA requirements. However, if trench widths are wider than indicated, the Contractor shall be responsible for determining and furnishing the proper class of embedment and piping for the installation with no additional compensation to the Contractor.
- B. Trench Width: The trench widths shall be as shown on the Drawings.
- C. Pipe Foundation Subgrade:
1. Excavate the trench to an even grade to permit the installation of the pipe so that the full length of the pipe barrel is supported on the proper depth of bedding material. The entire foundation subgrade area in the bottom of the excavations shall be firm, stable material, and the material shall not be disturbed below required grade except as described in this Section. Where the character of the subgrade material is such that proper subgrade cannot be obtained at the elevation indicated, deepen the excavation to a satisfactory subgrade material.
 2. Remove the material until a firm, stable, and uniform bearing is reached and the subgrade brought back to the required grade with the specified bedding material compacted in place or with lean concrete material. The expense of replacing any unsatisfactory subgrade shall be borne by the Contractor.
- D. Correcting Faulty Grade: Should any part of the trench be excavated below required grade, correct the trench with bedding material, thoroughly compacted, or with lean concrete, at no additional compensation to the Contractor.
- E. Care of Surface Material for Reuse: If local conditions permit reuse, keep surface material suitable for reuse separate from the general excavation material.
- F. Trenching Methods: The use of any suitable trench digging machinery is permitted except in places where such operations may cause damage, above or below ground, in which case, employ hand methods.
- G. Pipe Clearance in Rock: Remove ledge rock, rock fragments, shale, or other rock to provide proper clearance for bedding materials. Provide adequate clearance for properly jointing pipe laid in rock trenches at bell holes.

3.03 BACKFILL

A. Bedding within Pipe Zone:

1. Concrete Cradle, Encasement or Concrete Arch: Where indicated, install the pipe in concrete cradle, encasement, or concrete arch. Take precautions to prevent pipe movement or deflection during construction. Where pipes are placed below structures, completely encase pipes in 1500 psi concrete, and extend up to bottom of structure.

B. Aggregate Fill Bedding:

1. After the trench has been cut to the depths indicated, bring up the bedding layer to a point slightly above grade in maximum 4-inch lifts and uniformly compact to the density indicated. Form bell holes and scoop out a trough to grade so that the pipe is uniformly supported by the embedment material. Lay and join the pipe. Bring up the embedment material in maximum 6-inch lifts on either side of the pipe to the elevation above the pipe shown on the Drawings. Uniformly compact the pipe as indicated.
2. After moisture is gone from the embedment material, place utility detection tape and backfill and compact the remaining backfill by tamping or other appropriate methods. Water jetting shall not be permitted.
3. Install utility detection tape and tracer wire.

C. Compaction Requirements:

1. Compact earth fill and cohesive aggregate fill in maximum 6-inch lifts with pneumatic rollers or power hand tampers and make a minimum of eight passes.
2. Compact cohesionless aggregate fill in maximum 6-inch lifts with vibratory rollers or vibratory plate power hand compactors and make a minimum of eight passes.
3. The acceptability of the compaction equipment shall be based upon the results of a test section. Compact earth fill and cohesive aggregate fill to a minimum of 95 percent of maximum dry density as determined by ASTM D698, Standard Proctor.
4. Compact Class 1 and 2 earth fill at a moisture content within minus 0 to plus 5 percentage points of the optimum moisture content. Compact the remaining classes of earth fill and cohesive aggregate fill at a moisture content within minus 2 to plus 5 percentage points of optimum moisture content. The moisture ranges listed above are minimum and maximum limits. A tighter moisture range within these limits may be required to consistently achieve the specified density.
5. Compact cohesionless aggregate fill on which it is not practical to control the density by "Proctor" methods to a minimum of 75 percent relative density as determined by ASTM D4253 and D 4254, or at the discretion of the Engineer, by a field compaction mold method correlated to ASTM D4253 and D 4254.
6. Compact cohesionless aggregate fill at a moisture content within a range that accommodates consistent placement and compaction to the minimum relative density specified above.
7. The Owner will arrange and pay for density and moisture testing. The testing frequency and methods shall be as requested by the Engineer. The Engineer may waive testing requirements on cohesionless bedding where testing is not practical because of limited

space between the pipe and trench walls, however, the minimum number of passes of the compaction equipment specified above shall be achieved.

3.04 FINISHING

- A. Grade and rake areas smooth and even which do not receive any type of paved surface, to allow drainage to drain away from the structures and toward the roads and streets or the natural drainage course. Break up large clods of earth and remove rocks, trash or debris near the surface.
- B. Finish the top portion of backfill beneath established sodded (lawn) areas with not less than 6 inches of topsoil corresponding to, or better than, that underlying adjoining sodded areas.

3.05 FIELD QUALITY CONTROL

- A. Compact backfill and appropriate embedment material to a minimum of 95 percent of maximum density at a moisture content of 0 to plus 5 percent of optimum for backfill and at optimum for sand-cement embedment as determined by ASTM D698, Standard Proctor.
- B. Make periodic tests of compaction for conformance every 500' with this Section by an approved testing laboratory selected and paid for by the Owner. Contractor shall pay for re-testing until acceptable test results are obtained.

3.06 CLEAN AND ADJUST

- A. Remove surplus pipeline materials, tools, rubbish and temporary structures and leave the construction site clean, to the satisfaction of the Engineer.

END OF SECTION

31 23 33.14 TRENCH SAFETY

1.00 GENERAL

1.01 WORK INCLUDED

- A. This specification consists of the basic requirements which the Contractor must comply with in order to provide for the safety and health of workers in a trench. This specification is for the purpose of providing minimum performance specifications, and the Contractor shall develop, design, and implement the trench safety system. The Contractor shall bear the sole responsibility for the adequacy of the trench safety system and providing “a safe place to work” for the workman. The trench safety system shall be prepared by a licensed engineer in the State of Texas.
- B. Should the trench safety protection system require wider trenches than specified elsewhere, the Contractor shall be responsible for the costs associated with determining adequacy of pipe bedding and class, as well as, purchase and installation of alternate materials.

1.02 STANDARDS

- A. The following standard shall be the minimum governing requirement of this specification and is hereby made a part of this specification as if written in its entirety.
 - 1. Occupational Safety and Health Standards - Excavations (29CFR Part 1926), U.S. Department of Labor, latest edition.
- B. Comply with the applicable Federal, State, and Local rules, regulations, and ordinances.

2.00 PRODUCTS (NOT APPLICABLE)

3.00 EXECUTION (NOT APPLICABLE)

END OF SECTION

31 37 00 RIPRAP

1.00 GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, tools and incidentals necessary to produce and place the riprap and bedding material.

1.02 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 "Submittal Procedures" and shall include soundness, gradation, and unit weight.

1.03 STANDARDS

- A. Sampling and testing of material shall be in compliance with the latest revision of the following except where specifically modified:

- 1. American Society for Testing and Materials (ASTM) Standards:

ASTM C88	Standard Specification for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium sulfate
ASTM C127	Standard Specification for Specific Gravity and Absorption of Coarse Aggregates
ASTM C136	Standard Specification for Sieve Analysis of Fine and Coarse Aggregates

1.04 DELIVERY AND STORAGE; RIPRAP STOCKPILE

- A. Riprap temporarily stockpiled for construction purposes shall be located in an area approved by the Owner. Riprap materials shall not be located so as to block or restrict equipment and vehicle access to existing structures.

2.00 PRODUCTS

2.01 MATERIALS

- A. Bedding Material:

- 1. Bedding material shall be crushed stone, gravel or a blend of crushed stone and gravel. Bedding material shall be composed of tough durable particles; shall be reasonably free from thin, flat, and elongated pieces; shall be well graded between the prescribed limits; and shall contain no organic matter or soft, friable particles in quantities considered objectionable by the Owner.
 - 2. Bedding material shall have a loss of less than 18 percent weighted average at five cycles when tested for soundness in magnesium sulfate in accordance with ASTM C88 using particles passing a 2-1/2-inch sieve and retained on a 1-1/2-inch sieve. After final drying, the material shall be screened over the 1-1/4-inch sieve. A minimum of one soundness test shall be performed on materials delivered to the site.

3. Bedding material shall have a gradation as shown on the drawings when tested in accordance with ASTM C136. The material shall not be skip graded, scalped of certain sizes, or have other irregularities which would be detrimental to the proper functioning of the bedding. Acceptance of bedding material shall be based on in-place gradations.

B. Riprap:

1. Stone for riprap shall be durable and of a suitable quality to insure permanence in the structure and in the climate which it is to be used. The stone shall be free from cracks, seams, and other defects which would tend to increase unduly its deterioration from natural causes and shall be reasonably well graded between the prescribed limits as specified herein.
2. Riprap shall have a minimum unit weight of 165 pounds per solid cubic foot based upon the bulk specific gravity (saturated surface dry) when tested in accordance with ASTM C127. A minimum of one bulk specific gravity (saturated surface dry) shall be performed on riprap material delivered to the site.
3. Riprap shall have a loss of less than 18 percent after five cycles when tested for soundness in magnesium sulfate in accordance with ASTM C88. The test shall be run using particles passing a 2-1/2-inch sieve and retained on a 1-1/2-inch sieve. After final drying, the material shall be screened over the 1-1/4-inch sieve. A minimum of one soundness-in-magnesium sulfate test shall be performed on riprap material delivered to the site.
4. Riprap gradation shall be as shown on the drawings. Acceptance of riprap material shall be based upon in-place gradations.

3.00 EXECUTION

3.01 FOUNDATION PREPARATION

- A. Trim and dress areas on which bedding and riprap are to be placed to conform to cross sections shown on the drawings within an allowable tolerance of plus or minus 2 inches from the theoretical slope lines and grades. Where such areas are below the allowable minus tolerance limit, bring areas to grade with compacted fill similar to the adjacent material in accordance with Section 35 73 13.16 "Compacted Fill [Dams]" or with well compacted bedding material.

3.02 BEDDING PLACEMENT

- A. Uniformly spread bedding material on the prepared surface, in a satisfactory manner, to the slope lines and grades indicated on the drawings. Placing of material by dumping from top of slope or by any method which tends to segregate particle sizes within the blanket shall not be permitted. Repair any damage to the prepared surface during placing of the blanket before proceeding with the work. Compaction of the blanket will not be required, but it shall be finished to present a reasonably even surface free from mounds or windrows.

3.03 RIPRAP PLACEMENT

- A. Place stone for riprap on the blanket in such manner as to produce a reasonably well-graded mass of rock with the minimum practicable percentage of voids, and construct within the

specified tolerance to the lines and grades shown on the drawings or staked in the field. A tolerance of plus 6 or minus 0 inches from the slope lines and grades shown on the drawings shall be allowed in the finished surface of the riprap. Place riprap to its full course thickness at one operation and in such a manner as to avoid displacing the blanket material. Distribute the larger stones evenly and conform the entire mass of stones in their final position to the specified gradation.

- B. The finished riprap shall be free from objectionable pockets of small stones and clusters of larger stones. Place riprap loads along horizontal rows and progress up the slope. Place each load against previously placed riprap. Placing riprap in layers shall not be permitted. Placing riprap by dumping from top of slope, dumping into chutes, or by similar methods likely to cause segregation of the various sizes shall not be permitted. The desired distribution of the various sizes of stones throughout the mass shall be obtained by methods of placement which produces the specified results. Rearrange individual stones by mechanical equipment or by hand to the extent necessary to obtain a reasonably well graded distribution of stone sizes. Maintain the riprap protection until accepted and replace any material displaced by any cause to the lines and grades shown on the drawings.

3.04 FIELD QUALITY CONTROL; TESTING

- A. The Contractor shall be responsible for providing all testing to demonstrate compliance with the requirements of the Contract Documents. Gradation testing of the riprap and bedding materials shall be performed on all the materials within a 10-by-10-foot square area designated by the Engineer. Gradation tests shall be representative of no greater than one-third of the material placed. The Contractor shall bear all costs, including additional testing, of the correction of materials which fail to meet the requirements of the Contract Documents.

END OF SECTION

DIVISION 32
EXTERIOR IMPROVEMENTS

32 12 16 ASPHALT PAVING

1.00 GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment and incidentals necessary to perform operations in connection with the construction of hot mix asphaltic concrete (HMAC) base course, leveling-up course and surface course or any other combination of these courses. Construct the pavement on the previously completed and approved subgrade, base, or existing pavement.

1.02 QUALITY ASSURANCE

- A. Design Criteria: Use the services of an independent testing laboratory to prepare a mix design to comply with Texas Department of Transportation, Standard Specification Item 340 or may use a previously prepared mix design meeting the specification requirements with satisfactory substantiation of experience with the mix.

1.03 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 "Submittal Procedures" and shall include:
 - 1. Mix design as record data.

1.04 STANDARDS

- A. Hot mix asphaltic concrete (HMAC) pavement shall conform to the requirements of the current Texas Department of Transportation (TXDOT), Standard Specification for "Dense-Graded Hot Mix Asphaltic ", Item 340.
- B. Asphaltic material shall comply with Texas Department of Transportation (TXDOT) Standard Specification Item 300.

1.05 DELIVERY AND STORAGE

- A. Haul the asphaltic mixture to the job site in tight vehicles previously cleaned of foreign materials. Arrange the dispatching of vehicles so that all material delivered shall be placed and all rolling shall be completed during daylight hours. In cool weather, or for long hauls, canvas covers may be required. The inside of the truck body may be given a light coating of oil, if necessary, to prevent the asphaltic mixture from adhering to the body.

1.06 JOB CONDITIONS

- A. Do not apply prime coat when the air temperature is below 50 F and falling, but may be applied when the air temperature is above 40 F and rising, the air temperature being taken in the shade and away from artificial heat. Do not place asphaltic material when general weather conditions, in the opinion of the Owner's Representative are not suitable.
- B. The asphaltic mixture shall be at a temperature between 225 and 350 F when dumped from the mixer. The Owner's Representative shall determine the temperature, within the above

limitations. The mixture when dumped from the mixer shall not vary from the selected temperature more than 30 F.

2.00 PRODUCTS

2.01 MATERIALS

A. Aggregate: Conform to TXDOT Standard Specification Item 340. The Type “B” mixtures and at least three bins when producing Type “D” mixture. These bins shall contain the following sizes of aggregate, in percentages by weight or by volume, as applicable.

1. Gradation for base course or leveling-up course shall comply with Type B listed as follows:

a. Type “B” (Fine Graded Base Course):

Sieve Size	Percent Passing by Weight or Volume
1”	98-100
3/4”	84-98
5/8”	75-95
3/8”	60-80
No. 4	40-60
No. 8	29-43
No. 30	13-28
No. 50	6-20
No. 200	2-7
VMA percent minimum	12
The asphaltic material shall form from 3.5 to 7 percent of the mixture by weight unless specified otherwise on the plans.	

2. Gradation for surface course shall comply with Type D listed as follows:

a. Type “D” (Fine-Graded Surface Course):

Sieve Size	Percent Passing by Weight or Volume
1/2”	98-100
3/8”	85-100
No. 4	50-70
No. 8	35-46
No. 30	15-29
No. 50	7-20
No. 200	2-7

VMA percent minimum	14
The asphaltic material shall form from 4 to 8 percent of the mixture by weight unless specified otherwise on the plans.	

- B. Asphaltic Materials: Comply with TXDOT Standard Specification Item 300. In general, the grade of asphalt shall be AC-10. Other grades of asphalt shall be considered if weather conditions or mix design appear to warrant a change. Prime coat shall comply with TXDOT Standard Specification Item 300, Grade MC-30. Tack coat shall meet the requirements of cutback asphalt RC-250.

2.02 EQUIPMENT

- A. The equipment necessary for the construction of the hot mix asphaltic concrete pavement shall be on the project site and shall be approved by the Owner's Representative as to condition before the Contractor shall be permitted to begin construction operations on which the equipment is to be used. Equipment shall be maintained in good repair and operating condition.
- B. Spreading and Finishing Machines:
1. The spreading and finishing machine shall be of a type approved by the Owner's Representative and capable of producing a surface that shall meet the requirements of the typical cross section and surface test.
 2. Rollers:
 - a. Pneumatic Tire Roller: The roller shall consist of not less than seven pneumatic tire wheels, running on axles in such a manner that the rear group of tires shall cover the entire gap between adjacent tires of forward group; mounted in a rigid frame; and provided with a loading platform or body suitable for ballast loading. The front axle shall be attached to the frame in such a manner that the roller may be turned within a minimum circle. The tire shall afford surface contact pressures up to 90 pounds per square inch or more. The roller shall be so constructed as to operate in both forward and a reverse direction with suitable provisions for moistening the surface of the tires while operating; and shall be approved by the Owner's Representative.
 - b. Two-Axle Tandem Roller: The roller shall be an acceptable power-driven, steel-wheel tandem roller weighing not less than 8 tons. The roller must operate in forward and reverse directions; contain provisions for moistening the surface of the wheels while in motion; and shall be approved by the Owner's Representative.
 - c. Three-Wheel Roller: The roller shall be an acceptable power-driven, all steel three wheel roller weighing not less than 10 tons. The roller must operate in forward and reverse directions; contain provisions for moistening the surface of the wheels while in motion; and shall be approved by the Owner's Representative.
 - d. Vibratory Steel Wheel Roller: If approved for use by the Owner's Representative, this roller shall have a minimum weight of 6 tons. The compactor shall be equipped with amplitude and frequency controls and shall be specifically designed to compact

the material on which it is used. The roller shall be operated in accordance with the Manufacturer's recommendations.

3. Straightedges: The Contractor shall provide acceptable straightedges for the surface testing. Satisfactory templates shall be provided as required by the Owner's Representative.

3.00 EXECUTION

3.01 PREPARATION

- A. Prime Coat: Apply a uniform coat of prime coat asphaltic material to the surface of the prepared subgrade, sub-base, or base, applied at a rate of not less than 0.30 gallon per square yard of surface. Apply a thin uniform coat of the prime coat material to contact surfaces of gutters, manholes, and other structures.
- B. Tack Coat: Thoroughly clean the surface of the asphalt base course and apply a uniform coat of tack material meeting the requirements for cutback asphalt RC-250. Apply a tack coat when the surface to be paved is Portland cement concrete, brick, or asphaltic pavement. Apply the tack coat using sprayer at a rate not exceeding 0.05 gallon per square yard surface. Paint contact surfaces of curbs, gutters, vertical faces, and other structures in actual contact with asphaltic mixes with asphaltic material to provide a closely bonded, water-tight joint.
- C. Compacted Thickness of Asphaltic Concrete Surface Courses and Base Courses:
 1. Surface Course: The compacted thickness or depth of the asphaltic concrete surface shall be as indicated on the plans. Where the plans indicate a depth or thickness of the surface course greater than 2 inches compacted depth, same shall be placed in multiple courses of equal depth, each which shall not exceed 2 inches compacted depth. A tack coat is required between any of the multiple courses, and applied at the rate specified.
 2. Base Course: The compacted thickness or depth of each base shall be as indicated. Where the plans indicate a depth or thickness of the course greater than 4 inches, same shall be accomplished by constructing multiple lifts of approximately equal depth, each of which shall not exceed these maximum compacted depths. An additional tack coat is required between any of the multiple lifts, and applied at a rate specified.

3.02 PLACEMENT

- A. Place the asphaltic mixture on an approved base course with the previously specified spreading and finishing machine in such a manner that, when properly compacted, the finished course shall comply with the maximum thickness requirements, shall be smooth, of uniform density and meet the requirements of the typical cross-sections and the surface test. During the placing and spreading of the asphaltic material, take care to prevent the spilling of the material onto adjacent pavement, gutters, or structures.
- B. In small areas, which are inaccessible to the spreading and finishing machine, hand spreading may be authorized by the Owner's Representative, provided an acceptable surface can be obtained.

3.03 COMPACTION

- A. Rolling with the three-wheel and tandem rollers shall start longitudinally at the sides and proceed toward the center of the surface course, overlapping on successive trips by at least half the width of the rear wheels. Alternate trips of the roller shall be slightly different in length. Rolling with the pneumatic tire roller shall be done as directed by the Owner's Representative. Rolling shall continue until no further compression can be obtained and all roller marks are eliminated. The motion of the rollers shall be slow enough at all times to avoid displacement of the asphaltic surface material. If displacement should occur, correct the situation at once by the use of rakes and fresh asphaltic mixtures. The roller shall not be allowed to stand on the surface course when it has not been fully compacted and allowed to cool. To prevent adhesion of the surface to the roller, the wheels shall be kept thoroughly moistened with water, but an excess of water shall not be permitted. Rollers must be in good mechanical condition. Take the necessary precautions to prevent the dripping of gasoline, oil, grease, or other foreign matter on the surface course while the rollers are in motion or when standing. In areas where surface course cannot be compacted with the roller, hand tamps, lightly oiled, shall be used to secure the required compaction.
- B. With approval by the Owner's Representative, the vibratory steel wheel roller may be substituted for the three-wheel roller and tandem roller. Each course, after final compaction, shall contain from 5 to 9 percent air voids determined by TXDOT Test Method TEX207-F and TEX-227-F.

3.04 FIELD QUALITY CONTROL

- A. Surface Tests: The finished surface of the pavement after compression shall be smooth and true to the established line, grade, and cross-section. When tested with a 16-foot straightedge placed parallel to the centerline of the roadway, the finished surface shall have no deviation in excess of 1/16 inch per foot from the nearest point of contact. The maximum ordinate measured from the face of the straightedge shall not exceed 1/4 inch at any point. Any point in the pavement surface not meeting these requirements shall be immediately corrected.
- B. Pavement Thickness Test: Upon completion of the work and before final acceptance and final payment shall be made, pavement thickness test shall be made by the Owner or his authorized representative unless otherwise specified in the special provisions or in the plans. The number and location of tests shall be at the discretion of the Owner's Representative. The cost for the initial pavement thickness test shall be at the expense of the Owner. In the event a deficiency in the thickness of the pavement is revealed during normal testing operations, subsequent tests necessary to isolate the deficiency shall be at the Contractor's expense. The cost for the additional coring test shall be at the same rate charged by commercial laboratories.

END OF SECTION

32 16 13 CURBS AND GUTTERS

1.00 GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment and incidentals necessary to construct reinforced concrete curb and gutter in accordance with the lines, grades, and section indicated on the plans or as directed by the Owner's Representative.

1.02 OPTIONS

- A. A curb and gutter laydown machine may be used for placing reinforcing steel and forming and placing concrete.

2.00 PRODUCTS

2.01 MATERIALS

- A. Concrete: Conforming to the requirements for 3600-psi concrete in Section 03 30 53 "Miscellaneous Cast-In-Place Concrete."
- B. Reinforcing Steel: Conforming to the requirements in Section 03 21 00 "Reinforcing Steel."
- C. Expansion Joint Material: Conforming to the requirements in Section 03 30 00 "Miscellaneous Cast-In-Place Concrete."

2.02 MIXES

- A. Mortar: 1 part Portland cement and 2 parts fine aggregate.

3.00 EXECUTION

3.01 PREPARATION, EXCAVATION AND GRADING

- A. Excavate, stabilize and shape the subgrade or foundation to line, grade and section as indicated on the plans or as directed by the Owner's Representative. Lightly sprinkle the subgrade or foundation material immediately before placing concrete.
- B. Where curb and gutter is not adjacent to new pavement, use 2 inches of sand cushion. After the fine grading has been completed, evenly spread a 2-inch layer of sand or suitable gravel cushion over the subgrade for curb and gutter. Thoroughly wet and tamp sand cushion into place to the satisfaction of the Owner's Representative. Place the forms upon this sand or gravel base and use a screed to shape the sand cushion to parallel the top of gutter.

3.02 INSTALLATION

- A. Forms:
 - 1. Forms shall be made of wood or steel and framed, braced, or staked in a substantial and approved manner so as to insure perfect alignment and grade. Clean and oil the forms immediately before placing concrete. Take care in removing forms to prevent marring

or spalling of the concrete. Forms shall be of a depth equal to the depth of the curb and gutter and a minimum of 1-1/2 inches in width when wooden forms are used or a raga that provides equivalent rigidity and strength when metal forms are used.

2. Forms showing a deviation of 1/8 inch in 10 feet from a straight line shall be cause for rejection.
3. For curves with a radius of less than 250 feet, acceptable flexible metal forms or wood forms may be used upon approval by the Owner's Representative.

B. Reinforcing Steel:

1. Accurately place steel reinforcement as indicated and hold in place during progress of placing concrete, and do not allow movement from the true position. Wire the bars at intersections and laps or splices. Lap bars at splices a minimum of 20 diameters of the bar or 12 inches, whichever is greater.
2. Place the reinforcement necessary for a section of concrete, and have the Owner's Representative approve the reinforcement before any concrete is deposited in the section. Steel shall be free from paint and oil, and completely remove loose scale, rust, dirt, and other foreign substances before using.
3. Reinforcing steel shall conform to requirements in Section 03 21 00 "Reinforcing Steel."

C. Expansion Joints:

1. Form expansion joints using preformed expansion joint material as specified herein. Place expansion joints in the curb and gutter at 36-foot intervals and at intersection returns or as otherwise shown on the plans or as directed by the Owner's Representative. Place "Flagging" or a tooled joint at 6-foot intervals to provide a plane of weakness, unless otherwise shown on the plans or as directed by the Owner's Representative. Place expansion joints at abutting structures such as concrete driveways, sidewalks, buildings, inlets, etc. Expansion joints shall be 1/2 inch in thickness and shall extend the full depth of the concrete. Neatly trim any expansion material extending above the finished work to the surface of the finished work. The expansion joints in concrete pavement shall coincide with the expansion joints in the curb and gutter. Longitudinal dowels, across the expansion joints in the curb and gutter, shall be required. There shall be three No. 3 round, smooth bars for dowels at each expansion joint spaced in accordance with standard reinforcement steel. The dowel shall be a minimum of 24 inches in length. Coat one end of the dowel with asphalt and terminated with an expansion cap. The cap shall provide a minimum of 1 inch free expansion. Support dowels by an approved method to provide a true horizontal and longitudinal alignment.
2. Seal joints through the gutter with a joint sealant material as specified herein.
3. Construct joints in a neat and workmanlike manner with edges rounded in conformity with the plans and specifications, and at locations as indicated on the plans or as designated by the Owner's Representative.

3.03 PLACEMENT

- A. Deposit concrete so as to maintain a horizontal surface and thoroughly and continuously work into spaces and around all reinforcement to form a dense voidless mass.

- B. Work the coarse aggregate away from contact with the forms so as to form a smooth, hard exposed concrete surface.
- C. Continuously pour the concrete for curb and gutter between expansion joints. If construction joints are allowed at other locations by the Owner's Representative, properly construct joints with wood bulkheads so as to completely separate adjacent concrete sections.

3.04 FINISHING

- A. After the concrete has been struck off and while still plastic, thoroughly work the exposed surfaces with a wooden float. Round the exposed edges by the use of an edging tool to the radius indicated. Float and trowel exposed surfaces. Brush exposed surfaces of curb and gutter to a smooth and uniform surface. Avoid excess working of the surface. Remove excess water, laitance and inert material from the surface.

3.05 CURING

- A. Cure the completed curb and gutter in accordance with the requirements of Membrane Curing, as specified in Section 03 30 53 "Miscellaneous Cast-In-Place Concrete." Other methods of curing as outlined herein shall be acceptable with a required curing period of 72 hours.

3.06 BACKFILLING

- A. Backfill the curb and gutter to the full height of the concrete, and tamp and slope as indicated or as directed by the Owner's Representative.

3.07 FIELD QUALITY CONTROL

- A. The top of the work and the face of the curbs shall be checked for irregularities as soon as the surface is finished, using a 10-foot straightedge. The maximum distance from the straightedges to the concrete shall not exceed 1/4 inch. Variations exceeding 1/4 inch shall be immediately corrected. Immediately chip out and patch honeycombed areas disclosed by removal of forms with mortar as specified.

END OF SECTION

32 92 13 HYDRO-MULCHING

1.00 GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, material, equipment and incidentals necessary to prepare the ground, furnish and install fertilizer and hydro-mulching seed or a mixture of seed of the kind specified in areas disturbed by the construction operations.

1.02 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 "Submittal Procedures" and shall include:
 - 1. Texas Testing Seed Label.
 - 2. Specification of fertilizer to be used.

1.03 STANDARDS

- A. The applicable provision of the following standard shall apply as if written here in its entirety:
 - 1. Texas Seed Law.

1.04 GUARANTEES

- A. The Contractor shall fertilize and reseed any area which fails to survive for a period of 1 year from the date the project is accepted by the Owner.

2.00 PRODUCTS

2.01 MATERIALS

- A. General: Seed used must carry a Texas Testing Seed label showing purity and germination, name, type of seed, and that the seed meets all requirements of the Texas Seed Law. Seed furnished shall be of the previous season's crop and the date of analysis shown on each tag shall be within 9 months of the time of delivery to the project. Each variety of seed shall be furnished and delivered in separate bags or containers.
- B. Seed: The specified seed shall equal or exceed the following percentages of purity and germination:

Common Name	Purity	Germination
Common Bermuda Grass	95%	90%
Gulf Coast Annual Rye	95%	90%

- C. Mulch: The mulch shall be natural cellulose fiber mulch produced from grinding clean, whole wood chips, or fiber produced from ground newsprint with a labeled ash content not to exceed 7 percent. The mulch shall be designed for use in conventional mechanical planting, hydraulic planting of seed or hydraulic mulching of grass seed, either alone or with

fertilizers and other additives. The mulch shall be such that, when applied, the material shall form a strong, moisture-retaining mat without the need of an asphalt binder.

- D. Fertilizer: Pelleted or granulated type fertilizer of the composition for the season of the year at which applied shall be used:
 - 1. Early season (April 1-June 1) 21-0-0.
 - 2. Normal season (June 1-Sept 1) 10-10-5.
 - 3. Late season (Sept 1-Nov 1) 6-12-12.

3.00 EXECUTION

3.01 PREPARATION

- A. After the areas disturbed by construction operations have been backfilled and completed to the original pre-construction lines and grades shown on the plans and as provided for in other items of this contract, perform hydro-mulch seeding in accordance with the requirements hereinafter described.

3.02 INSTALLATION

- A. Cultivation: Cultivate areas to be seeded to a depth of at least 4 inches. Cultivate the seedbed sufficiently to reduce the soil to a state of good tilth when the soil particles on the surface are small enough and lie closely enough together to prevent the seed from being covered too deep for optimum germination. Cultivation of seedbed will not be required in loose sand where depth of sand is 4 inches or more. Maintain the cross-section previously established throughout the process of cultivation and any necessary reshaping shall be done prior to any planting of seed.
- B. Planting Season and Application Rates: Perform planting between the dates specified for each type except when specifically authorized in writing. The seeds planted per acre shall be of the type specified with the mixture, rate, and planting dates as follows:
 - 1. Common Bermuda Grass - hulled, 20 pounds per acre - February through August or a combination of.
 - 2. Common Bermuda Grass - unhulled, 15 pounds per acre and Gulf Coast Annual Rye - unhulled, 15 pounds per acre - August through February.
 - 3. Apply fertilizer uniformly at the average rate of 400 pounds per acre.
- C. Hydro-Mulch (Cellulose Fiber) Seeding: Uniformly distribute the fertilizer, seed or seed mixture, in the quantity specified over the areas to be seeded. Mechanical equipment shall be such that all varieties of seed as well as fertilizer may be distributed at the same time, provided that each component is uniformly applied at the specified rate. When seed and fertilizer are to be distributed as a water-slurry, apply the mixture to that area to be seeded within 30 minutes after all components are placed in the equipment. Upon completion of planting the seed, spread cellulose fiber mulch uniformly over the area at the following rates:
 - 1. Sandy soils with 3:1 slope or less: min. 2000 lb./acre.
 - 2. Sandy soils with greater than 3:1 slope: min. 2300 lb./acre.

3. Clay soils with 3:1 slope or less: min. 2500 lb./acre.
 4. Clay soils with greater than 3:1 slope: min. 3000 lb./acre.
 5. The rates are given in dry weight of mulch per acre. A mulching machine, approved by the Owner's Representative, shall be equipped to eject the thoroughly wet mulch material at a uniform rate to provide the mulch coverage specified.
- D. Maintenance: Water the planted area at such times as necessary for a period of 1 year after final acceptance of the project by the Owner. Fertilize and reseed any area which fails to survive for a period of 1 year from the date the project is accepted by the Owner.

END OF SECTION

DIVISION 33
UTILITIES

33 01 30.16 TV INSPECTION OF SEWER PIPELINES

1.00 GENERAL

1.01 WORK INCLUDED

- A. Provide all necessary materials, equipment, tools, labor, and associated appurtenances for cleaning sanitary sewer mains in preparation for rehabilitation. Cleaning shall remove debris and foreign materials from the mains and manholes in preparation for television inspection of sewer mains.
- B. Provide all television equipment, technical assistance, labor, tools and associated incidentals and appurtenances required to internally inspect the existing wastewater mains shown on the Drawings. Verify the mains are properly cleaned in preparation of inspection and/or rehabilitation. Locate service laterals and identify pipeline segments that require repair prior to the slip lining, pipe bursting or CIPP installation. The internal TV inspection shall also document the post rehabilitation status of the pipe for comparison and total acceptance of Work done. After cleaning, visually inspect the main sections by means of a closed-circuit television. Inspect one line section between manholes at a time, during which the wastewater flow in that line section is properly controlled according to the flow control requirements of this Section.
- C. Provide control of wastewater flow in conjunction with cleaning of wastewater mains, and installation of replacement lines. Wastewater flow diversion shall not cause flooding or damage to public or private property. The wastewater flow shall be plugged at an upstream manhole for the section of sewer line that is to be rehabilitated (by sliplining, cured in place pipe, or pipe bursting), for both installation and televised post installation inspection. Provide notification to property owners and tenants on flow control lines a minimum of 48 hours prior to institution of flow control measures.

1.02 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 "Submittal Procedures" and shall include:
 - 1. Television inspection logs in paper and digital format.
 - 2. DVD video of television inspection.
 - 3. Flow Control Plan.

1.03 REFERENCE SPECIFICATIONS

- A. Section 01 33 00 "Submittal Procedures."

1.04 CLEANING EQUIPMENT

- A. Selection of cleaning equipment and method of cleaning must be based on the condition of the wastewater mains at the time Work commences and is subject to the Owner representative's approval. Operation of all cleaning equipment and devices shall be by personnel experienced in the use of such equipment. The Owner may require the Contractor to demonstrate the performance capabilities of the proposed cleaning

equipment. If the cleaning equipment does not give the desired results required by the Owner, use different equipment that does give the desired results. More than one type of equipment/attachments may be required at any particular location.

1.05 TELEVISION CAMERA

- A. The television camera used for inspection must be specifically designed and constructed for internal inspection of sanitary sewer pipe with partial liquid flow through it. Lighting for the camera must allow a clear picture of the entire periphery of the pipe above the existing flow. The camera will operate in 100 percent humidity conditions. The camera, television monitor, and other components of the video system shall produce a picture quality satisfactory to the Owner's representative.

1.06 COMMUNICATION EQUIPMENT

- A. When manually operated winches are used to pull the television camera through the main, set up two-way radio or other suitable means of communication between the two manholes of the line section being inspected to insure good communications between members of the crew.

1.07 METHODS OF FLOW CONTROL

- A. Furnish temporary plugs as required to provide for diversion of flows and temporary isolation of sanitary sewer sections during rehabilitation. The plugs must be designed so all or any portion of the wastewater can be released at any time. Insert a plug into the upstream manhole of the line section being worked. A plug in the downstream manhole may be required to prevent any backflow.
- B. Furnish bypass pumping equipment as required to provide for diversion of flows and temporary isolation of sanitary sewer sections during rehabilitation. When total bypassing and pumping are required, supply the pumps, conduits, and other equipment to divert the flow of wastewater around the line section where rehabilitation work is to be performed. Begin the flow diversion at the upstream manhole. Divert flow to the downstream manhole of the line section being worked. The total bypass system must have sufficient capacity to handle peak flow during a rainstorm. The Contractor is responsible for furnishing the necessary labor and supervision to set up and operate the pumping and bypassing. If pumping is required on a 24-hour basis or outside of specified normal work hours, use engines with Hospital Rated noise suppression equipment. A comprehensive bypass pumping plan shall be submitted by the Contractor as required in Paragraph 1.02.

2.00 PRODUCTS (NOT APPLICABLE)

3.00 EXECUTION

3.01 CLEANING

- A. Clean the sewer lines from upstream to downstream, manhole to manhole. Remove dirt, grease, rocks, sand, roots and other materials and obstructions from the sewer lines and manholes. Dispose of removed materials in accordance with applicable federal, state, and local rules and regulations. The cleaning shall leave the interior pipeline suitable for

adequate television inspection and installation of replacement materials as applicable for the Project. Several passes and different equipment may be required. TV Inspection shall be used to verify acceptable completion of the cleaning.

3.02 TELEVISION

- A. Move the camera through the main in either direction at a moderate rate, stopping when necessary to permit proper documentation of the sewer line condition. In no case shall the television camera be pulled at a speed greater than 30 feet per minute. Use manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the wastewater main condition. Identify locations of defects by means of a measurement device (distance meter) above ground. Marking on the cable or similar practices that require interpolation for depth of manhole is not allowed. Check accuracy of the distance meter with a walking meter, roll-a-tape, or other suitable device satisfactory to the Owner.
 - 1. Television Inspection Logs: Keep printed location records that clearly show the camera location in relation to an adjacent manhole for each infiltration point or defect observed during inspection. In addition, record other points of significance such as locations of service line entry points, unusual conditions, roots, storm sewer connections, broken pipe, presence of scale and corrosion, and other discernible features. Submit a copy of such records and copies of the video in DVD format to the Owner's representative.

3.03 FLOW CONTROL

- A. Provide flow control measures needed to allow for isolation of individual sanitary sewer sections for rehabilitation work. Prior to beginning Work, Contractor shall submit a written plan for flow control as noted in Paragraph 1.02. In providing this Work, protect the wastewater main from damage that might result from wastewater surcharging. In addition, take precautions necessary to insure that wastewater flow control operations do not cause flooding or damage to public or private property being served by the wastewater mains involved. Contractor is advised to schedule his Work in section lengths such that in the event of a rainstorm that might cause an increase in the wastewater flow, the Work can be adequately secured, the flow diversion stopped, and flow resumed back in the existing main expeditiously and without damage to the new Work.
 - 1. Notify property owners and tenants a minimum of 48 hours prior to scheduled flow control diversion operations.
 - 2. Locate flow diversion equipment, facilities, and activities such that local traffic, private property access, or any public activities are not interrupted.
 - 3. Where diversion piping crosses side streets, alleys and driveways, provide asphalt ramps and covers over the piping to facilitate passage of any traffic. Provide pedestrian cross-over ramps and walkways where needed or requested by the Owner. Do not open cut streets, alleys, or driveways to bury piping.
 - 4. Divert incoming flow from all service connections and laterals. Provide all the necessary materials and equipment to tie this flow into the main diversion system.
 - 5. Flow diversion materials and equipment must be in place and successfully operating for a period of 4 hours prior to starting any rehabilitation work requiring flow diversion.

6. Reduce flow to within the limits required for TV inspection. After the Work has been completed, restore flow to normal.
7. Keep pumping engine noise complaints from the citizens to a minimum. The Owner's representative may terminate all pumping activities if noise control is not adequately addressed.

3.04 REPAIR OF DAMAGED MAIN

- A. If the main is damaged and requires repair prior to rehabilitation, make such repairs as directed by the Owner's representative. Any pavement cut excavation and repair must comply with the details in the Drawings. If the main is damaged through the negligence of the Contractor, make repairs as approved by the Owner's representative at no additional cost to the Owner.

END OF SECTION

33 01 30.73 PIPEBURSTING

1.00 GENERAL

1.01 WORK INCLUDED

- A. Provide labor, materials, equipment and incidentals necessary to rehabilitate existing sanitary sewers by the pipe bursting method which splits the existing pipe and immediately installs a new polyethylene or PVC pipe. Rehabilitation includes flow diversion, reconnecting existing sewer service connections, television inspection, and complete installation in accordance with the Contract Documents.

1.02 QUALITY ASSURANCE

- A. The requirements set forth in this document specify a wide range of procedural precautions necessary to provide the very basic, essential aspects of a proper pipe bursting installation and are adequately controlled. Strict adherence shall be required under specifically covered conditions outlined in this Section. Adherence to the specifications contained herein, or the Owner's Representative approval of any aspect of the pipe bursting operation covered by this Section, shall in no way relieve the Contractor of their ultimate responsibility for the satisfactory completion of the Work authorized under the Contract.
- B. Certification: The Contractor or Subcontractor shall be certified by the particular pipe bursting system manufacturer that such firm is a licensed installer of their system. If patented processes are involved based on the pipe selection, the installer shall be licensed, trained, and in good standing with the pipe manufacturer.
- C. Pipe jointing shall be performed by personnel trained in the use of thermal butt-fusion equipment and recommended methods for new pipe connections. Personnel directly involved with installing the new pipe shall receive training in the proper methods for handling and installing the pipe. Training shall be performed by a qualified representative.
- D. The Contractor shall hold the Owner harmless in any legal action resulting from patent infringements.
- E. Protection of Existing Improvements:
 - 1. Provide protection to prevent damage to existing improvements and structures to remain in place on the Owner's property and adjoining properties.
 - 2. Restore damaged improvements to their original condition, as acceptable to parties having jurisdiction.
 - 3. Land areas outside the limits of permanent Work performed under this Contract shall be preserved in their present condition. Confine construction activities to areas defined for Work or specifically assigned by the Owner's Representative for his use.
 - 4. Protection of Existing Utilities:
 - a. Verify all existing utility locations.
 - b. Immediately notify the Owner's Representative and applicable utility company of any damages to existing utilities.

- c. Make repairs to damaged utilities in accordance with the requirements of the Owner's Representative and applicable utility company at no additional cost to the Owner.
 - d. Coordinate with property owners. Service disruptions are to be minimized.
 - e. Coordinate with the Owner and the applicable utility company for shut-off of or connection to active utilities. Do not interrupt existing utility services except as authorized in writing by the Owner's Representative.
5. Protection of Work Site: Provide barricades or other types of protectors necessary to warn and prevent access by unauthorized personnel.

1.03 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 "Submittal Procedures" and shall include:
- 1. Work Plan: Prior to beginning Work, the Contractor shall submit to the Owner's Representative a work plan as Record Data detailing the procedure and schedule to be used to execute the Project. The work plan should include a description of all equipment to be used, down-hole tools, a list of personnel and their qualifications and experience (including back-up personnel in the event that an individual is unavailable), list of Subcontractors, a schedule of work activity, a safety plan (including MSDS of any potentially hazardous substances to be used), traffic control plan (if applicable), all excavation locations, interfering utilities, and flow bypass plan, an erosion and sedimentation control plan and contingency plans for possible problems. Work plan should be comprehensive, realistic and based on actual working conditions for the Project.
 - 2. Equipment: Contractor will submit specifications on equipment as Record Data. Equipment shall include but not be limited to: pipe bursting apparatus and equipment, butt fusion welding apparatus, mud system, mud motors (if applicable), down-hole tools, guidance system, rig safety systems. Calibration records for guidance equipment shall be included. Specifications for any drilling fluid additives that Contractor intends to use or might use will be submitted.
 - 3. Material: Provide Shop Drawings of the pipe with material specifications, including size, type, diameter and manufacturer's data and certifications on piping and jointing methods. The shop drawing shall include a Certificate of Adequacy of Design stating the pipe and fittings are satisfactory for the loads which will be imposed during all loading conditions.
 - 4. Contractor shall maintain a daily project log of operations along with a fusion report for all butt fused welding of joints with a copy given to Owner's Representative at completion of the Project.

1.04 STANDARDS

- A. Comply with local governing regulations if more stringent than specified herein. Piping shall meet the following standards and shall be a part of this Section as if written here in their entirety:

1. American Society for Testing and Materials (ASTM) Standards:

ASTM D1693	Test for Environmental Stress-Cracking of Ethylene Plastics
ASTM D2122	Determining Dimensions of Thermoplastic Pipe and Fittings
ASTM D2241	Standard Specification for Poly Vinyl Chloride PVC Pressure Rated Pipe
ASTM D3034	Standard Specification for type PSM Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings
ASTM D2657	Practice for Heat-Joining Polyethylene Pipe and Fittings
ASTM D2837	Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials
ASTM D3035	Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter (up to 6-Inch IPS)
ASTM D3350	Specification for Polyethylene Plastics Pipe and Fittings Material
ASTM F585	Standard Practice for Insertion of Flexible Polyethylene Pipe Into Existing Sewers
ASTM F714	Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter (3-Inch IPS and larger)

2. American Water Works Association (AWWA) Standards:

AWWA C900	Standard for PVC Pressure Pipe and Fabricated Fittings, 4 through 12 Inches, for Water Distribution
AWWA C905	Standard for PVC Pressure Pipe and Fabricated Fittings, 14 through 48 Inches, for Water Distribution
AWWA C906	Polyethylene Pressure Pipe and Fittings, 4 through 63 Inches

1.05 JOB CONDITIONS, PERMITS AND EASEMENT REQUIREMENTS

- A. Where the Work is in the public right-of-way or railroad company right-of-way, the Owner will secure the appropriate permits or easements. The Contractor shall observe regulations and instructions of the right-of-way owner as to the methods of performing the work and take precautions for the safety of the property and the public. Negotiations and coordination with the right-of-way owner shall be carried on by the Contractor, not less than 5 days prior to the time of his intentions to begin Work on the right-of-way.
- B. Comply with the requirements of the permit and/or easement. Work within the Texas Department of Transportation (TXDOT) right of way shall comply with TXDOT requirements. If required by the right-of-way owner, obtain Protective Liability Insurance in the amount required by the particular company or other insurance as is specified in the permit at no cost to the Owner. Acquire a permit, agreement, or work order from the right-of-way Owner as is required.

- C. Construction along roads, railroads and public areas shall be performed in such manner that does not interfere with the operations of the roads, driveways, sidewalks, pedestrian traffic and railroads.
- D. Barricades, warning signs, and flagmen, when necessary and specified, shall be provided by the Contractor.
- E. No blasting shall be allowed.
- F. Existing pipelines and underground conduits are to be protected. The Contractor shall verify location and elevation of any pipe lines, telephone cable and fiber optics before proceeding with the construction and shall plan his construction so as to avoid damage to the existing pipe lines or telephone cables. Verification of location (vertical and horizontal) of existing utilities shall be the complete responsibility of the Contractor.

2.00 PRODUCTS

2.01 MATERIALS

A. Polyethylene:

1. Gravity Flow Polyethylene Plastic Pipe shall be high density polyethylene pipe with a minimum dimension ratio of 21 for up to 10-foot depth and 17 for depths greater than 10 feet and meet the applicable requirements of ASTM F714 Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter (Ductile Iron Pipe Sizing), ASTM D1248, and ASTM D3350. All pipe shall be made of virgin material. No rework except that obtained from the manufacturer's own production of the same formulation shall be used. The pipe shall be homogenous throughout and shall be free of visible cracks, holes, foreign material, blisters or other deleterious faults.
2. For pressure applications to meet TCEQ separation requirements piping shall be AWWA C906 with ductile iron sizing system (DIOD), PE3408 Materials, DR11 Pressure Class 160.

B. Service Connections:

1. Mechanical saddles made of polyethylene or PVC materials shall match the type and rating of the piping used.
2. Mechanical saddles shall have stainless steel straps and fasteners, neoprene gasket and backup plate.

3.00 EXECUTION

3.01 GENERAL

- A. The existing pipeline shall be cleaned and televised to locate service taps, sags and deflected joints in accordance with Section 33 01 30.16 "TV Inspection of Sewer Pipelines."
- B. Point repair sags and deflected joints identified by the television inspection.
- C. By-Pass Pumping: The Contractor shall provide for diversion of flows as necessary for the bursting/insertion process. The pumps and by-pass lines shall be of adequate capacity and size to handle all flows. All costs for by-pass pumping required during installation of the pipe shall be subsidiary to the pipe installation costs. The Contractor shall be responsible for

continuity of sanitary sewer service to each facility connected to the section of sewer during execution of the Work. If sewage backup occurs and enters buildings, the Contractor shall be responsible for cleanup, repair, property damage costs and claims.

- D. Transport and place excavated material in fill areas within the limits of the Work. Excavate unsuitable material encountered within the limits of the Work below the grade indicated and replace with suitable material as directed by the Owner's Representative.

3.02 INSERTION

- A. Launch pits shall only be allowed at locations of existing or proposed manholes, unless otherwise approved by Owner's Representative.
- B. Equipment used to perform the Work shall be located away from buildings so as to minimize noise impact. Contractor shall provide silencers or other devices to reduce machine noise as necessary.
- C. The Contractor shall install all pulleys, rollers, bumpers, alignment control devices, and other equipment required to protect existing manholes, and to protect the pipe from damage during installation. Lubrication may be used as recommend by the manufacturer.
- D. The selection considerations and installation procedures for all piping materials shall be in accordance with ASTM F85.
- E. Fusing:
 - 1. HDPE Fusing shall be accomplished by personnel certified as fusion technicians by the manufacturer of HDPE pipe and/or fusing equipment.
 - 2. PVC Pipe fusing shall be accomplished by personnel certified by Underground Solutions with equipment certified by Underground Solutions.
 - 3. The butt-fused joint shall be true alignment and shall have uniform roll-back beads resulting from the use of proper temperature and pressure. The joint shall be allowed adequate cooling time before removal of pressure. The fused joint shall be watertight and shall have tensile strength equal to that of the pipe.
 - 4. All joints shall be subject to acceptance by the Owner's Representative prior to insertion.
 - 5. All defective joints shall be cut out and replaced at no cost to the Owner. Any section of the pipe with a gash, blister, abrasion, nick, scar, or other deleterious fault greater in depth than 10 percent of the wall thickness, shall not be used and shall be removed from the Site. A defective area of the pipe may be cut out and the joint fused in accordance with the above procedures. Any section of pipe having other defects such as concentrated ridges, discoloration, excessive spot roughness, pitting, variable wall thickness, or any other defect of manufacturing or handling as determined by the Owner's Representative shall be discarded and not used.

F. Pull Loads:

HDPE Maximum Pull Loads (lb.) - ASTM F1804			
Minimum Radii = 40 Times Pipe Diameter			
Nominal	OD	SDR17	SDR21
16	17.4	57,474	47,081

- G. Pipe insertions shall be continuous and without interruption from one manhole to another. The pipe shall be assembled and joined on the Site using the thermal butt-fusion method to provide a leak proof joint. Threaded or solvent-cement joints shall not be permitted. All equipment and procedures used shall be in strict compliance with manufacturer's recommendations.
- H. The installed pipe shall be allowed the manufacturer's recommended amount of time but not less than 4 hours, for cooling and relaxation due to tensile stressing prior to any reconnection of sewer lines, sealing of the annulus, or backfilling of the insertion pit. Sufficient excess length of new pipe, but not less than 4 inches shall be allowed to protrude into the manhole.

3.03 FINISHING

- A. Following the relaxation period, the annular space shall be sealed. Sealing shall be made with material approved by the Owner's Representative and shall extend into the manhole wall in such a manner as to form a smooth, uniform, water tight joint.
- B. Terminal section pipe that are joined within the insertion pit shall be connected with a full circle pipe repair clamp. The butt gap between pipe ends shall not exceed 1/2 inch.
- C. Perform Hydrostatic Leak Test or Low Pressure Air Test, and Manhole Vacuum Test in accordance with Section 01 40 00 "Quality Requirements" prior to reconnection of services.
- D. Install tapping saddles and reconnect services. Once a saddle is secured in place, drill a hole the full size of the saddle outlet in the new piping. The inside and outside of the drilled holes shall be smooth and uniform. Reconnect service piping using full circle pipe repair clamps.
- E. At all points where the pipe has been exposed, as in starter excavations, at service connection fittings, outside of manholes, encase the pipe and fittings with a minimum of 6 inches of 1500-psi concrete in accordance with Section 03 30 53 "Miscellaneous Cast-In-Place Concrete."
- F. Perform Deflection Testing in accordance with Section 01 40 00 "Quality Requirements."

END OF SECTION

33 05 01.13 SANITARY SEWER PIPE (PVC) [CIVIL]

1.00 GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, and incidental necessary to install 4- through 48-inch gravity flow PVC pipe. Trenching, backfilling, and pipe embedment shall be in accordance with Section 31 23 33 "Trenching and Backfill [Utilities]."

1.02 QUALITY ASSURANCE

- A. Certification: The sewer pipe manufacturer shall provide certification that the pipe supplied conforms to these specifications and shall include laboratory tests results that support such certification. If the manufacturer is unable to provide the certification, an independent testing facility shall be utilized and retained at no cost to the Owner. The pipe supplied shall be permanently marked with the manufacturer's name, the date of manufacture, and identification with the tests performed to warrant its certification as being in conformance with this standard.
- B. Testing:
 - 1. At a minimum, actual test results shall be required as follows:
 - a. Load bearing tests.
 - b. Material tests.
 - c. Hydrostatic tests.
 - 2. Tests on PVC pipe 4 through 48 inches shall be made in accordance with appropriate ASTM standard testing procedures and shall be performed on a minimum of 1 percent of the pipe purchased.
- C. Inspection: An inspection of the pipe after delivery to the Project shall be made by a representative of the Owner. Pipe with visible defects which are indicative of poor structural condition or poor workmanship shall be rejected and replaced without cost to the Owner. Visible defects shall include cracks of any type, honeycombs, or any other defects of poor workmanship. Any pipe rejected shall not be returned under any condition to the Project.

1.03 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 "Submittal Procedures" and shall include:
 - 1. Manufacturer's data on all piping and joint methods.
 - 2. Lay Drawings.

1.04 REFERENCE SPECIFICATIONS

- A. Section 01 33 00 "Submittal Procedures."
- B. Section 01 40 00 "Quality Requirements."

C. Section 31 23 33 "Trenching and Backfill [Utilities]."

1.05 STANDARDS

A. The applicable provisions of the following standards shall apply as if written here in their entirety:

1. American Society of Testing and Materials (ASTM) Standards:

ASTM D3034	Standard Specification for Type PSM Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings
ASTM D2241	Standard Specification for Poly Vinyl Chloride PVC Pressure Rated Pipe (SDR Series)
ASTM D3212	"Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals"
ASTM F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F679 & Annex	Standard Specification for Poly Vinyl Chloride (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings
ASTM F794	Standard Specification for Poly Vinyl Chloride (PVC) Profile Wall Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter
ASTM F1803	Standard Specification for Poly Vinyl Chloride (PVC) Closed Profile Wall Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter

2. American Water Works Association (AWWA) Standards:

AWWA C900	Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 through 12 Inches
AWWA C905	Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 through 48 Inches

2.00 PRODUCTS

2.01 MATERIALS

- A. Gravity Pipe: ASTM D3034 4- to 15-inch SDR 35 or 26, as indicated on the plans, or ASTM F679 18- to 48-inch PS46 (115) Polyvinyl chloride pipe with bell and spigot compression joints. Pipe shall have a home mark on the spigot to indicate proper penetration when the joint is made.
- B. Pressure Pipe: Pressure rated pipe as called for on the Drawings shall be ASTM D2241 SDR 26, PR 160 (4 to 12 inches) or AWWA C905 DR25 PR165 (14 to 42 inches).
- C. Gaskets: Conform to ASTM F477.
- D. Joints: Tested in accordance with ASTM D3212.
- E. Services: Where pressure rated piping is called for on the Drawings, PVC service laterals shall be pressure rated.

3.00 EXECUTION

3.01 INSTALLATION

- A. Install pipe to the lines and grades indicated. Begin installation at the downstream discharge connection point and make connections where indicated.
- B. Carefully lower sanitary sewage pipe into the trench to avoid damage to the pipe. Remove dirt and trash from the pipe while suspended. Keep pipe clean during laying operations, and seal the pipe against entrance of objects at the close of each operating day.
- C. Where a gravity flow PVC wastewater line is within 9 feet of, and parallels a waterline, construct the sewer of PVC meeting ASTM or AWWA specifications with a minimum pressure rating for both the pipe and joints of 150 psi. The vertical separation shall be a minimum of 2 feet between outside diameters and the horizontal separation shall be a minimum of 4 feet between outside diameters. The gravity flow line shall be located below the waterline.
- D. Where a gravity flow PVC wastewater line crosses a waterline, construct the wastewater line of PVC with a minimum pressure rating of 150 psi, and maintain an absolute minimum distance of 6 inches between outside diameters. In addition, the wastewater line shall be located below the waterline where possible and one length of the wastewater pipe must be centered on the waterline.
- E. Where a gravity flow PVC wastewater line crosses over a waterline, construct all portions of the wastewater line within 9 feet of the waterline of PVC pipe with a pressure rating of at least 150 psi with one joint of pipe centered on the waterline, using appropriate adapters.

3.02 FIELD QUALITY CONTROL

- A. Testing shall be as specified in Section 01 40 00 "Quality Requirements."
- B. Do not enclose or cover any Work until inspected.

END OF SECTION

33 05 23.33 PIPELINE CROSSING HIGHWAYS, STREETS AND RAILROADS BY BORING

1.00 GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment and incidentals necessary to install pipe casings or tunnel liners by boring, tunneling or open cut as specified. This section sets forth the requirements for utility lines crossing roadways or railroads using bore, tunneling, or open cut.

1.02 QUALITY ASSURANCE

A. Design Criteria:

- 1. Tunnel Liner Plate: The tunnel liner plate shall be designed by the Manufacturer in accordance with the methods and criteria as specified in AASHTO Standard Specifications for Highway Bridges, Section 26. Soil parameters shall be determined by the Tunnel Liner Plate Manufacturer. The tunnel liner plate shall be designed to allow a maximum deflection of 3 percent. The thickness of the tunnel liner plate specified herein is the minimum acceptable and shall be increased as necessary to obtain adequate joint strength, stiffness, buckling strength, and resistance to deflection.
 - 2. Casing Insulators: Casing insulators shall be designed by the Manufacturer to adequately support and electrically isolate the carrier pipe within the casing pipe under all conditions. Number and location of spacing insulators shall be determined by the Manufacturer to protect carrier pipe from damages. One insulator shall be placed within 2 feet of ends of casing.
- B. Installer's Qualifications: Installation shall be by a competent, experienced contractor or sub-contractor. The installation contractor shall have a satisfactory experience record of at least 3 years engaged in similar work of equal scope.
- C. Performance Requirements: Lateral or vertical variation in the final position of the pipe casing or tunnel liner from the line and grade established by the engineer shall be permitted only to the extent of 1 inch in 10 feet, provided that such variation shall be regular and only in the direction that will not detrimentally affect the function of the carrier pipe.

1.03 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 "Submittal Procedures" and shall include:
 - 1. Shop drawings of the tunnel liner plate and fasteners from the tunnel liner plate manufacturer. Shop drawings shall include calculations for the design of the tunnel liner plate. Shop drawings are for record purposes only and will not be reviewed or approved by the Engineer.
 - 2. Provide shop drawings of casing insulators including sketches of insulators with material components and dimensions and proposed locations of insulators.

1.04 STANDARDS

A. American Association of State Highway and Transportation Officials (AASHTO) Standards:

AASHTO M190	Bituminous Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO	Standard Specifications for Highway Bridges, 1993

B. American Society of Testing and Materials (ASTM) Standards:

ASTM A36	Carbon Structural Steel
ASTM A123	Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products
ASTM A135	Electric – Resistance – Welded Steel Pipe
ASTM A139	Electric – Fusion (Arc) – Welded Steel Pipe (NPS4 and Over)
ASTM A153	Zinc Coating (Hot Dip) on Iron and Steel Hardware
ASTM A307	Carbon Steel Bolts and Studs 60,000 PSI Tensile Strength
ASTM A449	Quenched and Tempered Steel Bolts and Studs
ASTM A568/ A568M	Steel, Carbon, and High Strength, Low Alloy, Hot-Rolled and Cold-Rolled for Commercial Quality
ASTM C76	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM D4254	Test Method for Minimum Index Density of Soils and Calculation of Relative Density

C. American Water Works Association (AWWA) Standards:

AWWA C206	Field Welding of Steel Water Pipe
AWWA C210	Liquid Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines

1.05 JOB CONDITIONS; PERMITS AND EASEMENT REQUIREMENTS

- A. Where the work is in the public right-of-way or railroad company right-of-way, the Owner will secure the appropriate permits or easements. The Contractor shall observe regulations and instructions of the right-of-way Owner as to the methods of performing the work and take precautions for the safety of the property and the public. Negotiations and coordination with the right-of-way Owner shall be carried on by the Contractor, not less than 5 days prior to the time of his intentions to begin work on the right-of-way.
- B. Comply with the requirements of the permit and/or easement, a copy of which is included in the Appendix. The work within the Texas Department of Transportation (TXDOT) shall comply with TXDOT specifications. If required by the Right-of-Way Owner, obtain Protective Liability Insurance in the amount required by the particular company or other insurance as is specified in the permit at no additional cost to the Owner. Acquire a permit, agreement, or work order from the right-of-way Owner as is required.
- C. Construction along roads and railroads shall be performed in such manner that the excavated material be kept off the roads and railroads at all times, as well as, all operating equipment. Construction shall not interfere with the operations of the roads and railroads.
- D. Barricades, warning signs, and flagmen, when necessary and specified, shall be provided by the Contractor.

- E. No blasting shall be allowed. Existing pipelines are to be protected. The Contractor shall verify location and elevation of any pipe lines and telephone cable before proceeding with the construction and plan his construction so as to avoid damage to the existing pipe lines or telephone cables. Verification of location of existing utilities shall be the complete responsibility of the Contractor.

1.06 OPTIONS

- A. Casing Material: Unless specified otherwise, the Contractor may use steel pipe, reinforced concrete pipe, or tunnel liner plate where bore and/or tunnel is specified. Unless specified otherwise, the Contractor may use steel pipe or reinforced concrete pipe where open cut casing is specified. The material specification for casing pipe and tunnel liner are the minimum acceptable. The Contractor shall be fully responsible to insure the materials used are of sufficient strength for the installation method chosen and the soil conditions encountered.
- B. Bore and Tunnel Methods: Unless specified otherwise, the Contractor may use boring, jacking, tunneling for the installation method of casing material. Tunnel liner plate shall not be used where bore or jack methods are used. The Contractor shall be fully responsible to insure the methods used are adequate for the protection of workers, pipe, property, and the public. Provide a finished product as required.

2.00 PRODUCTS

2.01 MATERIALS

- A. Steel Pipe: Steel casing pipe shall have a minimum yield strength of 35,000 psi. Casing shall meet ASTM A36, ASTM A568, ASTM A135, ASTM A139, or approved equal. Pipe shall be coated and lined in accordance with AWWA C210 or approved equal. Pipe joints shall be welded in accordance with AWWA C206. After pipe is welded, coating and lining shall be repaired. Unless specified otherwise, the minimum wall thickness of steel casing pipe shall be as follows:

Casing Diameter	Wall Thickness
4" to 23"	0.25"
24" to 42"	0.375"
43" to 60"	0.50"

2.02 MIXES

- A. Cement Mortar: Consisting of 1 part cement to 2 parts clean sand with sufficient water to make a thick workable mix.
- B. Pressure Grout Mix: Comprised of 1 cubic foot of cement and 3.5 cubic feet of clean fine sand with sufficient water added to provide a free flowing thick slurry. If desired to maintain solids in the mixture in suspension, 1 cubic foot of commercial grade bentonite may be added to each 12 to 15 cubic feet of the slurry.

2.03 MANUFACTURED PRODUCTS

- A. Casing Insulators: Use casing insulators for any type of carrier pipe. Insulators shall consist of pre-manufactured steel bands with plastic lining and plastic runners. Insulators shall fit snug over the carrier pipe and position the carrier pipe approximately in the center of the casing pipe, to provide adequate clearance between the carrier pipe bell and the casing pipe. Fasteners for insulators shall be stainless steel or cadmium-plated. Insulators shall be as manufactured by Cascade Waterworks Manufacturing Company or Pipeline Seal and Insulators, Incorporated or Perry Equipment Corporation.

3.00 EXECUTION

3.01 GENERAL CONSTRUCTION PROCEDURES

A. Excavation and Backfill of Access Pits:

1. Do not allow excavation over the limits of the bore or tunnel as specified. Trench walls of access pits adjacent to the bore or tunnel face shall be truly vertical. Shore the trench walls as necessary to protect workmen, the public, structures, roadways, and other improvements.
2. Excavations within the right-of-way and not under surfacing shall be backfilled and consolidated by tamping in 6-inch horizontal layers to 95 percent of maximum density as measured by ASTM D698. Surplus material shall be removed from the right-of-way and the excavation finished to original grades. Backfill pits immediately after the installation of the carrier pipe is completed. If carrier pipe is not installed immediately after casing pipe installation, the Right-of-Way Owner may require the access pits be temporarily backfilled until installation of carrier pipe.
3. Where seeding or sodding is disturbed by excavation or backfilling operations, such areas shall be replaced by seeding or sodding as specified in Section 31 23 33.16 "Trenching and Backfill [Utilities]."

B. Installing Carrier Pipe in Casings:

1. Pipe to be installed within the casing or tunnel liner shall meet the requirements for the type of pipe as specified. Where indicated, place, align, and anchor guide rails and/or casing insulators inside the casing. If guide rails are used, place cement mortar on both sides of the rails.
2. Pull or skid pipe into place inside the casing. Lubricants such as flax soap or drilling mud may be used to ease pipe installation. Do not use petroleum products, oil or grease for this purpose. If guide rails are used, install pipe and hold down jacks after installation of carrier pipe.
3. After installation of the carrier pipe, mortar inside and outside of the joints as applicable.
4. After carrier pipe installation is completed, seal or plug the ends of the casing.

C. Free-Air System:

1. If required by OSHA standards, free-air systems shall be installed and maintained.
2. Installation of Pressure Grout Mix:

- a. Install pressure grout mix in the void space between the outside of the casing pipe or tunnel liner and the excavation. For bore or jacks with casing pipe, install pressure grout mix immediately upon completion of setting casing pipe. For tunnel liner plate, install pressure grout mix at the end of each work day or more often as conditions warrant.
- b. Unless specified otherwise, install pressure grouting through grout fittings for the casing pipe or tunnel liner plate 48 inches in diameter or larger. Grout fittings shall be fabricated into casing pipe and tunnel liner plate at a maximum spacing of 6 feet. Remove and plug grout fittings after pressure grouting.
- c. Install pressure grout from the low end for all crossings where grout fittings are not used. Seal the low end and pressure grout until grout is extruded from the opposite end.

3.02 CROSSINGS INSTALLED BY BORING

- A. Perform the boring from the low or downstream end unless specified otherwise. Bore the holes mechanically and use a pilot hole. By this method, an approximate 2-inch pilot hole shall be bored the entire length of the crossing and shall be checked for line and grade. This pilot hole shall serve as the centerline of the larger diameter hole to be bored. Place excavated material near the top of the working pit and dispose of material as required. The use of water or other fluids in connection with the boring operation will be permitted only to the extent to lubricate cuttings. Jetting shall not be permitted.
- B. In unconsolidated soil formations, a gel-forming colloidal drilling fluid consisting of at least 10 percent of high grade carefully processed bentonite may be used to consolidate cuttings of the bit, seal the walls of the hole, and furnish lubrication for subsequent removal of cuttings and installation of the pipe immediately thereafter.
- C. In locations where the soil formation is other than consolidated rock, insert the casing pipe simultaneously with the boring operation. This requirement applies to all bored holes of 18 inches or greater in diameter. For smaller diameter bored holes, it is desirable that the casing be installed as the boring progresses, but because of differences in soil formations, the time for inserting the casing shall be the Contractor's responsibility. In the event that caving sand or water bearing materials are encountered, insert the casing pipe simultaneously with the boring operation regardless of the diameter of the bored hole. In all cases, the security and integrity of the roadway is the primary concern. The Contractor shall be held fully responsible for the continued integrity of the structure of the roadway being crossed, whether or not a casing pipe is inserted simultaneously with the boring operation.

3.03 CROSSINGS INSTALLED BY TUNNELING AND JACKING

- A. Jack the pipe from the low or downstream end, unless specified otherwise. Provide heavy duty jacks suitable for forcing the pipe through the embankment. In operating jacks, apply even pressure to the jacks used. Provide a suitable jacking head and bracing between jacks so that pressure will be applied to the pipe uniformly around the ring of the pipe. Provide a suitable jacking frame or back stop. Set the pipe to be jacked on guides, properly braced together, to support the section of the pipe and to direct it in the proper line and grade. Place the whole jacking assembly so as to line up with the direction and grade of the pipe.

In general, excavate embankment material just ahead of the pipe and material removed through the pipe. Force the pipe through the embankment with jacks into the space provided.

- B. The excavation for the underside of the pipe, for at least one-third of the circumference of the pipe, shall conform to the contour and grade of the pipe. Provide a clearance of not more than 2 inches for the upper half of the pipe. This clearance shall be tapered off to zero at the point where the excavation conforms to the contour of the pipe. Extend the distance of the excavation beyond the end of the pipe depending on the character of the material, but do not exceed 2 feet in any case. Decrease the distance if the character of the material being excavated makes it desirable to keep the advance excavation closer to the end of the pipe.
- C. If desired, use a cutting edge of steel plate around the head end of the pipe extending a short distance beyond the end of the pipe with inside angles or lugs to keep the cutting edge from slipping back onto pipe.
- D. When jacking of pipe has begun, carry on the operation without interruption to prevent the pipe from becoming firmly set in the embankment. Remove and replace any pipe damaged in the jacking operations. The Contractor shall absorb the entire expense.

END OF SECTION

33 39 13 SANITARY UTILITY SEWAGE MANHOLES, FRAMES AND COVERS

1.00 GENERAL

1.01 WORK INCLUDED

- A. Provide labor, materials, equipment and incidentals necessary to construct standard and special manholes and cleanouts complete with covers, fittings, and other appurtenances, in accordance with the details and/or called out on the Drawings. At a minimum, provide 48-inch inside diameter manholes for pipe diameters 36 inches and smaller and 60-inch inside diameter manholes for pipe diameters larger than 36 inches. No Matter of pipe size, if the Manhole is deeper than 10' the Manhole shall have a minimum of 60-inch diameter.
- B. For precast manholes, the tops of the manholes shall be set to proper elevation by using a predetermined length of the bottom section of the manhole riser and using standard lengths for the other sections of the riser pipe.

1.02 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 00 "Submittal Procedures" and shall include:
 - 1. Drawings and data covering precast concrete sections. These shall be submitted as Record Data.
 - 2. Concrete batch mix for cast-in-place sections shall be submitted as a Shop Drawing.
 - 3. Manhole cover and ring shall be submitted as Record Data.
 - 4. Design and fabrication details for pre-cast manholes and components shall be submitted as Record Data.
 - 5. Required items for corrosion protection
 - a. Product Data, Technical Data and Material Safety Data Sheet.
 - b. Certification of Applicators and Local Field Services.
 - c. Certified Material Test Report.

1.03 REFERENCE SPECIFICATIONS

- A. Section 01 33 00 "Submittal Procedures."
- B. Section 01 40 00 "Quality Requirements."
- C. Section 03 30 53 "Miscellaneous Cast-in-Place Concrete."

1.04 STANDARDS

- A. Applicable provisions of the following standards shall apply as if written here in their entirety:
 - 1. American Society for Testing and Materials (ASTM) Standards:

ASTM A48	Specification for Gray Iron Castings
ASTM C478	Specification for Precast Reinforced Concrete Manhole Sections
ASTM D2240	Test Method for Rubber Property - Durometer Hardness
ASTM C76	Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C33	Concrete Aggregates
ASTM C923	Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals
ASTM D3753	Glass-Fiber Reinforced Polyester Manholes and Wet wells

2. American National Standards Institute (ANSI) Standards:

ANSI A21.10	American National Standard for Gray Iron and Ductile Iron Fittings, 3 through 48 Inches for Water and Other Liquids
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B. With the following additions for Precast Reinforced Concrete Manhole Sections:

1. All ASTM C478 pipe shall be machine made by a process that shall provide for uniform placement of zero slump concrete in the form and compaction by mechanical devices which shall assure a dense concrete in the finished product, except that reducer cones may be wet-cast.
2. Aggregates for the concrete shall comply with the requirements of ASTM C33, with the additional requirement that the aggregate shall have a minimum of 50 percent of calcium carbonate equivalent.
3. Minimum wall thicknesses for the manhole risers shall be as listed under Wall "B" in the ASTM C76 "Class Tables."
4. Manhole steps shall not be furnished for sanitary sewer manholes.
5. Resilient connectors shall provide an airtight seal that eliminates infiltration and exfiltration.

1.05 DELIVERY AND STORAGE

- A. Do not deliver precast concrete section to the Site until representative concrete control cylinders have attained a strength of at least 80 percent of the specified minimum.
- B. Inspect precast concrete sections upon delivery, and reject any cracked or otherwise visibly defective units.

2.00 PRODUCTS

2.01 MATERIALS

- A. Concrete: Concrete for all cast-in-place manholes and bases shall be as specified in Section 03 30 53 "Miscellaneous Cast-In-Place Concrete" and at a minimum shall be 3000-psi concrete. Mortar shall be as specified in Section 03 30 53 "Miscellaneous Cast-In Place Concrete."

- B. Precast Concrete Manholes: Above the manhole base, manholes shall be constructed with precast concrete rubber gasket sections in accordance with ASTM C478 pipe as detailed on the Drawings using the following materials.
 - 1. Non-Shrinking Grout: Material shall be a non-shrink cement-base grout. "Five Star Grout" as manufactured by U.S. Grout Corporation or "Supreme" grout as manufactured by Forterra or approved equal.
 - 2. Rubber Gaskets: Neoprene or other synthetic, 40 plus or minus 5 hardness when measured by ASTM D2240, Type A durometer.
 - 3. Precast Cone: Precast cone shall be concentric.
 - 4. Grade Adjustment Risers shall be pre-cast, reinforced concrete in conformance to ASTM C478.
- C. Manhole Rings and Covers:
 - 1. Manhole rings and covers shall be made of gray iron castings, ASTM A48, and shall conform to Class No. 30.
 - 2. A minimum of four stainless steel anchor bolts for the ring are required for the connection to manholes. A minimum of five stud bolts for anchoring of the waterproof lid shall be of 316 stainless steel. Seal between ring and cover shall be by a 5/16-inch neoprene "O" ring or equivalent.
 - 3. Castings shall be clean, sound, and free of blow or sand holes or other defects.
- D. Cleanout Fittings:
 - 1. Pipe fittings shall be ductile iron and shall conform to ANSI A21.10 with a minimum pressure rating of 250 psi.
 - 2. The cleanout casting shall conform to ASTM A48, Class 30.
 - 3. Ductile Iron fittings shall be lined with factory installed Protecto 401 Ceramic Epoxy Lining by Enduron or American Polybond Plus (fusion bonded epoxy and fusion bonded polyethylene) or an approved equal. Lining primers, applications and thicknesses shall be in accordance with manufacturer's recommendations for sanitary sewer applications.

2.02 MANUFACTURED PRODUCTS

- A. Precast Concrete Sections: Sections shall be as manufactured by Forterra or CSR Hydroconduit or approved equal. Joints shall be sealed with "O" ring rubber gaskets.
- B. Manhole Rings and Covers: Manhole rings and covers shall be made of gray iron castings in accordance with ASTM A48 and shall conform to Class No. 30. Lids shall have pick slots. Minimum manhole ring and cover inside diameter shall be 30 inches. Ring depth shall be minimum 6 inches. Lid and ring shall be designed for traffic loading. Water tight lids shall be bolted using stainless steel bolts to ring and neoprene gaskets.
- C. Manhole Vents: Vents shall be designed to minimize inflow and must be located above the 100-year flood plain elevation.
- D. Chimney Seals: Frame seals shall consist of a flexible internal rubber sleeve, interlocking extensions and stainless steel expansion band as manufactured by Cretex Specialty Products, or approved equal, conforming to the following requirements. The seal shall

remain flexible throughout a 25-year design life, allowing repeated vertical movement of the frame of not less than 2 inches and/or repeated horizontal movements of not less than 1/2 inch. The sleeve portion of the seal shall be either double or triple pleated with a minimum unexpanded vertical height of either 8 or 10 inches respectively. The sleeve and extension shall have a minimum thickness of 3/16 inch and shall be made from a high-quality rubber compound conforming to the applicable requirements of ASTM C923, with a minimum 1500-psi tensile strength, a maximum 18 percent compression set and a hardness (durometer) or 48 plus or minus 5. The bands shall be integrally formed from 16-gauge stainless steel conforming to ASTM A240, Type 304, with no welded attachments, and shall have a minimum adjustment range of 2 diameter inches and a positive locking mechanism. Any screws, bolts, or nuts used for this mechanism shall be stainless steel conforming to ASTM F593 and F594, Type 304.

E. Corrosion Protection Manhole Liner:

1. Resurfacing Material:

- a. Provide resurfacing material to fill cavities and resurface exposed aggregate where it is impossible to achieve a pinhole-free membrane at the specified total topcoat film thickness.
- b. Resurfacing material shall be the following: AquataPoxy A-7 manufactured by Raven Lining Systems, 1024 North Lansing, Tulsa, OK 74106, or Arc 791 by A.W. Chesterton Co., Stoneham, MA, 02180, or Spectrashield Lining System by CCI Spectrum, Inc., 9716 Florida Mining Blvd. W., Jacksonville, FL, 32257.

2. Topcoat:

- a. Provide a high build epoxy coating that is 100 percent solids epoxy formulated with a wide range of chemical resistance, including resistance to hydrogen sulfide and sulfuric acid, and a high physical strength. Coating must be designed for temperatures up to 200 F. Coating shall be Raven 405 manufactured by Raven Lining Systems, 1024 North Lansing, Tulsa, OK 74106, or Arc S1HB by A.W. Chesterton Co., Stoneham, MA, 02180, (781) 438-7000, or Spectrashield Lining System by CCI Spectrum, Inc., 9716 Florida Mining Blvd. W., Jacksonville, FL, 32257 or approved equal.
- b. The material must be suitable for overhead, vertical and horizontal surfaces, and capable of being spray applied, brushed or rolled at a specified thickness as recommended by the manufacturer.
- c. The material must provide a permanent impermeable, high strength, monolithic lining for concrete structures that is sulfuric acid corrosion, abrasion and impact resistant.

Performance Testing	
Flexural Strength	ASTM D790
Compressive Strength, Yield	ASTM D695
Tensile Strength	ASTM D638
Tensile Ultimate Elongation	ASTM D638

Performance Testing	
Hardness, Shore D	ASTM D2240
Impact, IZOD	ASTM D256
Water Vapor Transmission	ASTM D1653, Method B
Taber Abrasion, CS17 Wheel	ASTM D4060
Adhesion	ASTM D4541
Temperature Resistance	200 F

3.00 EXECUTION

3.01 INSTALLATION

A. Manhole Base:

1. Precast Manhole Base: The applicable details as indicated in the Drawings shall apply. Place the manhole base at an elevation that allows the invert to match the pipe flowline.
2. Cast-in-place Manhole Base: The applicable details as indicated in the Drawings shall apply. Form and place the manhole base at an elevation that allows the invert to match the pipe flowline.
3. Give the concrete portion of all inverts within the manholes a smooth steel trowel finish.
4. The first section of pipe extending out a minimum of 24 inches from each side of the manhole base shall be supported by lean concrete as part of the manhole base. No additional payment shall be made for this concrete cradle; the sum shall be included in the bid price for the manhole.

- B. Monolithic Manholes: Pour monolithic concrete manholes on the Site using specifically designed, re-usable plastic or metal forms. Pour manholes using 3000-psi concrete to provide a formed wall thickness of at least 8 inches. Monolithic manholes shall be substantially water-tight when completed. Bases or footing for these manholes shall be as described above.

- C. Inverts: Construct invert channels to provide a smooth waterway with no disruption of flow at the connection between the pipe and manhole.

- D. Manhole Rings and Covers: Securely anchor the base of the manhole ring into a 6-inch minimum thickness precast concrete ring as indicated, and set on top of concentric manhole cone as a unit.

- E. Cleanouts: Provide a cleanout at the ends of all sewer lines unless a manhole is provided at that point. Construct cleanouts in accordance with the details shown on the Drawings.

- F. Drop Manholes: Install a drop manhole piping assembly in all cases where the distance between the incoming pipe and the floor of the manhole is 2 feet or more. External drop assemblies shall be encased in concrete as indicated in the Drawings.

3.02 GROUTING

- A. Use the mortar for grouting within 40 minutes after mixing. Discard mortar which has begun to take an initial set. Do not mix mortar with additional cement or new mortar.

3.03 CORROSION PROTECTION

- A. Surface must be clean and structurally sound. Repair and resurface any defective areas prior to surface preparation. Apply resurfacing material in accordance with the manufacturer's recommendation.
- B. Clean and dry the concrete by dry abrasive brush blast removing laitance, form release agents, curing membranes and contaminants to provide a sound, firm surface with no loose matter. Wet abrasive blasting is allowed provided that the water produced does not hinder application. Water blasting alone will not be allowed except for decontamination. Abrasive blasting must produce an anchor pattern on the surface, similar to sandpaper, suitable for coating. Avoid opening excessive cavities during abrasive blast. Round off any sharp edges by chipping, wire brushing or any other method.
- C. Alternate methods of surface preparation, i.e. acid etch or high pressure water wash, may be used with prior written approval of the liner manufacturer.
- D. Repair all hydrostatic leaks in the structure prior to applying the liner system. Use a cement base, quick-setting, hydraulic leak repair compound which instantly stops water or seepage and expands as it sets.
- E. If the manhole is to be located in an area where water infiltration through the concrete is expected, then an exterior coating shall be applied.
 - 1. The exterior surface shall be coated with two coats of an approved bituminous coating to obtain a minimum total thickness of 23 mil.
 - 2. Prior to application dirt, dust, oil or other contaminants that can interfere with adhesion of the coating shall be removed.
 - 3. 3 days of cure time for the coating shall be given before backfilling around the structure is permitted.
- F. Application Procedure:
 - 1. Clean the surface of any blasting residue, either with dry air or brushing.
 - 2. Apply properly mixed materials by conventional high pressure airless spray, brush or roller. Apply material on the prepared surfaces in a single application, as specified by the manufacturer (consult manufacturer for theoretical coverage in square feet per gallon).
 - 3. Apply the topcoat within the ambient temperature, material temperature and relative humidity ranges specified by the manufacturer.
 - 4. Take the precaution in applying one or more test patches to determine the optimum method and rate of application.
 - 5. A minimum 12 hours after application, inspect top coat with high-voltage holiday detection equipment (spark-tester). An induced holiday made on the coated concrete surface will serve to delimit the minimum/maximum voltage to be used in testing the coating for holidays at that particular area. Initially set the spark tester at 100 volts per 1 mil of film thickness applied but increase if it is insufficient to detect the induced

holiday. Mark all detected holidays and repair per the manufacturer's recommendations.

6. Minimum cure time prior to immersion or exposure to fluids must be 8 hours at 72 F. Allow 72 hours cure time before exposure to abrasive or impact conditions.
7. Dry Film Thickness Inspection: At the Owner's direction, perform destructive dry film thickness measurements in accordance with SSPC-PA-2 guidelines for frequency of sampling, averaging of sample results, minimum acceptable value for any one sample result, etc. The average dry film thickness of the liner system must be 120 mils or as recommended by manufacturer. A magnetic reading may be utilized, provided metal plates are over coated in the application process.
8. Application Log: Keep a daily log showing date, weather conditions, quantity of structure(s) lined (square footage covered), and number of gallons of lining compound expended.
9. Adhesion Testing: The fully cured manhole structure shall be subjected to adhesion testing at the direction of the Owner. Use an elcometer testing device to verify an adhesion value of 300 psi.

3.04 FIELD QUALITY CONTROL

- A. Manholes shall be tested by hydrostatic exfiltration or vacuum testing in accordance with Section 01 40 00 "Quality Requirements." Manholes shall be tested after installation with all connections (existing and /or proposed) in place. Drop connections and gas sealing connections shall be installed prior to testing.

END OF SECTION

APPENDIX A
GEOTECHNICAL REPORT

MEMORANDUM



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www.freeze.com

TO: Aaron Conine, P.E.; Robb Otey, P.E.
CC: Project File
FROM: Russell G. Springer, P.E.
SUBJECT: Geotechnical Investigation for Walker Branch Interceptor
PROJECT: Walker Branch Interceptor (NRH16432)
DATE: January 17, 2017



A handwritten signature in black ink, appearing to read 'R. G. Springer'.

01-17-2017

FREESE AND NICHOLS, INC.
TEXAS REGISTERED
ENGINEERING FIRM
F-2144

This memorandum presents the results of the geotechnical investigation performed for the proposed Walker Branch Interceptor and its associated appurtenances in the City of North Richland Hills, Texas. The results of the investigation are summarized below along with recommendations for use during the design of the foundation system.

PROJECT BACKGROUND

The proposed Walker Branch Basin Interceptor will consist of an interceptor pipeline comprising two segments located in the northeastern part of the City of North Richland Hills, Texas. Segment 1 is a proposed 15-inch pipeline with its northernmost terminus near the intersection of Smithfield Drive and Main Street and its southern terminus located to the east and south, near the intersection of Watauga Road and Ice House Drive. Segment 2 will consist of a 27-inch proposed pipeline with its northern terminus near the north edge of Walker's Creek Park. The proposed pipeline alignment will extend to the south, eventually paralleling Emerald Hills Way, and will cross Highway 26 and Harwood Road to its southern terminus.

PURPOSE AND SCOPE

The purpose of the geotechnical investigation is to provide recommendations for use during the design of the project. To accomplish this purpose, the study was planned based on the following scope:

1. Obtain right-of-way and utility locate permits from the City of North Richland Hills (the City). Contact Texas 811 to perform utility locates at least 48 hours prior to drilling.

2. Drill ten (10) borings at various locations along the interceptor alignment, including locations where the alignment will cross beneath existing infrastructure,
3. Perform laboratory tests on selected samples to determine classification and engineering properties of the subsurface,
4. Perform an analysis using the collected data to develop recommendations for the proposed pipeline, and
5. Prepare a summary engineering memorandum of the findings, recommended foundation and/or backfill types, a general discussion of construction issues, and a general characterization of subsurface conditions along the pipeline alignment.

WEST Drilling (WEST) was subcontracted to provide drilling, and field sampling services for the project. Gorrondona & Associates, Inc. (GAI) was subcontracted to provide laboratory testing services.

FIELD INVESTIGATION AND LABORATORY TESTING

FIELD INVESTIGATION

The subsurface investigation included 10 geotechnical borings along the proposed alignment of the Walker Branch Basin Interceptor, six borings along Segment 1 and four borings along Segment 2. The borings were drilled on October 5, October 10, and October 11, 2016, by WEST Drilling with a truck-mounted CME 75 drilling rig. The approximate locations of the borings are presented on the attached Boring Location Map (Figure 1). The borings were located in the field by Freeze and Nichols, Inc. (FNI) personnel and were drilled in the vicinity of the staked locations. The coordinates at the boring locations were collected with a hand-held GPS device, and the coordinates (NAD83) are listed on the boring logs. Note that the coordinates are accurate only to the degree implied by the method used in their determination.

The borings were advanced using “dry” drilling methods and with approximate 7 ¼-inch O.D. hollow-stem augers to boring termination depths ranging from about 28 to 30 feet. The subsurface soils within the borings were primarily cohesive and were sampled using Shelby tube samplers with some intermittent sampling of granular soils with split-spoon samplers, used in conjunction with the Standard Penetration Test (SPT). Handheld penetrometer tests were performed in the field on cohesive samples, and the results are shown on the boring logs. The bedrock and rock-like materials were evaluated in-place in the borings using the Texas Highway Department cone penetrometer test (TCP) in which a 3-inch diameter cone is driven using a 140-pound drop hammer falling 30 inches.

Seepage was observed in some of the borings during and after the drilling operation. At the completion of drilling, the borings were backfilled with soil cuttings.

LABORATORY TESTING

Laboratory testing was performed by GAI on selected soil samples. The testing was performed to allow for material classification in accordance with the Unified Soil Classification System (USCS), ASTM D 2487 and to evaluate pertinent engineering properties of the subsurface materials. Samples were selected for Atterberg limits, percent passing a No. 200 sieve, moisture content, and unconfined compressive strength testing. The results of these tests are shown on the boring logs. The boring logs were developed from the field logs and represent an interpretation of the field data with modifications to the material types and descriptions based on the results of the laboratory testing. The boring logs are attached, and indicate the material types, depths, and other details encountered in the borings. Stratigraphy lines shown on the logs correspond to the approximate boundary between strata and are based on the discrete samples collected during drilling. The in-situ transition between strata is often gradual.

GEOLOGIC AND SUBSURFACE CONDITIONS

GEOLOGY^[MM1]

The Dallas Sheet of the Geologic Atlas of Texas (revised 1988) indicates that the proposed pipeline alignment is near the boundary of the lower member of the Woodbine Formation (Kwb) and the upper member of the Grayson Marl and Main Street Limestone Formation (Kgm^[MM2]). Some alluvial materials may be expected near creek channels. The Woodbine Formation is complex and highly variable comprising sand, clay, sandstone, and shale. Due to its variability, it is difficult to trace beds and strata over a significant distance. The formation^[MM3] exhibits a characteristically red color due to the presence of large amounts of iron oxide, and is often identified by sandy surface soils. The lower member of the Woodbine is noted as containing very hard, cobble- and boulder-sized sandstone masses and ironstone concretions. The Woodbine is considered a minor aquifer, and water is commonly found at various levels; often as perched water.

The Grayson Marl and Main Street Limestone are two unique formations, but they are similar in appearance and not separately mapped in this area (undivided). The Grayson Marl contains clays; marls and limestone that vary from yellow to gray. The limestone layers are thin and occur in the middle to upper portion of the formation. The Main Street formation contains regularly alternating thin layers of limestone and clay or shale that is generally yellow-gray and weathers to light gray to white.

SUBSURFACE STRATIGRAPHY AND SEEPAGE

The subsurface stratigraphy for Segment 1 and Segment 2 of the proposed pipelines can be generalized as provided in Tables 1 and 2, respectively^[MM4]. Refer to the attached boring logs for specific subsurface descriptions and thickness of particular strata. Note that the thickness of the strata is based on discrete borings, and that actual in-situ transitions may be gradual.

Table 1 – Generalized Subsurface Stratigraphy for Segment 1

Stratum	Approx. Depth	Description
Urban	Ground Surface	TOPSOIL ⁽¹⁾
I	0.3 to 13 feet	CLAYEY SAND and SANDY LEAN CLAY ⁽²⁾ ; yellow-brown, tan, orange-brown, and brown; medium stiff to stiff (clay) and loose to medium dense (sand)
II	13 to 24 feet	FAT CLAY and SHALY CLAY; yellow-brown and orange-brown with light gray; stiff to hard
III	24+ feet	SHALE ⁽³⁾ ; highly weathered to slightly weathered; yellow-brown and gray; very soft to soft

- Notes
- 1) 4 inches of asphalt was encountered at the ground surface in Boring B-10
 - 2) Boring B-08 encountered about 6 feet of overburden clay (lean and fat) near the ground surface. The clay was underlain by about 17 feet of very dense sand which was underlain by shale.
 - 3) Shale was not encountered in Boring B-01 which was terminated at about 29.5 feet.

Table 2 – Generalized Subsurface Stratigraphy for Segment 2

Stratum	Approx. Depth	Description
Urban	Ground Surface	TOPSOIL
I	0.3 to 6 feet	SANDY LEAN CLAY and LEAN CLAY ⁽¹⁾ ; brown to yellow-brown and orange-brown; medium stiff to hard
II	6 to 18 feet	FAT CLAY and SHALY CLAY; yellow-brown and orange-brown with light gray; stiff to hard
III	18+ feet	SHALE ⁽²⁾ ; highly weathered to slightly weathered; yellow-brown and gray; very soft to soft

- Notes
- 1) The sandy lean clay extended to a depth of about 13 feet in Boring B-03.
 - 2) Shale was not encountered in Boring B-04 which was terminated at about 29.5 feet.

Variable seepage was encountered in some of the borings during drilling and after completion as provided in Table 3. These observations are only indicative of conditions at the time and place shown. The occurrence of groundwater can vary due to many factors. These factors include seasonal changes, site topography, surface runoff, the layering and permeability of subsurface strata, water levels in waterways, utilities, and other factors not evident at the time of this study.

Table 3 – Seepage Observations

Boring	Seepage Depth During Drilling	Post-Drilling Observation
B-01	5.1 feet	3.5 feet
B-07	13 feet	25.9 feet
B-08	12.5 feet	12 feet

The seepage observations in the borings is likely due to localized groundwater that is perched just above the relatively impermeable, underlying clay soils. In Boring B-08, a thick, very dense sand layer was encountered, likely a constituent of the Woodbine Formation, between 6 and 23 feet. The observed groundwater level in this and layer was measured at about 12 feet below the ground surface, resulting in about 11 feet of perched water, based on the depth of underlying clay. This layer was not encountered in any other borings.

RECOMMENDATIONS AND CONSTRUCTION CONSIDERATIONS

EXCAVATIONS

Open-cut excavations will be used for most of the alignment with horizontal boring methods used beneath existing infrastructure crossings. Some of the more minor roadway crossings may use open-cut excavations assuming temporary road closures are acceptable to the City. Pipeline depths are about 8 to 10 feet for Segment 1, and 20 to 22 feet for Segment 2.

Given that the depth of the proposed excavations will exceed 4 feet, the excavations should be configured to create a safe working condition. As required by Texas State law, the excavation design and maintenance is the sole responsibility of the Contractor. Attention is drawn to OSHA Standards 29 CFR – 1926 Subpart P for guidance in the design of such systems.

Excavations along the alignment will encounter a variety of overburden soil consisting primarily of stiff very stiff sandy clays and loose to medium dense clayey sands for Segment 1. The Segment 2 alignment, which is deeper, will encounter very stiff to hard shaly clay and very soft to soft clayey shale. The overburden clay and sand materials can be excavated with conventional earthmoving equipment; however, the presence of very hard, cobble- to boulder-sized sandstone masses associated with Woodbine formation may be encountered and may require non-conventional excavation methods and equipment.

The clayey shale bedrock materials encountered in the Segment 2 borings exhibited laboratory compressive strengths as high as about 8 tons per square foot (tsf) and TCP blow counts as high as 100 blows for 4.5 inches

within the proposed excavation limits. In Borings B-01 and Borings B-02, the shale materials became harder below about 26 to 27 feet with TCP blow counts as high as 100 blow for ½ inch. The clayey shale within the pipeline excavation limits of Segment 2 can likely be ripped or trenched with appropriate equipment; however, planning should provide a contingency for hard shale or cemented seams, if encountered. This discussion is presented to assist with the development of project documents, and contractor's that refer to this document are solely responsible for determining excavation characteristics.

Some deposits of sand were encountered in the borings, but most were clayey, relatively thin, and should not present stability or groundwater issues. The exception is Boring B-08, located in Segment 1, which encountered a 17-foot thick layer of very dense sand starting at a depth of about 6 feet below the ground surface with groundwater at about 12 feet below the ground surface. This sand layer may be lightly cemented but should still be excavatable with conventional equipment. The lateral extent of the sand layer is indeterminable given the spacing and frequency of the borings. This sand layer was not encountered in the other borings.

Some of the excavations will likely encounter perched groundwater; however, the groundwater inflows are expected to be small and should be controlled by relatively simple means, such as collector trenches and sump pits with pumping. For the saturated sand soils in Boring B-08, the proposed excavation limits should extend to a depth just above the observed groundwater level, based on the proposed Segment 1 trench depth of 8 to 10 feet; however, some fluctuation of the groundwater levels in this layer should be expected and accounted for if groundwater levels are higher at the time of construction. The working area will need to be dewatered in general accordance with FNI Standard Specification 31 23 33.66 – Trenching and Backfill and meet the requirements of OSHA

The subgrade along the alignment are suitable for the support of the pipe loads. Groundwater seepage could soften the subgrade soils if allowed to stand on the bearing surface for any amount of time. If soft subgrade soils are encountered at the bottom of the excavation, replacement with suitable fill or reinforcement with gravel or crushed stone in conjunction with geosynthetic materials may be used.

INFRASTRUCTURE CROSSINGS

Bored casings or horizontal directional drilling methods will be used at major infrastructure crossings. For Segment 1, these crossings, from north to south, are proposed to include Davis Boulevard, the DART Rail, and two more crossings beneath Davis Boulevard. For Segment 2, these crossings are proposed for Walker's Creek Trail,

Highway 26, and Harwood Boulevard. The crossing at Walker's Creek Trail may be considered for an open-cut excavation if a temporary road closure is acceptable to the City

Based on the anticipated pipeline depths for Segment 1, the stiffness or density of the subsurface soils within the bore depth are fairly consistent, with the exception of the shaly clay soils encountered at about 8 feet in Boring B-09, and the very dense sands encountered in Boring B-08 at about 6 feet. While these materials should be excavatable with typical cutting equipment, horizontal boring along the interface of these materials with their softer/less dense overlying soils may be difficult due to their differential strength^[MM6]. The harder/more dense materials at the bottom of the bore may cause the borehole to "kick up" into the less resistant overburden materials. For Segment 2, the same scenario applies as the anticipated bore depths are near transition from shaly clay to clayey shale, where the structure of the subsurface materials becomes more rock-like than soil-like. The design and construction of the bored crossings will need to consider the possibility of the bore occurring at this interface and may require modifications or provisions to accommodate installation.

Though not encountered in the borings, the Woodbine formation in this area is noted as containing very hard, cobble- to boulder-sized sandstone masses. These masses may be difficult to penetrate with conventional cutting equipment and could cause changes in direction and difficulty in reaming out the borehole. Alternate tooling and/or drilling methods may be required if these hard masses are encountered during the horizontal bore.

Most of the subsurface soils encountered in the borings were moderately to highly cohesive and groundwater was below the proposed pipeline depths, with the exception of the silty sand soils encountered in Boring B-08. For horizontal boring, caving should be minimal based on the consistency/density of the soils; however, the blocky structure of some of the shaly clay and clayey shale materials could result in individual blocks of the jointed soil or rock shifting the surrounding mass and moving against the casing. The moderately to highly plastic clay may also squeeze against the casing, depending on the strength of the clay and depth of cover.

This discussion is presented to assist with the development of project documents, and contractor's that refer to this document are solely responsible for determining excavation characteristics.

EMBEDMENT AND BACKFILL

Prior to placing any bedding, embedment, or backfill materials, all existing loose fill, debris, and similar unsuitable materials should be removed from within the trench. If unsuitable materials are encountered at the pipeline bearing depth, then these materials should be replaced or reinforced as discussed in the Excavation section. In

general, if the depth of unsuitable materials is greater than about two feet or if the affected length along the trench becomes excessive, the geotechnical engineer should be notified to evaluate the situation in the field.

Pipe bedding and backfill should be in general accordance with FNI Standard Specification 31 23 33 – Trenching and Backfill. The typical trench type recommended for a depth of cover from four to twenty feet consists of granular embedment, based on the soil-structure interaction and the strength of the embedment materials required to prevent damage to the pipe due to load deformation. The pipe embedment should extend to the top of the pipe plus 12 inches. Most of the excavated soils from the trench are suitable for backfill above the pipe envelope, in non-load bearing areas. Pipe trench backfill above the embedment and beneath pavement sections and load bearing areas should consist of Structural Fill material. Some of the overburden soils encountered in Segment 1 may be suitable for re-use as Structural Fill material due to the varied mixture of the excavated soils, care should be taken to keep the material segregated if it will be used as backfill above the pipe envelope.

The sandy clays and clayey sand soils along the pipeline alignment are marginally suitable to be re-used as CLSM; however, the clay fines in these materials may limit their use due to problems with incomplete mixing, stickiness of the mixtures, excess water demand, shrinkage, and variable strength. The shaly clay and clayey shale materials would not be suitable for re-use as CLSM due to their poor shredability and the quantity of cement needed for mixing to achieve a suitable compressive strength.

Backfill material types and corresponding density and moisture requirements are provided in Table 5.

Table 4 – Material and Compaction Requirements

Material Use	Material Requirements	Compaction or Strength Test Method	Density Requirement	Moisture Requirement
Pipeline Embedment Backfill	Granular Embedment	Standard (ASTM D 4253)	95 to 100 % ⁽¹⁾	-- ⁽²⁾
Structural Fill	SC or CL PI: 4 to 15 LL: ≤35 -#200 Sieve ≤ 70%; No organics	Standard (ASTM D 698)	95 to 100%	-2 to +3 %
Native Soils	CL or CH LL>35 PI>15	Standard (ASTM D 698)	95 to 100%	0 to +3 %

Notes: (1) Density requirement is a percentage of an established index density.

(2) Compact cohesionless fill at a moisture content within a range that accommodates consistent placement and compaction to the minimum index density.

Compaction of each lift should be continuous over its entire area. Cohesive fill should be placed in loose horizontal lifts not exceeding about 8 to 9 inches, with the intent of providing a compacted lift thickness of 6 inches. The material should be consistent with regard to type and moisture content. Clods should be processed and mixed, and water should be evenly applied, so that each lift has a uniform moisture and density. Each lift should be tested to confirm it has the specified moisture and compaction. Subsequent lifts should not be placed until the exposed lift has the specified moisture and density. Lifts failing to meet the moisture and density requirements should be reworked to meet the required specifications.

The granular backfill materials should be placed in maximum 4-inch compacted lifts with vibratory rollers or vibratory plate power hand compactors. The compacted moisture content must be within a range that accommodates consistent placement and compaction to the minimum index density specified above.

The contractor must provide some means of controlling the moisture content (such as water hoses, water trucks, etc.). Maintaining subgrade moisture is always critical, but will require the most effort during warm, windy and/or sunny conditions. Density and moisture verification testing is recommended to provide some indication that adequate earthwork is being provided. However, the quality of the fill is the sole responsibility of the contractor. Satisfactory verification testing is not a guarantee of the quality of the contractor's earthwork operations.

EXPANSIVE CLAYS

Estimate of the potential expansive soil movement were made using the Potential Vertical Rise (PVR) Method 124-E published by TxDOT, the results of laboratory index testing, engineering judgment, and experience. Based on this information, the estimated soil movement or PVR, at the project site, is about 0.5 to 4 inches at the ground surface for a full seasonal moisture cycle. The estimated PVR values at the proposed pipe depths were lower due to the increased overburden pressure and ranged from about 0.5 to 1 inch for Segment 1. Because the pipeline depth is below the zone of seasonal moisture change in Segment 2, the PVR values were negligible; however, some movement, about an inch or less, should be anticipated. Recognize that this value range is not an exact value, and is only an indication of the potential movements due to expansive soil for seasonal moisture fluctuations.

Expansive clays of moderate to high plasticity were predominant in the boring logs. Expansive soils are problematic within the depth of seasonal moisture change, typically 20 feet for North Central Texas, or where water may be introduced to previously dry subsurface soils. In addition to seasonal moisture change, moisture fluctuations can

also be influenced to varying degrees by drainage conditions, site grades/sloping ground, landscaping, irrigation practices, the presence of vegetation, groundwater, and the presence of flatwork or other impervious barriers.

Swell-induced pressures may need to be considered for the pipeline, specifically at the joints where the pipe depth changes suddenly (e.g. infrastructure crossings). In areas where the pipe is founded in clay materials, expansive foundation materials could result in uplift pressures that damage or cause offsets due to differential settlement between the shallow foundation soils and the deeper shale foundation soils. The use of flexible pipe will alleviate some the problems associated with expansive soil; however, the use of flexible connections may be required at the joint locations where the pipe elevation drops to accommodate an infrastructure crossing. Chemical modification with lime may also be considered at the aforementioned joint locations to reduce the swell potential of the shallower soils but will require further study.

CLOSING

CONTINUITY

The geotechnical engineer should be requested to review the completed plans and specifications to confirm that the design is consistent with the subsurface conditions indicated by the investigation. The construction should be observed and tested by qualified personnel. The geotechnical engineer should be requested to visit the site periodically to observe subsurface conditions and construction procedures and to review the construction observation reports.

LIMITATIONS

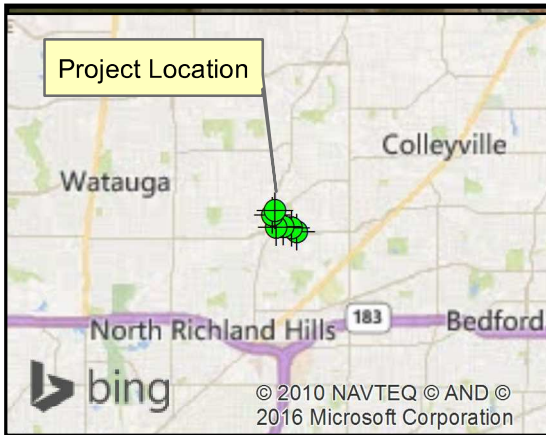
The work was performed in a manner consistent with the level of care and skill ordinarily exercised by other members of Freese and Nichols' profession practicing in the same locality, under similar conditions and at the date the services are provided. Freese and Nichols makes no other representation, guarantee or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided. Recommendations contained in this report are based on our field observations, subsurface explorations, laboratory tests, and present knowledge of the proposed construction. It is possible that soil, rock or groundwater conditions could vary between or beyond the points explored. This report has been prepared for use during design. Paragraphs, statements, test results, boring logs, figures, etc., should not be taken out of context, nor utilized without a knowledge and awareness of their intent within the purpose of this report.

This report was prepared specifically for use by Freese and Nichols, Inc. and the City of North Richland Hills for this project, and shall not be used for other projects or purposes. This report, and any future addenda or reports

regarding this site, may be made available to contractors/bidders to supply them with only the data contained in the report regarding subsurface conditions and laboratory test results at the point and time noted. Contractors/bidders may not rely on interpretations, opinion, recommendations, or conclusions contained in the report. Verification of the subsurface conditions for purposes of determining difficulty of excavation, trafficability, etc., is the responsibility of the contractors/bidders. Because of the limited nature of any subsurface study, the contractor may encounter conditions during construction which differ from those presented in the report. In such event, the contractor should promptly notify the Owner so that Freeze and Nichols' geotechnical engineer can confirm those conditions.

- END OF MEMORANDUM -

Attachment A
Boring Location Maps

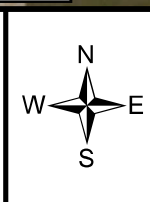


Name	LATITUDE	LONGITUDE
B-5	32.861950	-97.201720
B-6	32.863039	-97.203178
B-7	32.863354	-97.205773
B-8	32.863180	-97.207920
B-9	32.866220	-97.208930
B-10	32.867287	-97.208224



FREESSE AND NICHOLS

4055 International Plaza, Suite 200
Fort Worth, TX 76109 - 4895
Phone - (817) 735 - 7300



Walker Branch Interceptor
City of North Richland Hills

Boring Location Map
Segment 1

FN JOB NO	NRH16432
FILE	16432-BLM-2.mxd
DATE	12/9/2016
SCALE	1:4,800
DESIGNED	Russ Springer
DRAFTED	MPT

2

FIGURE

Attachment B
Final Boring Logs



LOG OF BORING NO. B-01

Project Description: Walker Branch Interceptor

Project Location: North Richland Hills, Texas

Date Drilling Started: 10/5/2016

Logged By: RGS

Rig Type: CME 75

Latitude: 32.845520

Drilling Co.: W.E.S.T. Drilling

Hammer Type: Automatic

Longitude: -97.201550

Project No.: NRH16432

Phase No.: ****

Date Drilling Completed: 10/5/2016

Drill Method: DRY w/ HSA

Elevation:

DEPTH, ft	SAMPLE					SYMBOL	MATERIAL DESCRIPTION	WATER CONTENT, %	UNIT DRY WEIGHT, pcf	% PASSING NO. 200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNC. COMPRESSIVE STRENGTH, tsf	STRAIN AT FAILURE, %	ELEVATION, ft
	TYPE	BLOW COUNTS	HAND PENE-TROMETER (P) / TORVANE (T), tsf	RECOVERY, %	RQD, %											
	U-1		1.9 (P)	100		3" Topsoil	0.25/									
	U-2		1.7 (P)	50			SANDY LEAN CLAY, brown to dark brown, medium stiff, moist, with rootlets and iron oxide nodules	14	58	38	14	24				
5	U-3			89			-yellow-brown and gray-brown, with highly oxidized gravel seams below 3.2 feet									
	SPT-4	4-6-9 (15)					-gravel seam from 5.1 to 5.5 feet									
	U-5		4.5+ (P)	67			SHALY CLAY, tan and light orange-brown, very stiff to hard, trace light gray along vertical and horizontal infilled joints, slightly stratified, blocky, with sandy seams	22								
10								16	51	42	16	26				
	U-6		4.5+ (P)	67			-more plastic, less vertical jointing below 13 feet	18	111	91	51	22	29	3.2	3.2	
15																
	TCP	47/6" 50/5"					CLAYEY SHALE, tan and light gray, very soft to soft	18/								
20	A															
	TCP	50/4" 50/2.5"														
25	A															
	A						-light gray below 27 feet									
	TCP	50/0.50" 50/0"					Total boring depth 28.1 ft.									
Water Observations: 5.1 ft At time of drilling 3.5 ft After drilling								Remarks: 0-28.1 feet - hollow stem augers. Backfilled with cuttings.								

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual. These logs are subject to the limitations, conclusions, and recommendations in the associated report.



LOG OF BORING NO. B-02

Project Description: Walker Branch Interceptor

Project Location: North Richland Hills, Texas

Date Drilling Started: 10/5/2016

Logged By: RGS

Rig Type: CME 75

Latitude: 32.847100

Drilling Co.: W.E.S.T. Drilling

Hammer Type: Automatic

Longitude: -97.201870

Project No.: NRH16432

Phase No.: ****

Date Drilling Completed: 10/5/2016

Drill Method: DRY w/ HSA

Elevation:

DEPTH, ft	SAMPLE					SYMBOL	MATERIAL DESCRIPTION	WATER CONTENT, %	UNIT DRY WEIGHT, pcf	% PASSING NO. 200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNC. COMPRESSIVE STRENGTH, tsf	STRAIN AT FAILURE, %	ELEVATION, ft
	TYPE	BLOW COUNTS	HAND PENE- TROMETER (P) / TORVANE (T), tsf	RECOVERY, %	RQD, %											
5	U-1		4.5+ (P)	58		3" Topsoil	0.25/									
						SANDY LEAN CLAY, dark brown, hard, dry to moist, with rootlets										
	U-2		2.2 (P)	67		-orange-brown and yellow-brown, stiff, moist, highly oxidized below 2 feet		18								
	U-3		3.1 (P)	67												
	U-4		4.5+ (P)	56		-stiff to very stiff, trace subrounded gravel below 5 feet		22	57	49	15	34				
10	U-5		4.5+ (P)	67		SHALY CLAY, yellow-brown, very stiff, moist	6/									
						-slightly stratified, with light gray, blocky, hard below 8 feet		18	95	45	20	25				
	U-6		4.5+ (P)	61				20								
20	U-7		4.5+ (P)	100		CLAYEY SHALE, tan and light gray, very soft to soft	18/	17	117	93	68	27	41	8.1	2.6	
	TCP	50/5" 50/3"														
	TCP	50/4" 50/0.50"														
	A					-light gray below 24 feet										
25						-gray-brown below 26 feet										
	A															
	TCP	50/0.75" 50/0.50"														
						Total boring depth 28.1 ft.										
Water Observations: None At Time Of Drilling None After Drilling								Remarks: 0-28.1 feet - hollow stem augers. Backfilled with cuttings.								

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual. These logs are subject to the limitations, conclusions, and recommendations in the associated report.



LOG OF BORING NO. B-03

Project Description: Walker Branch Interceptor

Project Location: North Richland Hills, Texas

Date Drilling Started: 10/5/2016

Logged By: RGS

Rig Type: CME 75

Latitude: 32.848844

Drilling Co.: W.E.S.T. Drilling

Hammer Type: Automatic

Longitude: -97.201813

Project No.: NRH16432

Phase No.: ****

Date Drilling Completed: 10/5/2016

Drill Method: DRY w/ HSA

Elevation:

DEPTH, ft	SAMPLE					SYMBOL	MATERIAL DESCRIPTION	WATER CONTENT, %	UNIT DRY WEIGHT, pcf	% PASSING NO. 200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNC. COMPRESSIVE STRENGTH, tsf	STRAIN AT FAILURE, %	ELEVATION, ft
	TYPE	BLOW COUNTS	HAND PENE- TROMETER (P) / TORVANE (T), tsf	RECOVERY, %	RQD, %											
	U-1		4.5+ (P)	47			2" Topsoil SANDY LEAN CLAY, dark brown to brown, hard, dry to moist, with rootlets, trace gravel -very stiff to hard below 2 feet	0.16/								
	U-2		4.5+ (P)	56				14		56	37	15	22			
5	U-3		4.5+ (P)	50				15								
	U-4		2.6 (P)	67			-brown and orange-brown, yellow-brown, stiff to very stiff, moist below 6 feet									
	U-5		2.2 (P)	72			-with light gray below 8.5 feet	17		65	43	15	28			
10																
	U-6		3.4 (P)	61			SHALY CLAY, light brown and light gray, very stiff, dry to moist, slightly stratified, blocky	13/	20	107	98	67	25	42	2.9	3.5
15																
	U-7		4.5+ (P)	50			CLAYEY SHALE, light brown to light gray, very soft	18/	17							
20																
	TCP	38/6"														
	A	36/6"														
25																
	TCP	50/4"														
	A	50/4"					-very soft to soft below 28 feet									
30																
							Total boring depth 30.0 ft.									

Water Observations:
None At Time Of Drilling

None After Drilling

Remarks: 0-30 feet - hollow stem augers. Backfilled with cuttings.

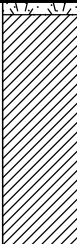


LOG OF BORING NO. B-04

Project Description: Walker Branch Interceptor
Project Location: North Richland Hills, Texas
Date Drilling Started: 10/10/2016
Logged By: RGS
Rig Type: CME 75
Latitude: 32.851040

Drilling Co.: W.E.S.T. Drilling
Hammer Type: Automatic
Longitude: -97.201624

Project No.: NRH16432
Phase No.: ****
Date Drilling Completed: 10/10/2016
Drill Method: DRY w/ HSA
Elevation:

DEPTH, ft	SAMPLE					SYMBOL	MATERIAL DESCRIPTION	WATER CONTENT, %	UNIT DRY WEIGHT, pcf	% PASSING NO. 200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNC. COMPRESSIVE STRENGTH, tsf	STRAIN AT FAILURE, %	ELEVATION, ft	
	TYPE	BLOW COUNTS	HAND PENE- TROMETER (P) / TORVANE (T), tsf	RECOVERY, %	RQD, %												
5	U-1		4.5+ (P)	72		4" Topsoil	0.33/	11	74	45	13	32					
	U-2		4.5+ (P)	33		LEAN CLAY, with sand, dark brown to brown, stiff to hard, moist to dry -with trace ferruginous staining below 2 feet											
	U-3		4.5+ (P)	39		-more plastic below 4 feet											
10	U-4		4.1 (P)	50		FAT CLAY, yellow-brown, gray-brown, and orange, very stiff, dry to moist, with ferruginous staining	6/	28	97	80	31	49					
	U-5		4.5 (P)	47													
15	U-6		4.0 (P)	78		SHALY CLAY, with sand, yellow-brown and gray-brown, very stiff, dry to moist, slightly stratified, with ferruginous staining	13/	26	100	84	73	30	43	2.5	2.2		
20	U-7	4.4 (P)	67		-with gray, with vertical and horizontal infilled joints below 18 feet -with occasional very thin selenitic seams below 19.5 feet		27	97					2	3.6			
25	U-8	4.5+ (P)	89		-with dark brown and dark gray, hard, slightly moist below 24 feet		27										
30	U-9	4.5+ (P)	83														
						Total boring depth 29.5 ft.											
Water Observations: None At Time Of Drilling None After Drilling								Remarks: 0-29.5 feet - hollow stem augers. Backfilled with cuttings.									

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual. These logs are subject to the limitations, conclusions, and recommendations in the associated report.



LOG OF BORING NO. B-05

Project Description: Walker Branch Interceptor

Project Location: North Richland Hills, Texas

Date Drilling Started: 10/10/2016

Logged By: RGS

Rig Type: CME 75

Latitude: 32.861909

Drilling Co.: W.E.S.T. Drilling

Hammer Type: Automatic

Longitude: -97.201706

Project No.: NRH16432

Phase No.: ****

Date Drilling Completed: 10/10/2016

Drill Method: DRY w/ HSA

Elevation:

DEPTH, ft	SAMPLE					SYMBOL	MATERIAL DESCRIPTION	WATER CONTENT, %	UNIT DRY WEIGHT, pcf	% PASSING NO. 200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNC. COMPRESSIVE STRENGTH, tsf	STRAIN AT FAILURE, %	ELEVATION, ft
	TYPE	BLOW COUNTS	HAND PENE-TROMETER (P) / TORVANE (T), tsf	RECOVERY, %	RQD, %											
	U-1		1.8 (P)	89			3" Topsoil SANDY LEAN CLAY, brown, stiff, moist to dry, with rootlets (Fill)	0.25/								
	U-2		4.5+ (P)	53			CLAYEY SAND, tan, with ferruginous staining, medium stiff, dry	2/	16	47	23	13	10			
5	U-3		4.5+ (P)	42												
	U-4		2.2 (P)	56			-yellow-brown and orange, and light gray, stiff, moist, highly oxidized, trace iron oxide nodules below 6 feet									
	U-5		2.3 (P)	61			SANDY LEAN CLAY, yellow-brown and orange, stiff, moist, highly oxidized, trace iron oxide nodules	8/	8	51	30	15	15			
10																
	U-6		3.4 (P)	67			FAT CLAY, light orange-brown and light green-gray, stiff to very stiff, moist, slightly shaly, blocky	13/	18	111	96	60	23	37	2.5	5.1
15																
	U-7		4.5+ (P)	72			SHALY CLAY, yellow-brown, trace light gray, hard, dry to moist, stratified	18/	21	107				3.6	4.3	
20																
	U-8		4.5+ (P)	64			-more light gray, partially slickensided below 23 feet									
25																
	U-9		4.5+ (P)	64			-with very thin selenitic seams below 28.5 feet		23							
30							Total boring depth 29.5 ft.									

Water Observations:
None At Time Of Drilling

None After Drilling

Remarks: 0-29.5 feet - hollow stem augers. Backfilled with cuttings.



LOG OF BORING NO. B-06

Project Description: Walker Branch Interceptor

Project Location: North Richland Hills, Texas

Date Drilling Started: 10/10/2016

Logged By:

Rig Type: CME 75

Latitude: 32.863039

Drilling Co.: W.E.S.T. Drilling

Hammer Type: Automatic

Longitude: -97.203178

Project No.: NRH16432

Phase No.: ****

Date Drilling Completed: 10/10/2016

Drill Method: DRY w/ HSA

Elevation:

DEPTH, ft	SAMPLE					SYMBOL	MATERIAL DESCRIPTION	WATER CONTENT, %	UNIT DRY WEIGHT, pcf	% PASSING NO. 200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNC. COMPRESSIVE STRENGTH, tsf	STRAIN AT FAILURE, %	ELEVATION, ft
	TYPE	BLOW COUNTS	HAND PENE-TROMETER (P) / TORVANE (T), tsf	RECOVERY, %	RQD, %											
0	U-1		2.7 (P)	67		0.25/	3" Topsoil									
5	U-2		4.5+ (P)	44			CLAYEY SAND, brown, loose, moist, with rootlets, trace sand -dry, medium dense below 1 foot -brown and orange, with ferruginous staining below 2.5 feet	13		43	34	14	20			
	U-3		4.5+ (P)	53												
	U-4		4.5+ (P)	83		6/	SANDY LEAN CLAY, tan with orange, stiff, moist, highly oxidized	15	116					1.4	3.1	
10	U-5		3.5 (P)	56		8/	CLAYEY SAND, light gray and tan, loose to medium dense, with ferruginous staining	16		19	31	21	10			
15	U-6	12-18-14 (32)	4.5+ (P)	83		13/	SHALY CLAY, yellow-brown with light gray, hard, with cemented seams, dry to moist -tan to light orange, stratified below 14 feet	19		93	63	23	40			
20	U-8		4.5+ (P)	67			-yellow-brown, with trace gray, more shale-like, with horizontal and vertical infilled joints, tight below 18 feet	16								
25	U-9		4.5+ (P)	56		24/	CLAYEY SHALE, weathered, yellow-brown and light olive brown, very soft									
30	SPT-10	12-27-36 (63)					-gray, slightly weathered below 28 feet	15								
							Total boring depth 29.5 ft.									

Water Observations:
None At Time Of Drilling

None After Drilling

Remarks: 0-29.5 feet - hollow stem augers. Backfilled with cuttings.



LOG OF BORING NO. B-07

Project Description: Walker Branch Interceptor
Project Location: North Richland Hills, Texas
Date Drilling Started: 10/10/2016
Logged By:
Rig Type: CME 75
Latitude: 32.863354

Drilling Co.: W.E.S.T. Drilling
Hammer Type: Automatic
Longitude: -97.205773

Project No.: NRH16432
Phase No.: ****
Date Drilling Completed: 10/10/2016
Drill Method: DRY w/ HSA
Elevation:

DEPTH, ft	SAMPLE					SYMBOL	MATERIAL DESCRIPTION	WATER CONTENT, %	UNIT DRY WEIGHT, pcf	% PASSING NO. 200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNC. COMPRESSIVE STRENGTH, tsf	STRAIN AT FAILURE, %	ELEVATION, ft
	TYPE	BLOW COUNTS	HAND PENE-TROMETER (P) / TORVANE (T), tsf	RECOVERY, %	RQD, %											
	U-1			81		3" Topsoil	0.25/									
							SANDY LEAN CLAY, dark brown and brown, medium stiff, moist, with roots and rootlets									
	U-2		4.5+ (P)	61			-light brown, hard, dry below 1.2 feet	11		50	40	16	24			
5	U-3		4.5+ (P)	39												
	U-4		3.7 (P)	78			CLAYEY SAND, silty, tan and orange, highly oxidized, loose to medium dense, dry to moist	6/	16	117	39	32	15	17	1.5	4.3
							-moist below 8 feet									
10	U-5		3.0 (P)	94												
	U-6		2.3 (P)	61			FAT CLAY, orange-brown and light gray, with dark brown, stiff, moist, slightly shaly, with quartz sand filled joints	13.2/	32		88	88	34	54		
15																
	U-7			100			-cemented seam at 18 feet									
20	SPT-8	14-13-20 (33)						19								
							SHALY CLAY, yellow-brown with trace light gray, hard, moist, dry	20/								
	U-9		4.5+ (P)	53			CLAYEY SHALE, very soft, gray, stratified, slightly weathered, dry to moist	23/	16							
25																
							SHALE, light gray, soft, slightly weathered	27/								
	TCP	43/6" 50/2"						12								
							Total boring depth 28.7 ft.									

Water Observations:
 13 ft At time of drilling
 25.9 ft After drilling

Remarks: 0-28.7 feet - hollow stem augers. Backfilled with cuttings.



LOG OF BORING NO. B-08

Project Description: Walker Branch Interceptor
Project Location: North Richland Hills, Texas
Date Drilling Started: 10/10/2016
Logged By: RGS
Rig Type: CME 75
Latitude: 32.863174

Drilling Co.: W.E.S.T. Drilling
Hammer Type: Automatic
Longitude: -97.207756

Project No.: NRH16432
Phase No.: ****
Date Drilling Completed: 10/10/2016
Drill Method: DRY w/ HSA
Elevation:

DEPTH, ft	SAMPLE					SYMBOL	MATERIAL DESCRIPTION	WATER CONTENT, %	UNIT DRY WEIGHT, pcf	% PASSING NO. 200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNC. COMPRESSIVE STRENGTH, tsf	STRAIN AT FAILURE, %	ELEVATION, ft
	TYPE	BLOW COUNTS	HAND PENE-TROMETER (P) / TORVANE (T), tsf	RECOVERY, %	RQD, %											
	U-1		3.6 (P)	83			4" Topsoil SANDY LEAN CLAY (FILL), orange-brown and brown, stiff, moist, with rootlets	0.33/								
	U-2		3.2 (P)	78			SANDY FAT CLAY (FILL), red-brown, brown, and orange-brown, stiff to very stiff, moist	2.8/	27	56	56	21	35			
5	U-3		4.5+ (P)	67			SILTY SAND, light orange-brown, very dense, moist to wet	6/								
	U-4	27-38-35 (73)		75			POORLY GRADED SAND WITH SILT, light gray and orange, very dense, wet, highly oxidized	18/	22	8						
	SPT-5	13-24-31 (55)														
10	SPT-6	9-22-29 (51)														
	SPT-7	40/6" 50/4"														
15	TCP	12-16-21 (37)					CLAYEY SHALE, gray, slightly weathered, very soft	23/	23							
	SPT-8	50/1.5"					SHALE, light gray, soft	28/								
20	TCP						Total boring depth 28.1 ft.									

Water Observations:
 12.5 ft At time of drilling
 12 ft After drilling

Remarks: 0-28.1 feet - hollow stem augers. Backfilled with cuttings.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual. These logs are subject to the limitations, conclusions, and recommendations in the associated report.



LOG OF BORING NO. B-09

Project Description: Walker Branch Interceptor

Project Location: North Richland Hills, Texas

Date Drilling Started: 10/11/2016

Logged By: RGS

Rig Type: CME 75

Latitude: 32.866211

Drilling Co.: W.E.S.T. Drilling

Hammer Type: Automatic

Longitude: -97.208886

Project No.: NRH16432

Phase No.: ****

Date Drilling Completed: 10/11/2016

Drill Method: DRY w/ HSA

Elevation:

DEPTH, ft	SAMPLE					SYMBOL	MATERIAL DESCRIPTION	WATER CONTENT, %	UNIT DRY WEIGHT, pcf	% PASSING NO. 200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNC. COMPRESSIVE STRENGTH, tsf	STRAIN AT FAILURE, %	ELEVATION, ft
	TYPE	BLOW COUNTS	HAND PENE- TROMETER (P) / TORVANE (T), tsf	RECOVERY, %	RQD, %											
	U-1		1.7 (P)	61		3" Topsoil	0.33/	23		50	44	17	27			
	U-2		2.0 (P)	44			SANDY LEAN CLAY, dark brown to yellow-brown and red-brown, medium stiff to stiff, moist, with rootlets									
5	U-3		2.7 (P)	50			-with ferruginous staining and highly oxidized seams below 4 feet	16								
	U-4		3.2 (P)	56			-yellow-brown and orange-brown, trace light gray, very stiff, slightly shaly, below 6 feet									
10	U-5		4.5+ (P)	61			SHALY CLAY, yellow-brown, very stiff to hard, moist, with very thin, lightly cemented seams, slightly stratified	8/	20		62	25	37			
15	U-6		4.5+ (P)	67				20	109					3.5	3.9	
20	U-7		4.5+ (P)	50			CLAYEY SHALE, yellow-brown, very soft	19/	15							
							-cemented seam below 20 feet									
25	TCP-8	50/6"					SHALE, light gray, very soft to soft, slightly weathered, lightly cemented	23/								
	A-9	50/3"														
	TCP	50/1.25"														
	Total boring depth 28.4 ft.															

Water Observations:
None At Time Of Drilling

None After Drilling

Remarks: 0-28.4 feet - hollow stem augers. Backfilled with cuttings.



LOG OF BORING NO. B-10

Project Description: Walker Branch Interceptor

Project Location: North Richland Hills, Texas

Date Drilling Started: 10/11/2016

Logged By: RGS

Rig Type: CME 75

Latitude: 32.867287

Drilling Co.: W.E.S.T. Drilling

Hammer Type: Automatic

Longitude: -97.208224

Project No.: NRH16432

Phase No.: ****

Date Drilling Completed: 10/11/2016

Drill Method: DRY w/ HSA

Elevation:

DEPTH, ft	SAMPLE					SYMBOL	MATERIAL DESCRIPTION	WATER CONTENT, %	UNIT DRY WEIGHT, pcf	% PASSING NO. 200 SIEVE	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	UNC. COMPRESSIVE STRENGTH, tsf	STRAIN AT FAILURE, %	ELEVATION, ft
	TYPE	BLOW COUNTS	HAND PENE- TROMETER (P) / TORVANE (T), tsf	RECOVERY, %	RQD, %											
							4" Broken Asphalt	0.25/								
	U-1		1.2 (P)	57			SANDY LEAN CLAY (FILL), yellow-brown, brown, and light gray, variegated, soft to medium stiff, moist, with gravel to about 1.5 feet		19	65	36	14	22			
	U-2		1.6 (P)	83			-light green-gray, medium stiff below 2 feet									
	U-3		1.2 (P)	33												
5	U-4		0.8 (P)	39												
	U-5		2.1 (P)	56			SANDY LEAN CLAY, yellow-brown, soft to medium stiff, moist	5.5/	19	113	59	48	14	34	2.2	15.7
	U-6		3.2 (P)	39			-with light gray, stiff below 8 feet		21							
10																
	U-7		3.0 (P)	56			SHALY CLAY, yellow-brown and light gray, stiff to very stiff, moist, slightly stratified	13/	25	103				1.8	5.9	
15																
	U-8		4.5+ (P)	78			-with vertical and horizontal infilled joints below 18 feet		19	111	94	50	19	31	2.7	4
20																
	U-9		4.5+ (P)	100												
	SPT-10	30-9-43 (52)					CLAYEY SHALE, yellow-brown and tan, very soft to soft, with dry, cemented seams	23/	8							
25																
	TCP	21/6" 50/5.5"					-light gray and light green-gray below 28 feet									
							Total boring depth 29.0 ft.									

Water Observations:
None At Time Of Drilling

None After Drilling

Remarks: 0-29 feet - hollow stem augers. Backfilled with cuttings.

The stratification lines represent approximate strata boundaries. In situ, the transition may be gradual. These logs are subject to the limitations, conclusions, and recommendations in the associated report.

Attachment C
Laboratory Results

Lab Testing Summary Report

Project: NRH16432 Boring(s): All

Print Date: 11/16/2016 9:56:37 AM

Boring	Top	Bottom	Lab Tech Description	Mc	UDW	LL	PL	PI	-200	UC Load
B-01	2	3.5		14		38	14	24	58	
B-01	6	7.5		22						
B-01	8	9.5		16		42	16	26	51	
B-01	13	14.5		18	111	51	22	29	91	
B-02	2	3.5		18						
B-02	4	5.5		22		49	15	34	57	
B-02	8	9.5		18		46	20	26	95	
B-02	13	14.5	DISTURBED SAMPLE	20						
B-02	18	18.7		17	116	68	27	41	93	
B-03	2	3.5		14		37	15	22	56	
B-03	4	5.5		15						
B-03	8	9.5		17		43	15	28	65	
B-03	13	14.5		20	108	67	25	42	98	
B-03	18	19.5	DISTURBED SAMPLE	17						
B-04	2	3.5		11		45	13	32	74	
B-04	8	9.5		28		80	31	49	97	
B-04	13	14.5		26	99	73	30	43	84	
B-04	18	19.5		27	97					
B-04	23	24.5		27						
B-05	2	3.5		16		23	13	10	47	
B-05	8	9.5		8		30	15	15	51	
B-05	13	14.5		18	112	60	23	37	96	
B-05	18	19.5		21	108					
B-05	28	29.5		23						
B-06	2	3.5		13		34	14	20	43	
B-06	6	7.5		15	115					
B-06	8	9.5	DISTURBED SAMPLE	16		31	21	10	19	
B-06	13.5	15		19		64	23	41	93	
B-06	18	19.5		16						
B-06	28	29.5		15						
B-07	2	3.5		11		40	16	24	50	
B-07	6	7.5		16	117	32	15	17	39	
B-07	13	14.5	DISTURBED SAMPLE	32		88	34	54	88	
B-07	18.2	19.7		19						
B-07	23	24.5		16						
B-07	28	28.7		12						

Lab Testing Summary Report

Project: NRH16432 Boring(s): All

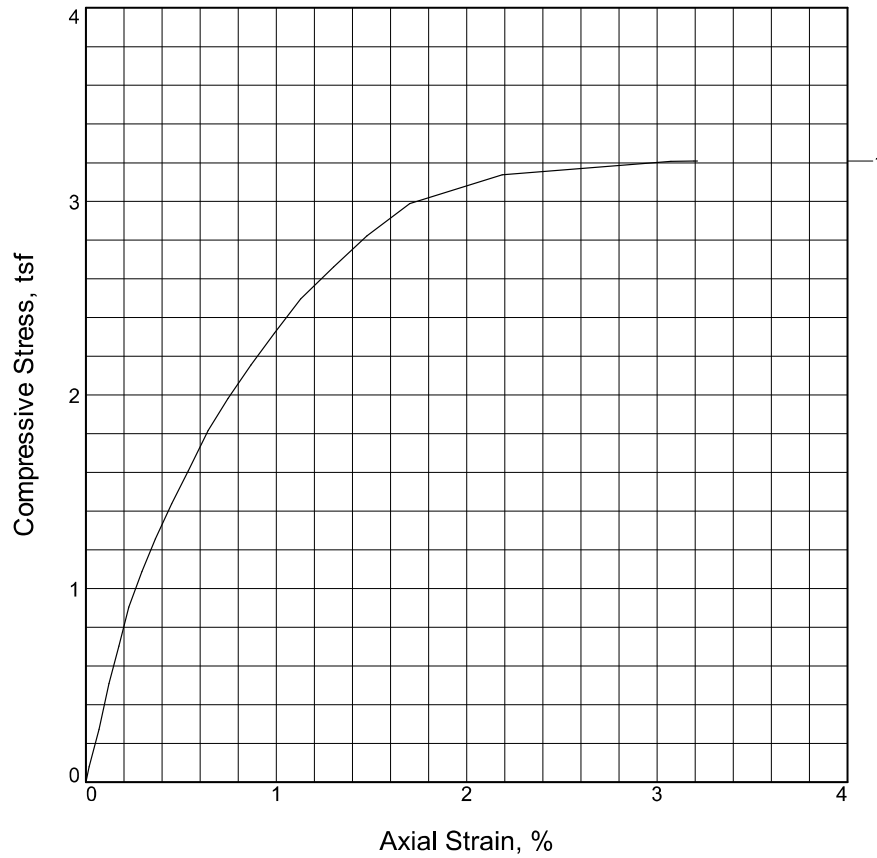
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Boring	Top	Bottom	Lab Tech Description	Mc	UDW	LL	PL	PI	-200	UC Load
B-08	2	3.5	Nonplastic (NP)	27		56	21	35	56	
B-08	6.3	7.8		9		22	N/A	N/A	31	
B-08	13	14.5		22					14	
B-08	18	18.8		22					8	
B-08	23	24.5		23						
B-09	0	1.5	DISTURBED SAMPLE	23		44	17	27	50	
B-09	4	5.5		16						
B-09	8	9.5		20		62	25	37	90	
B-09	13	14.5		20	109					
B-09	18	19.5		15						
B-10	2	3		19		36	14	22	65	
B-10	6	7.5		19	113	48	14	34	59	
B-10	8	9.5		21						
B-10	13	14.5		25	102					
B-10	18	19.5		19	110	50	19	31	94	
B-10	23.5	25		8						

Project/ Boring : Data Counts

# Borings	# Specimens	MCs	UDWs	LLs	PLs	PIs	-200s	UCLoads
10	52	52/52	13/13	28/28	27/28		30/30	0/0

UNCONFINED COMPRESSION TEST

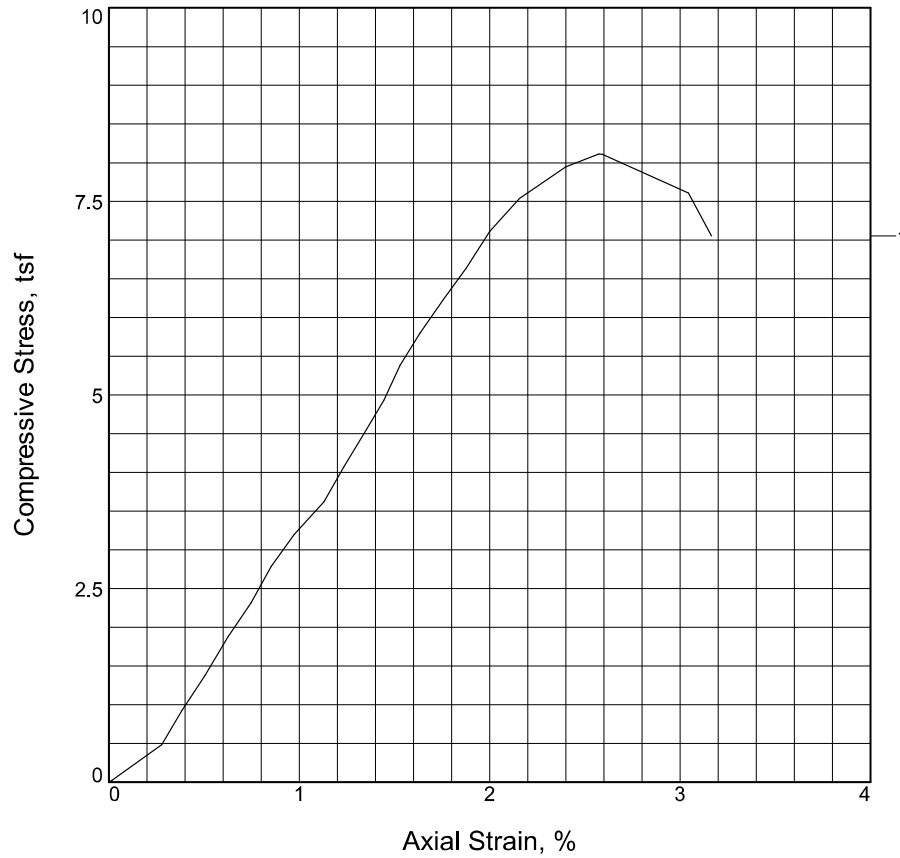


Sample No.	1			
Unconfined strength, tsf	3.210			
Undrained shear strength, tsf	1.605			
Failure strain, %	3.2			
Strain rate, %/min.	1.00			
Water content, %	18.1			
Wet density, pcf	130.8			
Dry density, pcf	110.8			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	2.76			
Specimen height, in.	5.76			
Height/diameter ratio	2.09			

Description:

LL = 51	PL = 22	PI = 29	Assumed GS=	Type: Shelby Tube
Project No.: NRH16432 Date Sampled: 10/05/2016 Remarks: Bulge Failure			Client: Freese and Nichols, Inc. Project: Walker Branch Interceptor Location: B-01 Sample Number: U-6 Depth: (13.0-14.5) ft.	
Figure _____			UNCONFINED COMPRESSION TEST Gorrondona & Associates, Inc. Houston, Texas	

UNCONFINED COMPRESSION TEST

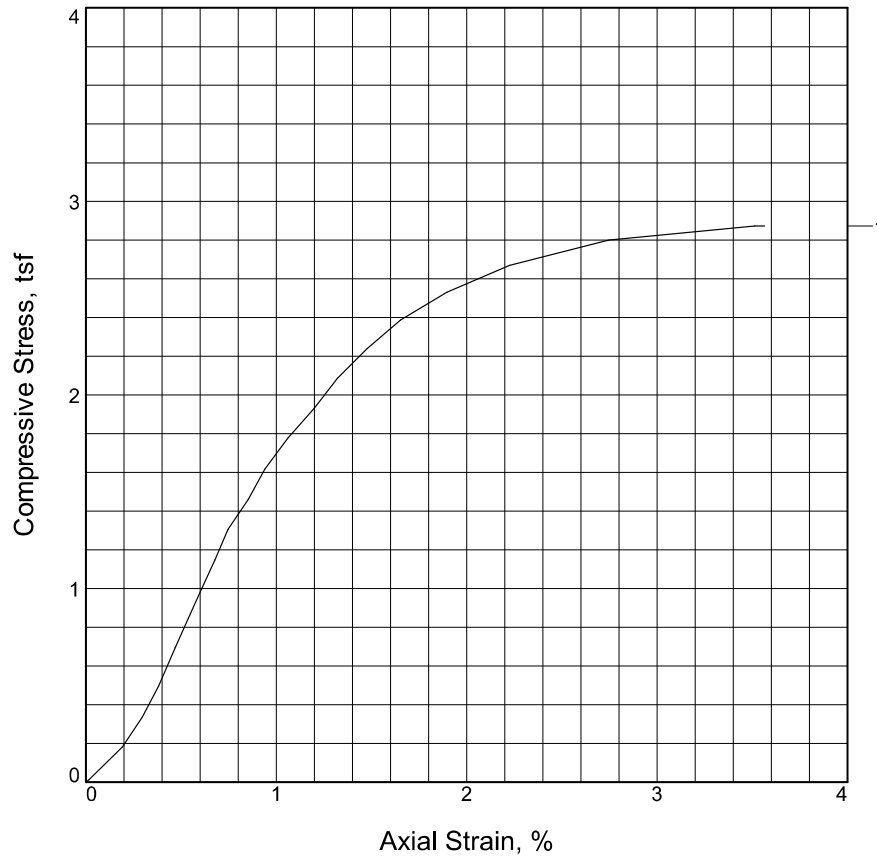


Sample No.	1			
Unconfined strength, tsf	8.113			
Undrained shear strength, tsf	4.057			
Failure strain, %	2.6			
Strain rate, %/min.	1.00			
Water content, %	16.7			
Wet density, pcf	136.7			
Dry density, pcf	117.2			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	2.77			
Specimen height, in.	5.75			
Height/diameter ratio	2.08			

Description:

LL = 68	PL = 27	PI = 41	Assumed GS=	Type: Shelby Tube
Project No.: NRH16432 Date Sampled: 10/05/2016 Remarks: Shear Plane Failure			Client: Freese and Nichols, Inc. Project: Walker Branch Interceptor Location: B-02 Sample Number: U-7 Depth: (18.0-18.7) ft.	
Figure _____			UNCONFINED COMPRESSION TEST Gorrondona & Associates, Inc. Houston, Texas	

UNCONFINED COMPRESSION TEST

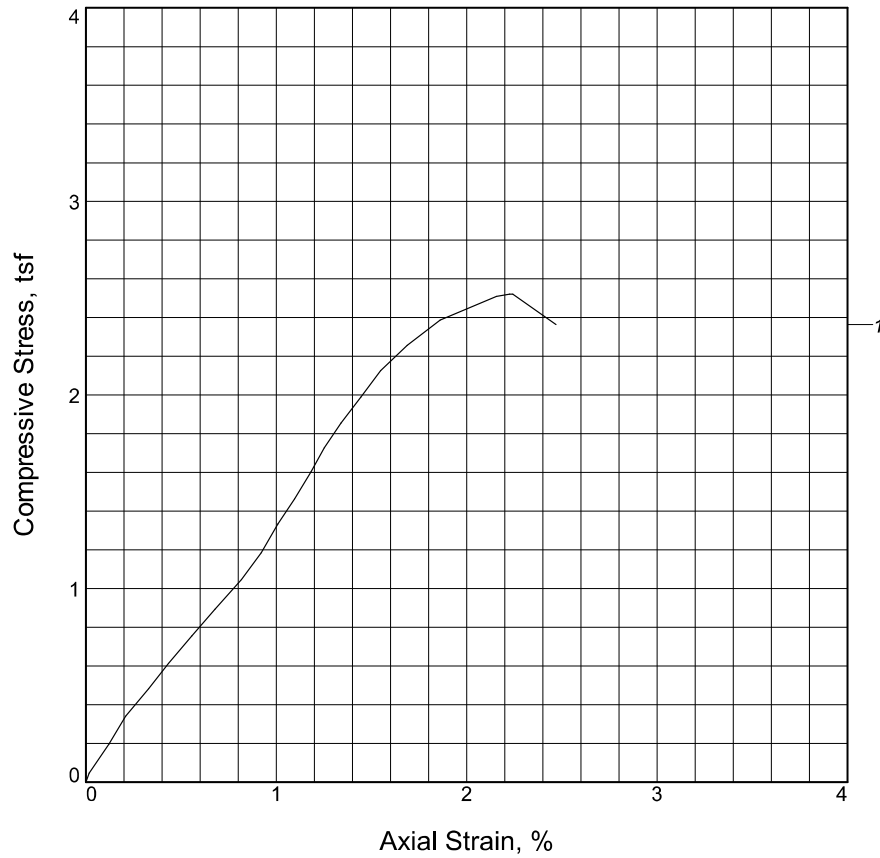


Sample No.	1			
Unconfined strength, tsf	2.874			
Undrained shear strength, tsf	1.437			
Failure strain, %	3.5			
Strain rate, %/min.	1.00			
Water content, %	19.9			
Wet density, pcf	129.7			
Dry density, pcf	108.2			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	2.75			
Specimen height, in.	5.75			
Height/diameter ratio	2.09			

Description:

LL = 67	PL = 25	PI = 42	Assumed GS=	Type: Sheby Tube
Project No.: NRH16432 Date Sampled: 10/05/2016 Remarks: Bulge Failure			Client: Freese and Nichols, Inc. Project: Walker Branch Interceptor Location: B-03 Sample Number: U-6 Depth: (13.0-14.5) ft.	
Figure _____			UNCONFINED COMPRESSION TEST Gorrondona & Associates, Inc. Houston, Texas	

UNCONFINED COMPRESSION TEST

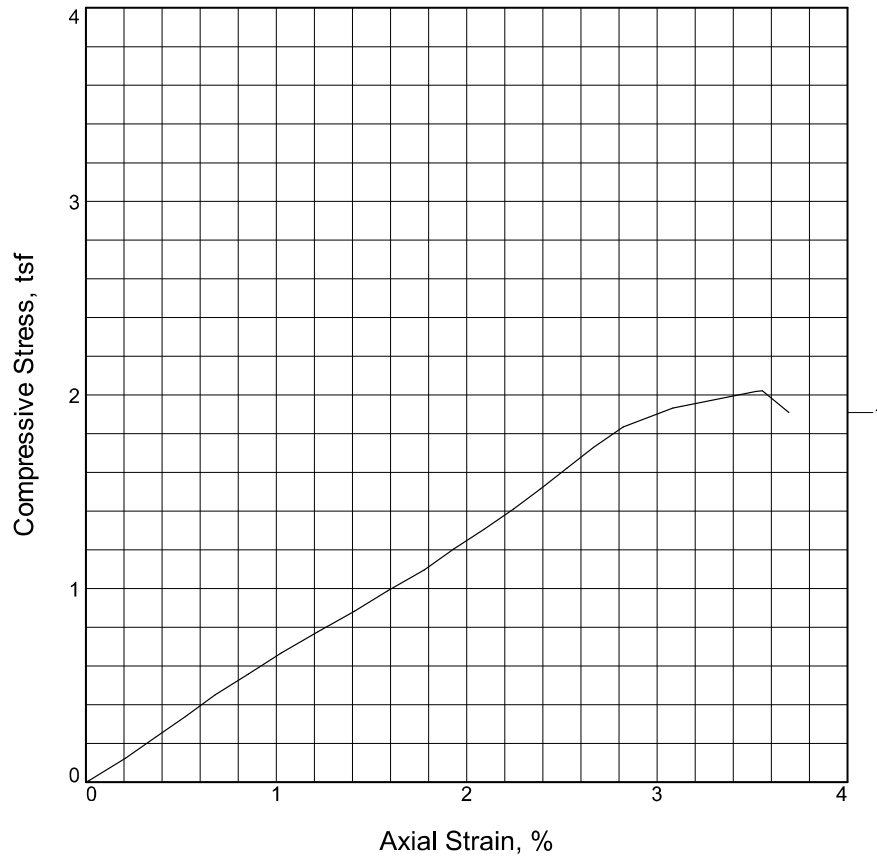


Sample No.	1			
Unconfined strength, tsf	2.522			
Undrained shear strength, tsf	1.261			
Failure strain, %	2.2			
Strain rate, %/min.	1.00			
Water content, %	25.6			
Wet density, pcf	125.7			
Dry density, pcf	100.1			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	2.75			
Specimen height, in.	5.75			
Height/diameter ratio	2.09			

Description:

LL = 73	PL = 30	PI = 43	Assumed GS=	Type: Shelby Tube
Project No.: NRH16432 Date Sampled: 10/10/2016 Remarks: Bulge Failure		Client: Freese and Nichols, Inc. Project: Walker Branch Interceptor Location: B-04 Sample Number: U-6 Depth: (13.0-14.5) ft. UNCONFINED COMPRESSION TEST Gorrondona & Associates, Inc. Houston, Texas		
Figure _____				

UNCONFINED COMPRESSION TEST

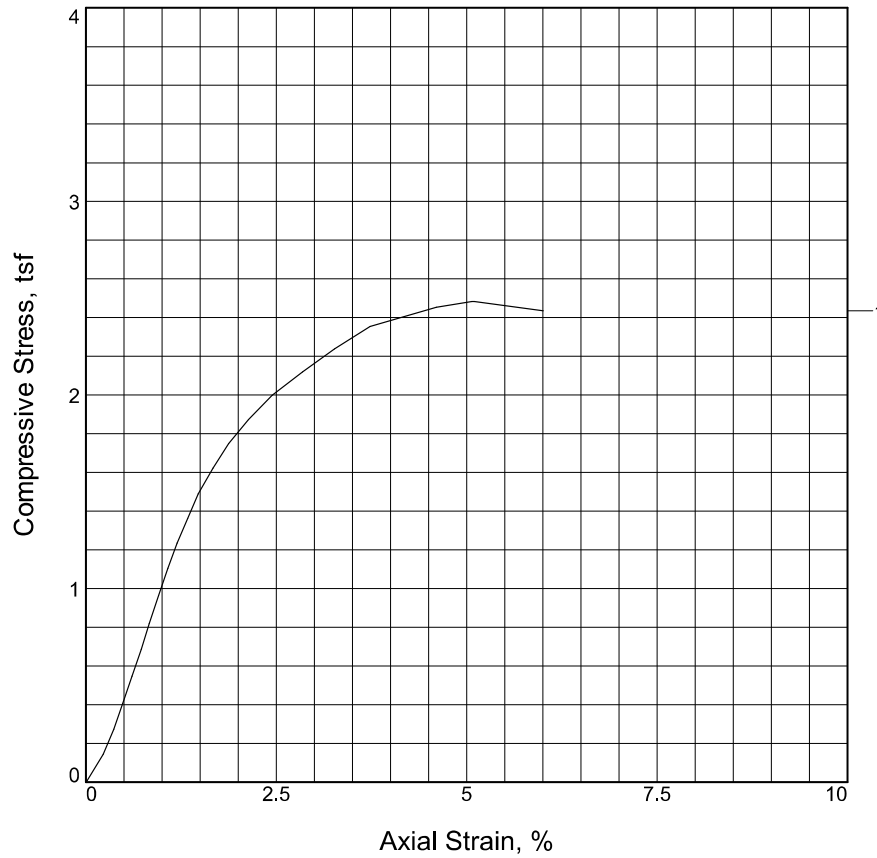


Sample No.	1			
Unconfined strength, tsf	2.021			
Undrained shear strength, tsf	1.011			
Failure strain, %	3.6			
Strain rate, %/min.	1.00			
Water content, %	26.5			
Wet density, pcf	123.0			
Dry density, pcf	97.2			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	2.77			
Specimen height, in.	5.74			
Height/diameter ratio	2.07			

Description:

LL =	PL =	PI =	Assumed GS=	Type: Shelby Tube
Project No.: NRH16432 Date Sampled: 10/10/2016 Remarks: Bulge Failure			Client: Freese and Nichols, Inc. Project: Walker Branch Interceptor Location: B-04 Sample Number: U-7 Depth: (18.0-19.5) ft.	
Figure _____			UNCONFINED COMPRESSION TEST Gorrondona & Associates, Inc. Houston, Texas	

UNCONFINED COMPRESSION TEST

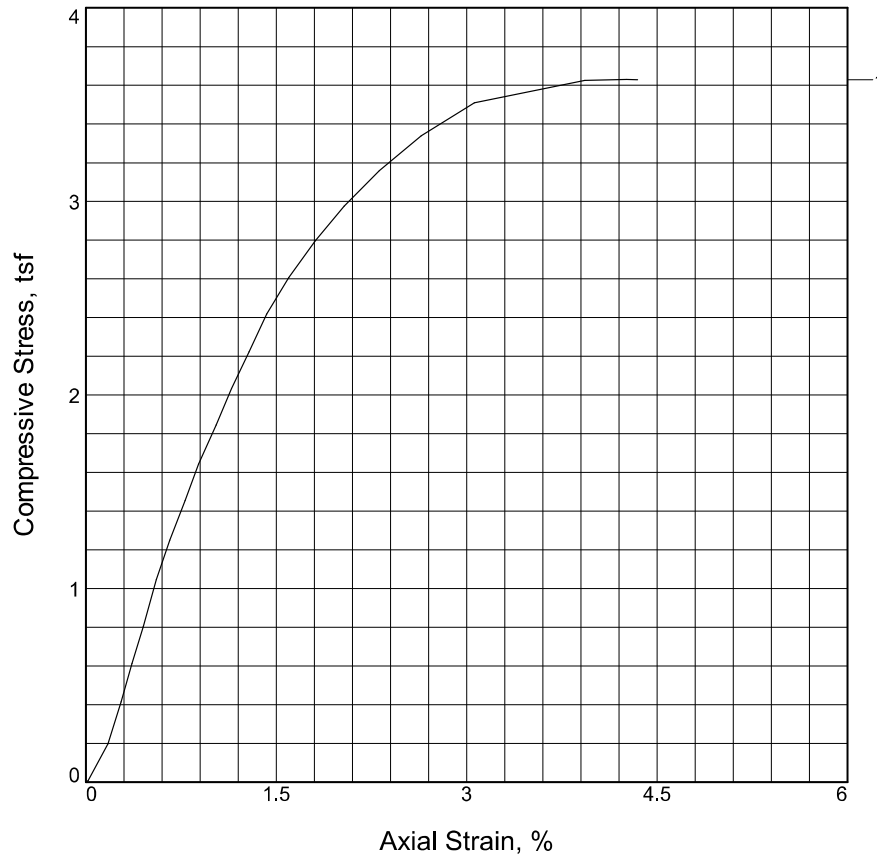


Sample No.	1			
Unconfined strength, tsf	2.483			
Undrained shear strength, tsf	1.241			
Failure strain, %	5.1			
Strain rate, %/min.	1.00			
Water content, %	18.4			
Wet density, pcf	131.7			
Dry density, pcf	111.2			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	2.76			
Specimen height, in.	5.76			
Height/diameter ratio	2.09			

Description:

LL = 60	PL = 23	PI = 37	Assumed GS=	Type: Shelby Tube
Project No.: NRH16432 Date Sampled: 10/10/2016 Remarks: Shear Plane Failure			Client: Freese and Nichols, Inc. Project: Walker Branch Interceptor Location: B-05 Sample Number: U-6 Depth: (13.0-14.5) ft.	
Figure _____			UNCONFINED COMPRESSION TEST Gorrondona & Associates, Inc. Houston, Texas	

UNCONFINED COMPRESSION TEST

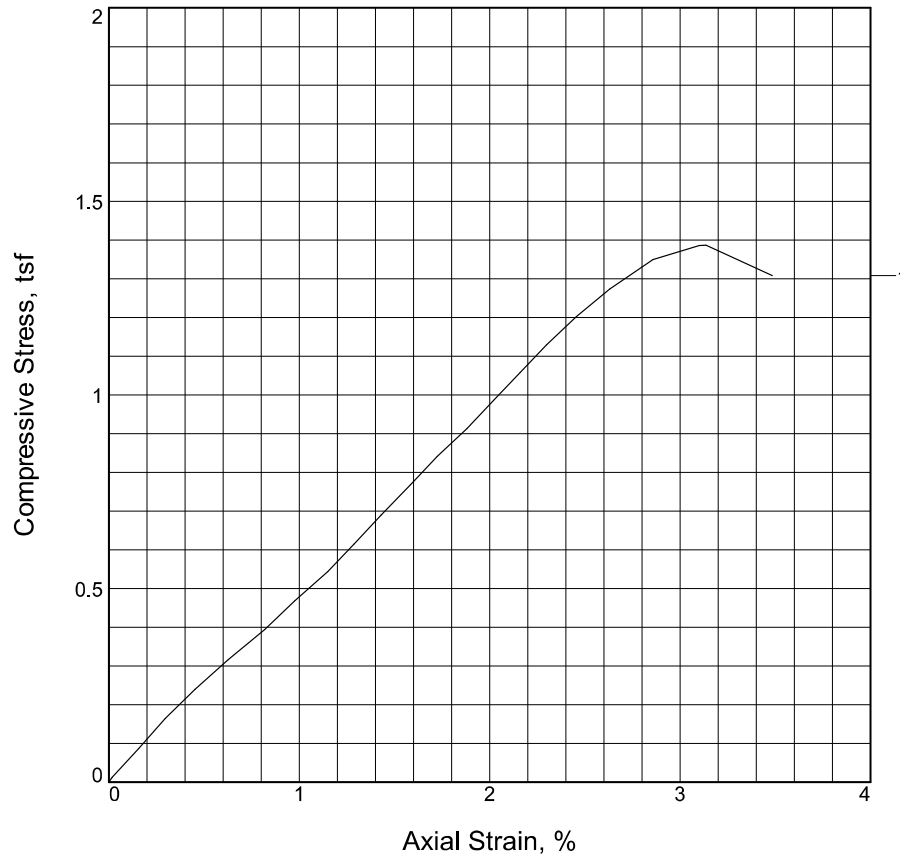


Sample No.	1			
Unconfined strength, tsf	3.630			
Undrained shear strength, tsf	1.815			
Failure strain, %	4.3			
Strain rate, %/min.	1.00			
Water content, %	20.7			
Wet density, pcf	129.7			
Dry density, pcf	107.5			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	2.76			
Specimen height, in.	5.75			
Height/diameter ratio	2.08			

Description:

LL =	PL =	PI =	Assumed GS=	Type: Shelby Tube
Project No.: NRH16432 Date Sampled: 10/10/2016 Remarks: Bulge Failure			Client: Freese and Nichols, Inc. Project: Walker Branch Interceptor Location: B-05 Sample Number: U-7 Depth: (18.0-19.5) ft.	
Figure _____			UNCONFINED COMPRESSION TEST Gorrondona & Associates, Inc. Houston, Texas	

UNCONFINED COMPRESSION TEST

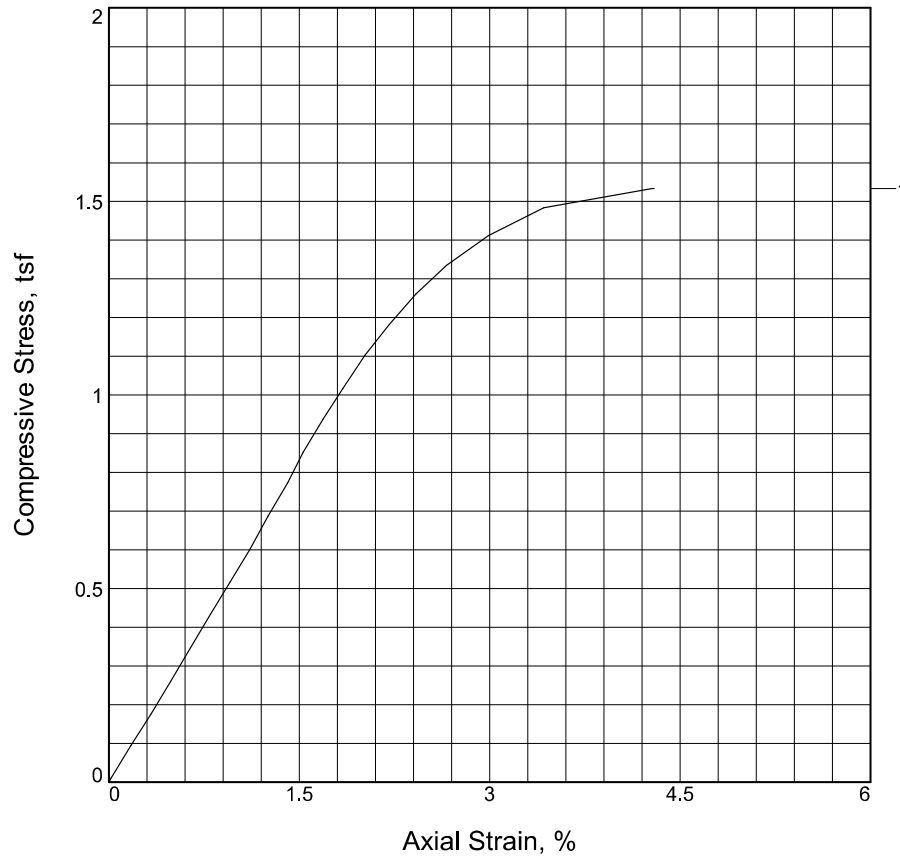


Sample No.	1			
Unconfined strength, tsf	1.387			
Undrained shear strength, tsf	0.693			
Failure strain, %	3.1			
Strain rate, %/min.	1.00			
Water content, %	14.5			
Wet density, pcf	132.4			
Dry density, pcf	115.6			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	2.75			
Specimen height, in.	5.74			
Height/diameter ratio	2.09			

Description:

LL =	PL =	PI =	Assumed GS=	Type: Shelby Tube
Project No.: NRH16432 Date Sampled: 10/10/2016 Remarks: Bulge Failure			Client: Freese and Nichols, Inc. Project: Walker Branch Interceptor Location: B-06 Sample Number: U-4 Depth: (6.0-7.5) ft.	
Figure _____			UNCONFINED COMPRESSION TEST Gorrondona & Associates, Inc. Houston, Texas	

UNCONFINED COMPRESSION TEST

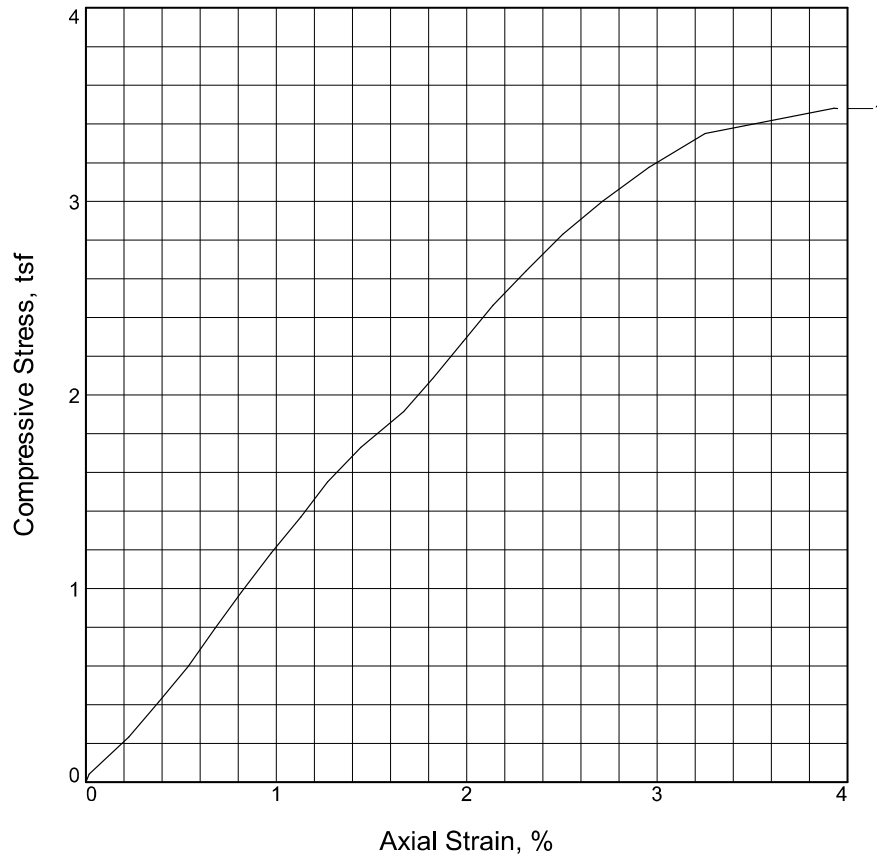


Sample No.	1			
Unconfined strength, tsf	1.533			
Undrained shear strength, tsf	0.767			
Failure strain, %	4.3			
Strain rate, %/min.	1.00			
Water content, %	16.2			
Wet density, pcf	135.7			
Dry density, pcf	116.8			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	2.76			
Specimen height, in.	5.75			
Height/diameter ratio	2.08			

Description:

LL = 32	PL = 15	PI = 17	Assumed GS=	Type: Shelby Tube
Project No.: NRH16432 Date Sampled: 10/10/2016 Remarks: Bulge Failure			Client: Freese and Nichols, Inc. Project: Walker Branch Interceptor Location: B-07 Sample Number: U-4 Depth: (6.0-7.5) ft.	
Figure _____			UNCONFINED COMPRESSION TEST Gorrondona & Associates, Inc. Houston, Texas	

UNCONFINED COMPRESSION TEST

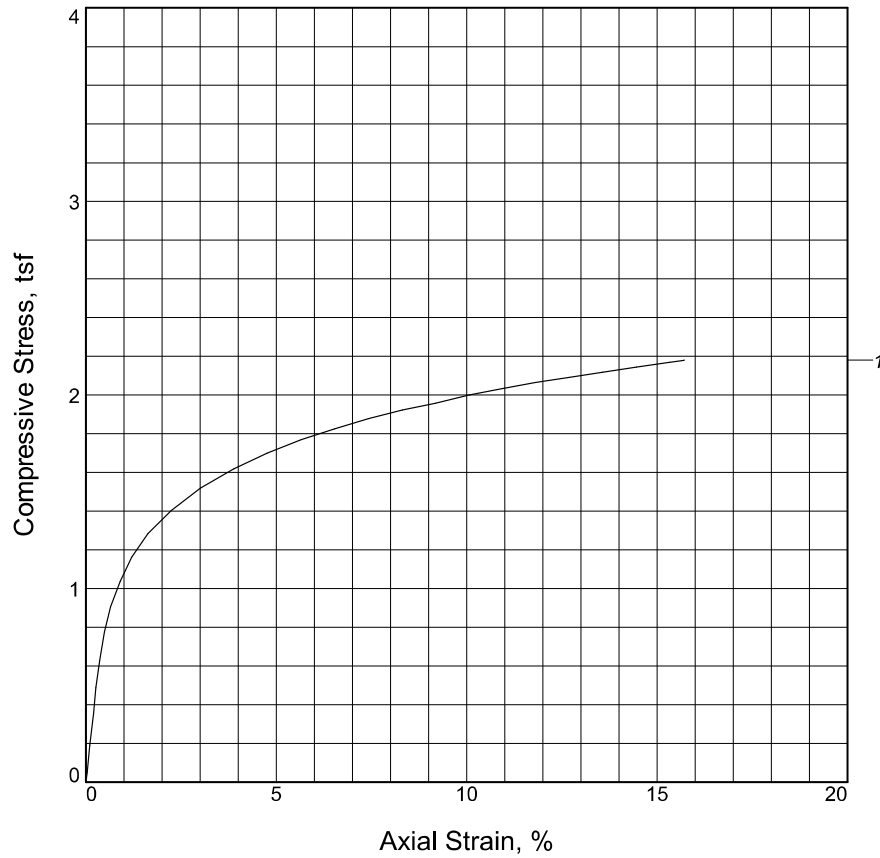


Sample No.	1			
Unconfined strength, tsf	3.481			
Undrained shear strength, tsf	1.741			
Failure strain, %	3.9			
Strain rate, %/min.	1.00			
Water content, %	19.6			
Wet density, pcf	130.3			
Dry density, pcf	109.0			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	2.77			
Specimen height, in.	5.75			
Height/diameter ratio	2.08			

Description:

LL =	PL =	PI =	Assumed GS=	Type: Shelby Tube
Project No.: NRH16432 Date Sampled: 10/11/2016 Remarks: Bulge Failure			Client: Freese and Nichols, Inc. Project: Walker Branch Interceptor Location: B-09 Sample Number: U-6 Depth: (13.0-14.5) ft.	
Figure _____			UNCONFINED COMPRESSION TEST Gorrondona & Associates, Inc. Houston, Texas	

UNCONFINED COMPRESSION TEST

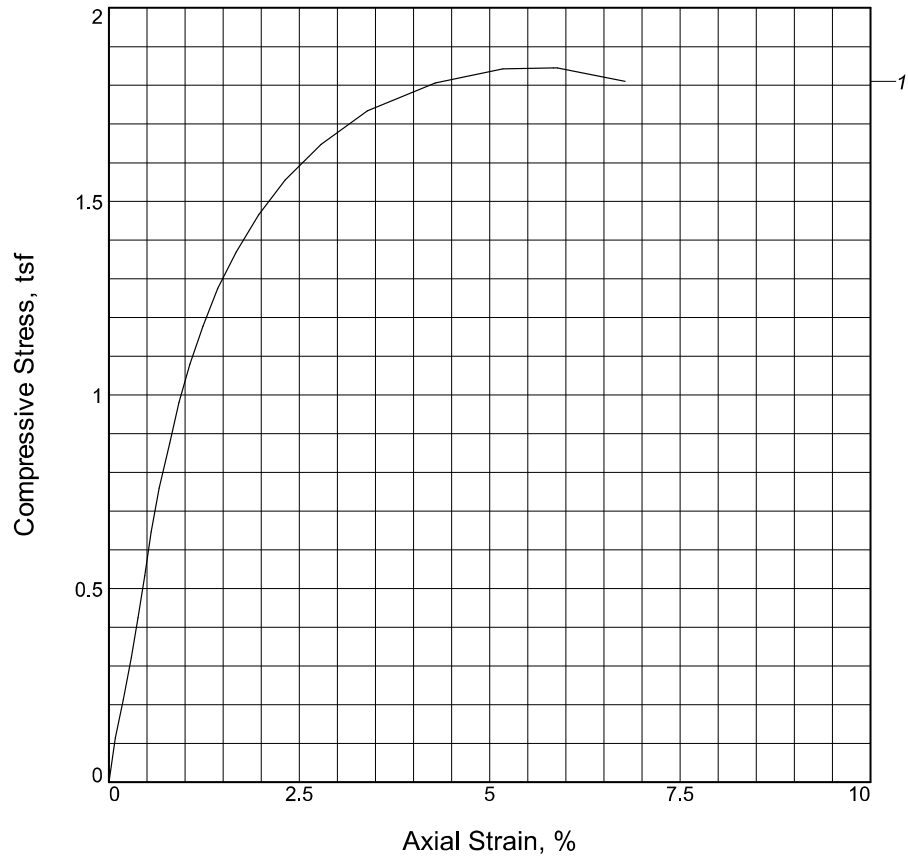


Sample No.	1			
Unconfined strength, tsf	2.180			
Undrained shear strength, tsf	1.090			
Failure strain, %	15.7			
Strain rate, %/min.	1.00			
Water content, %	19.1			
Wet density, pcf	135.2			
Dry density, pcf	113.5			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	2.74			
Specimen height, in.	5.74			
Height/diameter ratio	2.09			

Description:

LL = 48	PL = 14	PI = 34	Assumed GS=	Type: Shelby Tube
Project No.: NRH16432 Date Sampled: 10/11/2016 Remarks: Bulge Failure			Client: Freese and Nichols, Inc. Project: Walker Branch Interceptor Location: B-10 Sample Number: U-5 Depth: (6.0-7.5) ft.	
Figure _____			UNCONFINED COMPRESSION TEST Gorrondona & Associates, Inc. Houston, Texas	

UNCONFINED COMPRESSION TEST

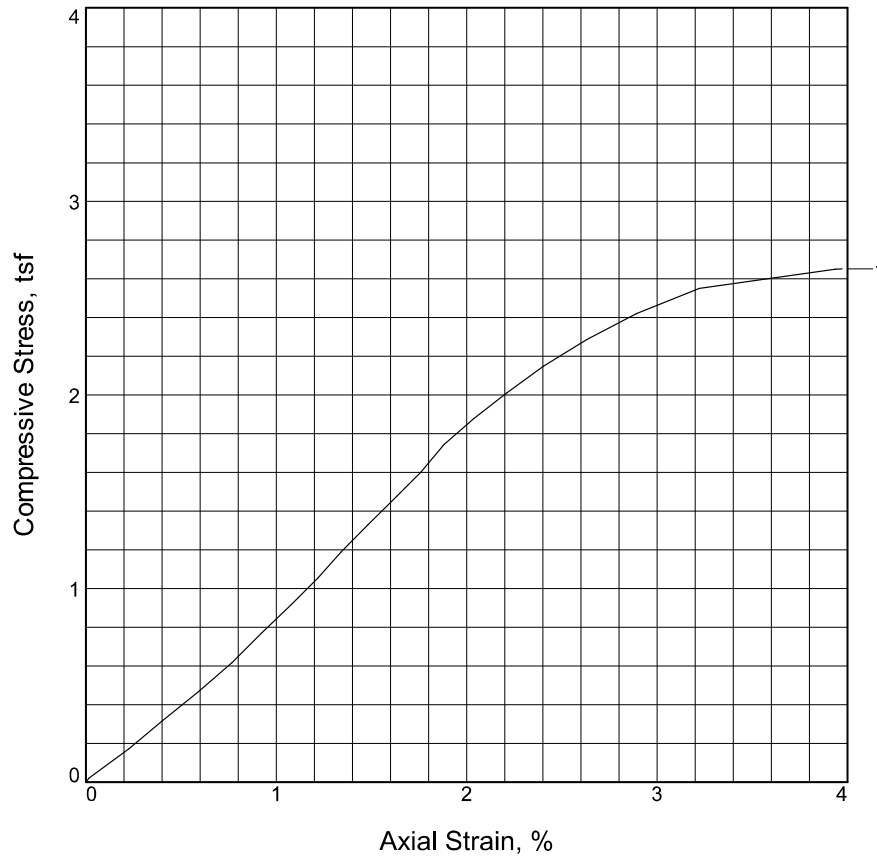


Sample No.	1			
Unconfined strength, tsf	1.845			
Undrained shear strength, tsf	0.922			
Failure strain, %	5.9			
Strain rate, %/min.	1.00			
Water content, %	25.2			
Wet density, pcf	128.4			
Dry density, pcf	102.5			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	2.75			
Specimen height, in.	5.74			
Height/diameter ratio	2.09			

Description:

LL =	PL =	PI =	Assumed GS=	Type: Shelby Tube
Project No.: NRH16432 Date Sampled: 10/11/2016 Remarks: Bulge Failure			Client: Freese and Nichols, Inc. Project: Walker Branch Interceptor Location: B-10 Sample Number: U-7 Depth: (13.0-14.5) ft.	
Figure _____			UNCONFINED COMPRESSION TEST Gorrondona & Associates, Inc. Houston, Texas	

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, tsf	2.651			
Undrained shear strength, tsf	1.326			
Failure strain, %	4.0			
Strain rate, %/min.	1.00			
Water content, %	18.6			
Wet density, pcf	131.4			
Dry density, pcf	110.8			
Saturation, %	N/A			
Void ratio	N/A			
Specimen diameter, in.	2.74			
Specimen height, in.	5.74			
Height/diameter ratio	2.09			

Description:

LL = 50	PL = 19	PI = 31	Assumed GS=	Type: Shelby Tube
Project No.: NRH16432 Date Sampled: 10/11/2016 Remarks: Bulge Failure			Client: Freese and Nichols, Inc. Project: Walker Branch Interceptor Location: B-10 Sample Number: U-8 Depth: (18.0-19.5) ft.	
Figure _____			UNCONFINED COMPRESSION TEST Gorrondona & Associates, Inc. Houston, Texas	

APPENDIX B
ONCOR CONSTRUCTION LIMITATIONS

CONSTRUCTION LIMITATIONS ON
Oncor ELECTRIC DELIVERY COMPANY RIGHT OF WAY
EXHIBIT "B"

1. You are notified, and should advise your employees, representatives, agents, and contractors, who enter the property that they will be working in the vicinity of high voltage electrical facilities and should take proper precautions, included but not limited to the following stipulations and in compliance, at all times, with Chapter 752, V.T.C.A., Health & Safety Code.
2. Blasting is not to be permitted on Oncor right-of-way or under Oncor lines.
3. Construction on electric transmission line easements acquired by Oncor after January 1, 2003 shall comply with the requirements of Public Utility Commission Substantive Rules §25.101, as amended from time to time.
4. No crossing less than 45 degrees to the centerline of the right-of-way.
5. Grading will be done in order to leave the right-of-way as near as possible to present condition. Spoil dirt will be removed from the right-of-way and no trash is to be left on right-of-way. Slopes shall be graded so that trucks can go down the right-of-way when required and such that the slopes can be mechanically maintained.
6. Equipment and materials will not be stored on the right-of-way during construction without written approval of the Supervisor of Regional Transmission.
7. Street or road crossings are to be based on drawings submitted. Any change in alignment or elevation will be resubmitted for approval.
8. No signs, lights or guard lights will be permitted on the right-of-way.
9. Power line safety equipment operations: hazard assessment and precautions inside the work zone area must be performed and in compliance with OSHA Standard §1926.1408 at all times. Equipment shall not be placed within fifteen (15) feet of the Oncor 138,000 volt or less power lines or within twenty (20) feet of the Oncor 345,000 volt power lines.

10. Any pre-approved fencing will not exceed eight (8) feet in height, and if metal in nature, will be grounded, at ten (10) feet intervals, with an appropriate driven ground. Gates should be at least sixteen (16) feet in width to allow Oncor access to the right-of-way.
11. No dumpsters will be allowed on Oncor right-of-way or fee owned property.
12. Draglines will not be used under the line or on Oncor right-of-way.
13. The existing grade shall not be disturbed, excavated or filled within 25 feet of the nearest edge of any Oncor transmission structure (tower, pole, guy wire, etc...).
14. Right-of-way will be protected from washing and erosion by Oncor approved method before any permits are granted. No discharging of water will be allowed within any portion of the right of way. Drainage facilitation will not be allowed to discharge into/onto Oncor right-of-way.
15. No obstruction shall be installed on the right-of-way that would interfere with access to Oncor structures or prevent mechanical maintenance.
16. Before any work is done under Oncor lines or by Oncor structures notify the Region Transmission Department, 817-496-2746 (Eddie Patterson).
17. No hazardous materials will be stored on the right of way.
18. For purposes of this document, "Hazardous Materials" means and includes those substances, including, without limitation, asbestos-containing material containing more than one percent (1%) asbestos by weight, or the group of organic compounds known as polychlorinated biphenyls, flammable explosives, radioactive materials, chemicals known to cause cancer or reproductive toxicity and includes any items included in the definition of hazardous or toxic waste, materials or substances under any Hazardous Material Law. "Hazardous Material Laws" collectively means and includes any present and future local, state and federal law relating to the environment and environmental conditions including, without limitation, the Resource Conservation and Recovery Act of 1976 ("RCRA"), 42 U.S.C. §6901 et seq., the Comprehensive Environmental Response, Compensation and Liability Act of 1980, ("CERCLA"), 42 U.S.C. §§9601-9657, as amended by the Superfund Amendments and Reauthorization Act of 1986

("SARA"), the Hazardous Material Transportation Act, 49 U.S.C. §6901 et seq., the Federal Water Pollution Control Act, 33 U.S.C. §1251, et seq., the Clean Air Act, 42 U.S.C. §741 et seq., the Clean Water Act, 33 U.S.C. §7401 et seq., the Toxic Substances Control Act, 15 U.S.C. §§2601-2629, the Safe Drinking Water Act, 42 U.S.C. §§300f-330j, and all the regulations, orders, and decrees now or hereafter promulgated thereunder.

19. Brush and cut timber is not to be piled or stacked on Oncor right-of-way nor is it allowed to be burned upon or in close proximity to the conductors or towers.
20. No structures or obstructions, such as buildings, garages, barns, sheds, swimming pools, playground equipment, guard houses, etc., will be permitted on the right-of-way.
21. Landscaping on Oncor right-of-way is permitted when Oncor approves landscaping plans in writing. No lighting or sprinkler systems are allowed on the right-of-way.
22. No park or park designation will be permitted on the right-of-way.
23. Gas Pipeline Protective Barrier; Grantee, at Grantee's sole expense, shall provide one of the following protective barriers; **1)** a concrete protective barrier between the surface and the pipe that is a minimum of one (1) foot thick by one (1) foot wide, if pipe is wider than one (1) foot, then width of pipe, with the top of the concrete barrier to be at least one (1) foot below the surface or final grade, **2)** construct the gas pipeline inside of a proper protective steel casing, **3)** where electric facilities are located above ground, install the pipeline a minimum of ten (10) feet below the ground surface, or **4)** where electric facilities are located below ground, install the pipeline at a depth that provides for a minimum of a ten (10) foot clearance between the pipeline and the underground electric facilities.
24. No fire hydrants or manholes will be permitted within the right-of-way.
25. Any drainage feature that allows water to pond, causes erosion, directs stormwater toward the right-of-way or limits access to or around Oncor's facilities is prohibited. Drainage facilitation will not be allowed to discharge into/onto Oncor right-of-way.
26. No boring pits or other type of pits will be permitted within the right-of-way.

APPENDIX C
UTILITY CONTACTS FOR PLAN SUBMITTAL

Utility Contacts for Plan Submittal
(Updated August 2017)

- **Atmos Energy**

Gregory Zylka, Project Specialist
2000 Reliance Parkway
Bedford, TX 76021
(Office) 817.685.1257x1313
(Fax) 817.685.1295
(Mobile)
gregory.zylka@atmosenergy.com

Robert Shaddox
Robert.Shaddox@atmosenergy.com

- **AT&T**

Gary Tilory, AT&T Utility Coordinator
(Darrell Hampton is NRH rep, but plans go through Gary Tilory)
1116 Houston Street
Room 1401
Fort Worth, TX 76102
(Office) 817.338.6202
gt1219@att.com

- **Oncor Electric Delivery (ONCOR)**

Robert Martinez, Project Manager-Lead
Major Construction Design - Existing
(CIP Projects - only)
115 West 7th Street
Suite 625
Fort Worth, TX 76102
(Office) 817.215.6688
Robert.Martinez@oncor.com

Larry Baldwin - Replaces Robert Martinez
Larry.Baldwin@oncor.com
Office: 817.215.6184

Rich Hildebrand
(Development Projects - only)
200 North Ector Drive
Euless, TX 76039

(Office) 817.355.7056
(Mobile) 817.994.7675
Richard.Hildebrand@oncor.com

Leslie Love
(Replaces Rich Hildebrand for NRH)
New Construction Manager
200 North Ector Drive
Euless, TX 76039
(Office) 817.355.7020
(Mobile) ?
Leslie.Love@oncor.com

Gillit, Alton <Alton.Gillit@oncor.com>

- **Charter Communications**

Chad Whidden, Construction Supervisor-Plant Maintenance
7600 South Freeway I-35W
Fort Worth, TX 76134
(Office) 817.822.8244
Chad.Whidden@Charter.com

- **Explorer Pipeline**

Robert Wilde – ROW Technician
3301 S Hwy 157
Euless TX, 76040
(Office) 214.882.2841
rwilde@expl.com

- **Sonoco Pipelines**

Juan Vasquez 3rd
jivasquez@sunocologistics.com

- **Williams Pipelines**

Willie Lee
Willie.Lee@williams.com
Office: 682-730-4880
Cell: 817-648-9920
Fax: 817-882-7161

APPENDIX D
EXPLORER LETTER OF NO EXCEPTION



Ray Matlock

Right-of-Way Integrity Administrator

P. O. Box 2650
Tulsa, Oklahoma 74101-2650
918-493-5153 direct dial
866-780-3598 facsimile
rmatlock@expl.com

April 25, 2018
Aaron B. Conine, P.E., ENV SP
Freese & Nichols Inc.
4055 International Plaza
Fort Worth, TX 76109
Office: 817-735-7469

ref: Letter of No Objection for Grapevine to Fort Worth Terminal – 1112

Ms. Conine,
,

Explorer Pipeline does not object to the furtherance of this project known Grapevine to Fort Worth Terminal – 1112. All design plans sent April 24, 2018 have been approved per Explorer Pipeline Specifications.

As a reminder, you need to generate a One-Call ticket to give us notice at least 48 hours prior to any activity within our easement/right-of-way. An Explorer Pipeline inspector is required to be present for all excavation on or near our Rights of Way.

We appreciate your cooperation. If you have any questions or comments, please call.

Respectfully,

A handwritten signature in black ink, appearing to read "Raymond E. Matlock", written in a cursive style.

Ray Matlock
Right-of-Way Integrity Administrator

Copies:

By email – Explorer Pipeline: Bill Sanders

APPENDIX E

DART APPLICATION

LICENSE AGREEMENT

THIS Agreement ("License"), is made by and between DALLAS AREA RAPID TRANSIT ("Licensor"), a regional transportation authority, created, organized and existing pursuant to Chapter 452, Texas Transportation Code, as amended (the "Act") and CITY OF NORTH RICHLAND HILLS ("Licensee"), a municipality corporation acting herein by and through its duly authorized official, whose mailing address is 4301 City Point Drive, North Richland Hills, Texas 76180.

Pursuant to an agreement between Licensor and Ft. Worth & Western Railroad, (hereinafter the "Railroad"), freight railroad operations exist on Licensor's corridor.

1. Purpose. Licensor hereby grants a license (the "License") to Licensee for the purposes of constructing, installing, maintaining and operating one 15-inch wastewater line encased in a 20-inch steel casing pipe along west side of Davis Blvd., crossing the Cotton Belt line at Mile Post 622.48 (the "Permitted Improvement") crossing the Cotton Belt line at Mile Post 622.48, (**Latitude: 35°51'59"N, Longitude: 97°12'31"W**) in North Richland Hills, Tarrant County, Texas, more particularly described as shown in Exhibit "A-1", dated April 26, 2017, attached hereto and incorporated herein for all pertinent purposes, (the "Property").

The Property shall be used by Licensee solely for the purpose of operating and maintaining the Permitted Improvement (the "Permitted Use"). Licensee's right to enter upon and use the Property shall be limited solely to the Permitted Use and the Permitted Improvement.

2. Term. This License shall begin on the **1st day of November, 2017** (the "Term") and continue thereafter until terminated by either party as provided herein.

3. Consideration.

3.01. The consideration for the granting of this License shall be (a) payment by Licensee to Licensor the sum of **TWO THOUSAND ONE HUNDRED FIVE AND NO/100 (\$2,105.00) DOLLARS** per annum, payable annually in advance (the "License Fee"), and (b) the performance by Licensee of each of the obligations undertaken by Licensee in this License, **PROVIDED, HOWEVER**, that the "License Fee" shall be adjusted annually as follows:

- a) The adjustment and change in the License Fee shall be determined according to the cost of living changes in the Consumer Price Index for All Urban Consumers – (CPI-U), Dallas-Fort Worth, TX., "All Items", as published by the Bureau of Labor Statistics, U.S. Department of Labor (the "CPI Index").
- b) The CPI Index figure for the month of November 2017 is hereby fixed and established as the Base Index Figure in the computation of adjustment of rentals herein provided. At the commencement of each annual period as provided herein, the CPI Index for the month of July of such year shall be ascertained and noted and the rent for the next annual period shall be adjusted by increasing or decreasing the License Fee, percentage-wise as the CPI Index for the month of November has increased or decreased as compared with the Base Index Figure as herein fixed, **PROVIDED HOWEVER**, that under no circumstances shall the License Fee ever be less than \$2,105.00 per year.
- c) If any time during the term hereof the U.S. Bureau of Labor Statistics shall discontinue the

issuance of the CPI Index, the parties shall use any other standard nationally recognized cost-of-living index for the Dallas-Fort Worth area then issued and available, which is published by the U.S. Government.

- d) Acceptance of any License Fee by Licensor after written notice of termination or expiration of this License shall not waive, reinstate, continue or extend the terms of this License.

3.02. Any payment not received by Licensor **by the 10th day after it is due**, shall bear a late charge of \$25.00 to help offset the administrative cost involved in handling such late payment.

3.03. For any payment not received by Licensor **by the 15th day after it is due**, such payment shall bear interest at the rate of 18% per annum, or the maximum rate allowed by law, from the date it was due until it is paid, in addition to the late charge.

4. **Non Exclusive License.** This License is non-exclusive and is subject to (a) any existing utility, drainage or communication facility located in, on, under, or upon the Property owned by Licensor, any Railroad, utility, or communication company, public or private; (b) all vested rights presently owned by any Railroad, utility or communication company, located within the boundaries of the Property; and (c) any existing lease, license or other interest in the Property granted by Licensor to any individual, corporation or other entity, public or private.

5. **Design, Construction, Operation and Maintenance.** Licensor's use of the Property and adjoining property may include the use of electrically powered equipment. Notwithstanding Licensor's inclusion within its system of measures designed to reduce stray current which may cause corrosion, **Licensee is hereby warned that such measures may not prevent electrical current being present in proximity to the Permitted Improvement and that such presence could produce corrosive effects to the Permitted Improvement. Licensee waives any claim and releases Licensor with regard to any claim arising from such corrosion.**

5.01. All design, construction, reconstruction, replacement, removal, operation and maintenance of the Permitted Improvement on the Property shall be done in such a manner so as not to interfere in any way with the operations of Licensor or other Railroad operations. In particular, cathodic protection or other stray current corrosion control measures of the Permitted Improvement as required shall be made a part of the design and construction of the Permitted Improvement.

5.02. During the design phase and prior to commencing any construction on the Property, a copy of the construction plans showing the exact location, type and depth of the construction, any cathodic protection measures and any working area, shall be submitted for written approval to Licensor and Railroad. Such approval shall not be unreasonably withheld. No work shall commence until said plans have been approved by Licensor.

5.03. Licensee agrees to design, construct and maintain the Permitted Improvement in such a manner so as not to create a hazard to the use of the Property, and further agrees to pay any damages which may arise by reason of Licensee's use of the Property.

5.04. Licensee covenants and agrees to institute and maintain a reasonable testing program to determine whether or not additional cathodic protection of its Permitted Improvement is necessary and if it is or should become necessary, such protection shall be immediately instituted by Licensee at its sole cost and expense.

5.05. **Licensor makes no warranty regarding subsurface installations on the Property.**

Licensee shall conduct its own inspection of same and will not rely on the absence or presence of markers.

5.06. Licensee shall provide to Licensor final construction drawings ("as-builts") that are signed and sealed by a Texas Professional Engineer within sixty ("60") days of completion of the project or a \$100.00 fee per month will be assessed until they are received.

6. **Governmental Approvals.** Licensee, at its sole cost and expense, shall be responsible for and shall obtain, any and all licenses, permits, or other approvals from any and all governmental agencies, federal, state or local, required to carry on any activity permitted herein.

7. **Licensor's Standard Contract and Insurance.** No work on the Property shall be commenced by Licensee or any contractor for Licensee until such Licensee or contractor shall have executed Licensor's Construction Agreement and Contractor's Right of Entry covering such work, and has furnished insurance coverage in such amounts and types as shall be satisfactory to Licensor in accordance with Section 7.02. A company-issued photo identification of Licensee's employees, contractors or agents shall be required to work on the Property.

7.02 Licensee shall procure and maintain at its sole cost and expense, Commercial General Liability Insurance with a per occurrence limit of liability of no less than \$2,000,000 naming DART as an additional insured for ongoing and completed operations without any qualifications or restrictions. DART must be given thirty (30) days prior written notice of any proposed cancellation or modification. The policy shall be endorsed waiving the issuing insurance company's rights of recovery against DART whether by way of subrogation or otherwise. In lieu of a commercial insurance policy, Licensee, which is a self-insured government entity, may provide Licensor with a letter of self-insurance sufficient to cover any liabilities Licensee may incur under this License.

8. **Duty of Care in Construction.** Licensee or its contractor shall use reasonable care during the construction period and thereafter, to avoid damaging any existing buildings, equipment and vegetation on or about the Property and any adjacent property owned by or under the control of Licensor. If the Licensee or its contractor causes damage to the Property or any adjacent property, the Licensee and/or its contractor shall immediately replace or repair the damage at no cost or expense to Licensor. If Licensee or its contractor fails or refuses to make or effect any such repair or replacement, Licensor shall have the right, but not the obligation, to make or effect any such repair or replacement at the sole cost and expense of Licensee, which cost and expense Licensee agrees to pay to Licensor upon demand.

9. **Environmental Protection.**

9.01. Licensee shall not use or permit the use of the Property for any purpose that may be in violation of any local, state or federal laws pertaining to health or the environment, including but not limited to, the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), the Resource Conservation and Recovery Act ("RCRA"), the Clean Water Act ("CWA") and the Clean Air Act ("CAA").

9.02. Licensee warrants that the Permitted Use of the Property will not result in the disposal or other release of any hazardous substance or solid waste on or to the Property, and that it will take all steps necessary to ensure that no such hazardous substance or solid waste will ever be discharged onto the Property by Licensee or its Contractors.

9.03. The terms "hazardous substance" and "release" shall have the meanings specified in CERCLA and the terms "solid waste" and "disposal" (or "disposed") shall have the meanings specified in

the RCRA; PROVIDED, HOWEVER, that in the event either CERCLA or RCRA is amended so as to broaden the meaning of any term defined thereby, such broader meaning shall apply subsequent to the effective date of such amendment; and PROVIDED FURTHER, that to the extent that the laws of the State of Texas establish a meaning for "hazardous substance", "release", "solid waste", or "disposal", which is broader than that specified in either CERCLA or RCRA, such broader meaning shall apply.

9.04. To the extent permitted by law, Licensee shall indemnify, defend and hold Licensor and Railroad harmless against all cost of environmental clean up to the Property resulting from Licensee's use of the Property under this License.

10. Mechanic's Liens Not Permitted. Licensee shall fully pay for all labor and materials used in, on, or about the Property and will not permit or suffer any mechanic's or materialmen's liens of any nature to be affixed against the Property by reason of any work done or materials furnished to the Property at Licensee's instance or request.

11. Maintenance of Completed Improvements. The Permitted Improvement shall be maintained by the Licensee in such a manner as to keep the Property in a good and safe condition with respect to Licensee's use. In the event the Licensee fails to maintain the Property as required, upon discovery, Licensor shall notify Licensee of such occurrence in writing. In the event Licensee shall not have remedied the failure within ten (10) days from the date of such notice, Licensor shall have the right, but not the obligation to remedy such failure at the sole cost and expense of Licensee. In the event Licensor exercises its right to remedy Licensee's failure, Licensee agrees to immediately pay to Licensor all costs incurred by Licensor upon demand.

12. Future Use by Licensor.

12.01. This License is made expressly subject and subordinate to the right of Licensor to use the Property for any purpose whatsoever.

12.02. In the event that Licensor shall, at any time subsequent to the date of this License, at its sole discretion, determine that the relocation of the Permitted Improvement shall be necessary or convenient for Licensor 's use of the Property, Licensee shall, at its sole cost and expense relocate said Permitted Improvement so as not to interfere with Licensor 's or Licensor 's assigns use of the Property. In this regard, Licensor may, but is not obligated to, designate other property for the relocation of the Permitted Improvement. Licensor shall give a minimum of thirty (30) days written notice of any required relocation. Licensee shall promptly commence to make the required changes thereafter and shall diligently complete the relocation as required within a reasonable period.

13. Relocation Benefits. The parties hereto agree that the construction of the Permitted Improvement on the Property shall be subsequent to the acquisition of the Property by Licensor and that Licensee does hereby waive any and all claim that it may have under the Act, or otherwise, regarding the payment of any and all relocation benefits and that all costs associated with any relocation of such Improvements shall be borne by Licensee.

14. Duration of License. This License shall terminate and be of no further force and effect (a) in the event Licensee shall discontinue or abandon the use of the Permitted Improvement; (b) in the event Licensee shall relocate the Permitted Improvement from the Property; (c) upon termination in accordance with paragraph 19 of this License, whichever event first occurs.

15. Compliance With Laws and Regulations. Licensee agrees to abide by and be governed by all laws, ordinances and regulations of any and all governmental entities having jurisdiction over the Licensee and by railroad regulations, policies and operating procedures established by the

Railroad, or other applicable railroad regulating bodies, and to the extent permitted by law, Licensee agrees to indemnify and hold Licensors harmless from any failure to so abide and all actions resulting therefrom.

16. **Indemnification.** To the extent permitted by law, Licensee shall at all times protect, indemnify, defend and hold Licensors and the Railroad harmless against and from any and all loss, cost, damage or expense, including attorney's fees and including, without limitation, claims of negligence, arising out of this License (including by example and not limitation, Licensee's acts or failure to act hereunder), Licensee's use in any way of the Property, or arising from any accident or other occurrence on or about the Property, resulting in personal injury, death, or property damage, except to the extent fault is judicially determined against Licensors.

17. **Termination of License.** At such time as this License may be terminated or canceled for any reason whatsoever, Licensee, upon request by Licensors, shall remove all improvements and appurtenances owned by it, situated in, on, under or attached to the Property, regardless of whether or not such improvements were placed thereon by Licensee, and shall restore the Property to a condition satisfactory to Licensors, at Licensee's sole expense.

18. **Assignment.** Licensee shall not assign or transfer its rights under this License in whole or in part, or permit any other person or entity to use the License hereby granted without the prior written consent of Licensors which Licensors is **under no obligation to grant**.

19. **Methods of Termination.** This License may be terminated in either of the following ways:

19.01. By written agreement of both parties; or

19.02. By either party giving the other party thirty (30) days written notice.

20. **Miscellaneous.**

20.01. Notice. When notice is permitted or required by this License, it shall be in writing and shall be deemed delivered when delivered in person or when placed, postage prepaid, in the U.S. Mail, Certified, Return Receipt Requested, and addressed to the parties at the following addresses:

LICENSOR:	Dallas Area Rapid Transit	OR	
	1401 Pacific Avenue		P. O. Box 660163
	Dallas, Texas 75202-7210		Dallas, Texas 75266-7210
	ATTN: Railroad Management		

LICENSEE:	CITY OF NORTH RICHLAND HILLS
	4301 City Point Drive
	North Richland Hills, Texas 76180

Either party may from time to time designate another and different address for receipt of notice by giving written notice of such change of address.

20.02. Governing Law. This License shall be construed under and in accordance with the laws of the State of Texas.

20.03. Entirety and Amendments. This License embodies the entire agreement between the

parties and supersedes all prior agreements and understandings, if any, relating to the Property and the matters addressed herein, and may be amended or supplemented only by a written instrument executed by the party against whom enforcement is sought.

20.04. Parties Bound. This License shall be binding upon and inure to the benefit of the executing parties and their respective heirs, personal representatives, successors and assigns.

20.05. Number and Gender. Words of any gender used in this License shall be held and construed to include any other gender; and words in the singular shall include the plural and vice versa, unless the text clearly requires otherwise.

20.06. No Joint Enterprise. The parties do not intend that this License be construed as finding that the parties have formed a joint enterprise. The purposes for which each party has entered into this License are separate and distinct. It is not the intent of any of the parties that a joint enterprise relationship is being entered into and the parties hereto specifically disclaim such relationship. This License does not constitute a joint enterprise, as there are no common pecuniary interests, no common purpose and no equal right of control among the parties hereto.

20.07. Counterparts. The parties may execute this Agreement in multiple originals and when taken together, those originals constitute a whole.

20.08 Indemnity. Notwithstanding any of the foregoing, nothing contained herein shall ever be construed so as to require Licensee to create a sinking fund or to assess, levy or collect any tax to fund any indemnity obligations under this License.

IN WITNESS WHEREOF, the parties have executed this License on the date last signed.

LICENSOR:

DALLAS AREA RAPID TRANSIT

BY:


Timothy H. McKay, P.E.
Executive Vice President
Growth/Regional Development

Date:

11/30/17

LICENSEE:

CITY OF NORTH RICHLAND HILLS

BY:



Printed Name:

Mark Hindman

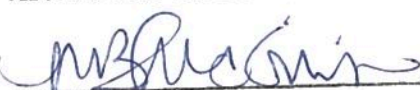
Title:

City Manager

Date:

11-09-2017

APPROVED AS TO FORM AND LEGALITY


Mareshia B. McGinnis, City Attorney

NRH Council Action

Date Approved 11-09-17

Agenda No.

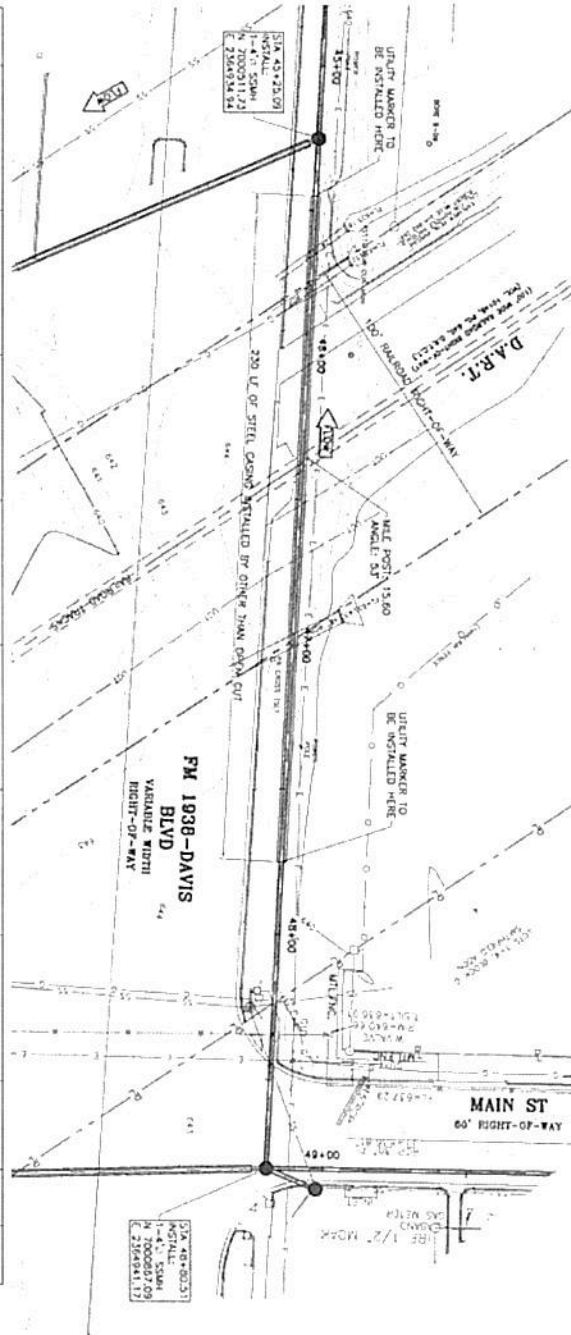
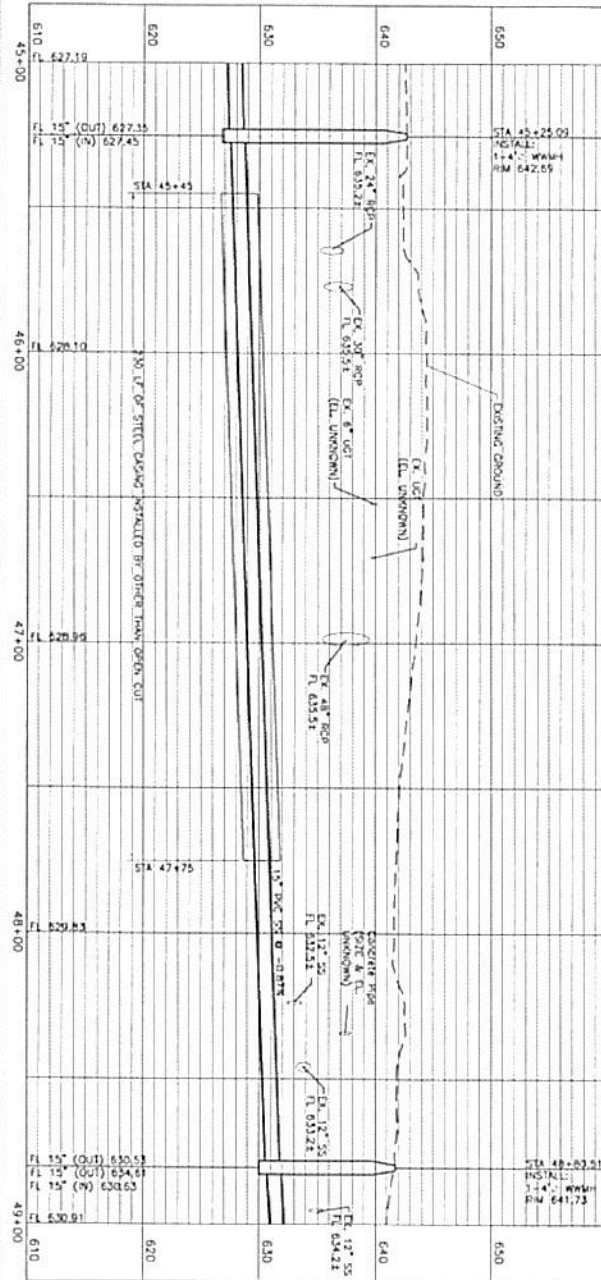
Ord / Res No.

Attest: 

Alicia Richardson

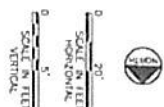


Plot Date: 1/31/2017 8:31 AM Plot By: ds Filename: N:\UTU\Report\CV-DART-PL-EXB101.dwg



LEGEND

- GAS
- WATER
- SEWER
- SANITARY SEWER
- C&G
- LOT LINES
- UNDERGROUND TELEPHONE
- DART ROW
- E - EJECTING LINE
- FENCE



- NOTES:
1. CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF NORTH RICHLAND HILLS, TEXAS, STANDARD SPECIFICATIONS FOR CONSTRUCTION OF PUBLIC WORKS, EDITION 2011.
 2. EXISTING 15' WIDE TO BE ABANDONED IN PLACE.
 3. DRAINAGE SHALL BE A MINIMUM 1% SLOPE TOWARD THE SOUTH.

CITY OF NORTH RICHLAND HILLS, TEXAS WALKER BRANCH INTERCEPTOR CNL NORTH INTERCEPTOR DART EXHIBIT

FREESE WICHOLS
 10000 Highway 170, Suite 100
 Fort Worth, Texas 76134-4400
 Phone: (817) 733-7333
 Fax: (817) 733-7447
 Web: www.freesewichols.com

NOT FOR CONSTRUCTION
 THIS DOCUMENT IS ISSUED FOR THE
 PURPOSE OF RECORD ONLY AND DOES NOT
 CONSTITUTE A CONTRACT. IT IS NOT TO BE
 USED FOR CONSTRUCTION OR AS A BASIS
 FOR ANY CLAIMS.

APPENDIX F EASEMENTS

EXHIBIT "A"
LEGAL DESCRIPTION
PERMANENT UTILITY EASEMENT

BEING 0.191 acre of land located in Tract A, NORTHEAST CAMPUS ADDITION, to the City of North Richland Hills, Tarrant County, Texas, according to the plat recorded in Volume 388-43, Page 61, of the Plat Records of Tarrant County, Texas. Said 0.191 acre of land being more particularly described by metes and bounds as follows:

BEGINNING at a point lying in the Southeast right-of-way line of (State Highway 26) Grapevine Highway and the Northwest boundary line of said Tract A, being located S 60° 57' 10" E 115.18 feet, from a Texas Department of Transportation monument found in the Northwest right-of-way line of Grapevine Highway, being the Northeast corner clip at the Intersection of Grapevine Highway and Emerald Hills;

THENCE S 45° 32' 35" E 20.00 feet, to a point;

THENCE running along a line 20.0 feet Southeast of and parallel to the Southeast right-of-way line of Grapevine Highway and the Northwest boundary line of said Tract A, as follows:

1. S 44° 27' 25" W 319.21 feet, to a point at the beginning of a curve to the right;
2. SOUTHWESTERLY 285.93 feet, along said curve to the right, having a radius of 2934.93 feet, a central angle of 05° 34' 11", and a chord bearing S 47° 14' 30" W 285.19 feet, to a point;

THENCE S 38° 21' 42" E 1.33 feet, to a point;

THENCE N 89° 33' 25" E 293.51 feet, running along a line 20.0 feet North of and parallel to the South boundary line of said Tract A and the North right-of-way line of North Harwood Road, to a point;

THENCE S 00° 26' 35" E 5.00 feet, to a point in the North line of an existing 15 foot wide permanent utility easement, recorded in Volume 5594, Page 959, of the Deed Records of Tarrant County, Texas;

THENCE S 89° 33' 25" W 295.95 feet, along the North line of said existing 15 foot wide permanent utility easement, also running along a line 15.0 feet North of and parallel to the South boundary line of said Tract A and the North right-of-way line of said North Harwood Road, to a point;

THENCE N 38° 21' 42" W 8.64 feet, to a point;

THENCE running along a line 15.0 feet Southeast of and parallel to the Southeast right-of-way line of aforesaid Grapevine Highway and the Northwest boundary line of said Tract A, and running along the Southeast line of an existing permanent utility easement, as follows:

1. NORTHEASTERLY 289.67 feet, along a curve to the left, having a radius of 2929.93 feet, a central angle of 05° 39' 53", and a chord bearing N 47° 17' 21" E 289.55 feet, to a point at the end of said curve;
2. N 44° 27' 25" E 67.63 feet, to a point;

THENCE N 45° 37' 20" W 15.00 feet, to a point lying in the Northwest boundary line of aforesaid Tract A and the Southeast right-of-way line of Grapevine Highway;

THENCE N 44° 27' 25" E 251.61 feet, along the Northwest boundary line of said Tract A and the Southeast right-of-way line of Grapevine Highway, to the POINT OF BEGINNING containing 0.191 acre (8,306 square feet) of land.

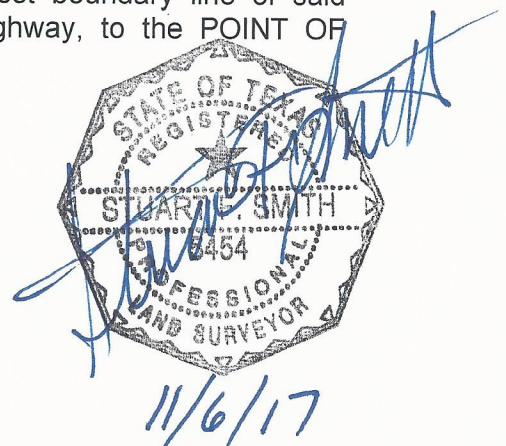


EXHIBIT "B"

LOT 2R1, BLOCK 2
WALKER BRANCH ADDITION
CC# D198015958
P.R.T.C.T.

LOT 1R1, BLOCK 1
WALKER BRANCH ADDITION
CC# D198080163
P.R.T.C.T.

LOT 7, BLOCK 1
WALKER BRANCH ADDITION
CC# D198080163
P.R.T.C.T.

POINT OF
BEGINNING

S 45°32'35"E
20.00'

STATE HIGHWAY 26
(GRAPEVINE HWY)
110' WIDE RIGHT-OF-WAY

LANDON C. WALKER SURVEY
ABSTRACT No. 1653

PERMANENT UTILITY EASEMENT
0.191 ACRE, 8,306 SQUARE FEET

TRACT "A"
NORTHEAST CAMPUS
VOL. 388-43, PG. 61
P.R.T.C.T.

$\Delta=05^{\circ}34'11''$
R=2934.93'
L=285.93'
CH=S 47°14'30"W
285.19'

$\Delta=05^{\circ}39'53''$
R=2929.93'
L=289.67'
CH=N 47°17'21"E
289.55'

15' PERMANENT UTILITY EASEMENT
VOLUME 5594, PAGE 959
D.R.T.C.T.

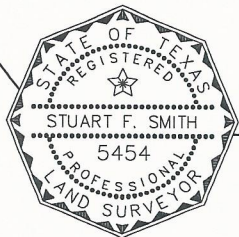
S 00°26'35"E
5.00'

NORTH HARWOOD ROAD

BLOCK 1
RICHLAND OAKS
15R VOL. 388-8, PG. 80
P.R.T.C.T.

BLOCK 3
UNIVERSITY PLAZA
FOURTH FILING
VOL. 388-157, PG. 23
P.R.T.C.T.

BEARING BASE:
THE BEARINGS SHOWN HEREON ARE STATE
PLANE GRID BEARINGS (NAD 83) FOR THE
TEXAS NORTH CENTRAL ZONE (4202)
ESTABLISHED USING THE GLOBAL POSITIONING
SYSTEM SATELLITES, AND LOCAL CONTINUOUSLY
OPERATING REFERENCE STATIONS.

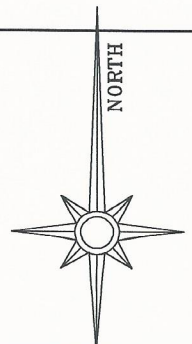


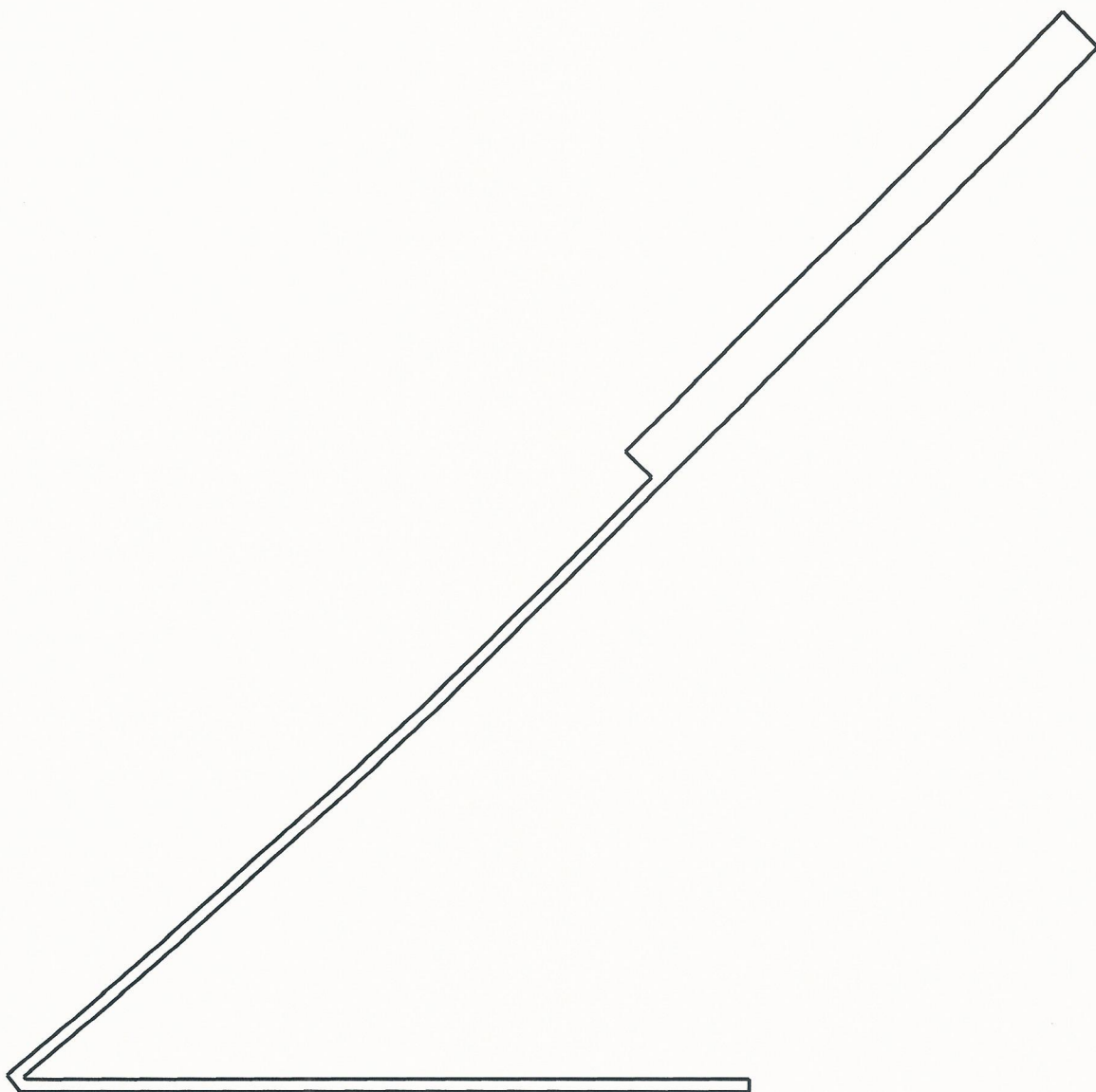
NOVEMBER 06, 2017

CITY OF
NORTH RICHLAND HILLS
4301 CITY POINT DRIVE - NORTH RICHLAND HILLS, TEXAS 76180
(817)-427-6000

BRITTAIN & CRAWFORD
LAND SURVEYING &
TOPOGRAPHIC MAPPING
(817) 926-0211 - METRO (817) 429-5112
FAX No. (817) 926-9347
P.O. BOX 11374 * 3908 SOUTH FREEWAY
FORT WORTH, TEXAS 76110
EMAIL: admin@brittain-crawford.com

**PERMANENT UTILITY
EASEMENT
0.191 ACRE OF LAND
LOCATED IN
TRACT "A" NORTHEAST
CAMPUS ADDITION
NORTH RICHLAND HILLS,
TARRANT COUNTY, TEXAS**





FN NRH Walker Branch - PUE 0.191ac Tract A, NE Campus

11/6/2017

Scale: 1 inch= 74 feet

File: PUE 0.191ac Tract A, NE Campus.ndp

Tract 1: 0.1907 Acres (8306 Sq. Feet), Closure: n00.0000e 0.00 ft. (1/853889), Perimeter=1853 ft.

01 s45.3235e 20.00

02 s44.2725w 319.21

03 Rt, r=2934.93, chord=s47.1430w 285.19

04 s38.2142e 1.33

05 n89.3325e 293.51

06 s00.2635e 5.00

07 s89.3325w 295.95

08 n38.2142w 8.64

09 Lt, r=2929.93, chord=n47.1721e 289.55

10 n44.2725e 67.63

11 n45.3720w 15.00

12 n44.2725e 251.61