SPECIFICATIONS
AND
FORMS OF CONTRACT, BONDS AND BID PROPOSALS

FOR

BID NO. 20-278-08-14
CITY OF MISSION DRAINAGE IMPROVEMENT PROJECT
FOR ERMA STREET

MISSION, TEXAS

Prepared By:
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TBPE FIRM NO. F-1295

TABLE OF CONTENTS

1. BID ADVERTISEMENT
2. NOTICE TO BIDDERS
3. INSTRUCTION TO BIDDERS
4. SUBCONTRACT FORM
5. ADDENDA CHECKLIST
6. BUSINESS QUESTIONNAIRE
7. SPECIAL PROVISIONS
8. BID FOR UNIT PRICE
9. BID BOND
10. SALES TAX STATEMENT
11. NON-COLLUSION AFFIDAVIT OF PRIME BIDDER
12. AGREEMENT
13. PERFORMANCE BOND
14. PAYMENT BOND
15. CERTIFICATE OF OWNER’S ATTORNEY
16. GENERAL CONDITIONS OF THE AGREEMENT
17. GENERAL PREVAILING WAGE LEGAL REQUIREMENTS
18. TECHNICAL SPECIFICATIONS

NEW SOLICITATION FROM
CITY OF MISSION

City of Mission Drainage Improvement Project for Erma Street
Bid #20-278-08-14

City of Mission has issued this solicitation for bids to be due **Friday, August 14, 2020 at 2:00 p.m. CST.** To be delivered and publicly opened **via Zoom** at City Hall in the Purchasing Department 1201 East 8th, Ste. R101, Mission, TX 78572.

Plans and specifications may be OBTAINED at the office of:
Javier Hinojosa Engineering
416 E. Dove Avenue
McAllen, TX 78504
(956) 668-1588
Upon a **non-refundable** deposit of **$150.00 per set.**

Solicitations and Addendums will be posted to the City of Mission Website at
http://www.missiontexas.us/bid-opportunities-2/
in the bid opportunities section or may be picked up at the Purchasing Department.

City of Mission
Crissy Cantu
Purchasing Buyer
ccantu@missiontexas.us
(956)580-8667

NOTICE TO BIDDERS

Sealed bids and proposal addressed to Mr. Randy Perez, City Manager, City of Mission will be received by the City of Mission, Texas (hereinafter called owner) at City Hall at the **Purchasing Department, 1201 East 8th, Ste. R 101, Mission, Texas 78572 until 2:00 p.m. CST, Friday, August 14, 2020** and then at said office publicly opened and read aloud as follows:

2:00 p.m. CST Bid No. 20-278-08-14

(See Instruction To Bidders for Zoom Meeting Information)

CITY OF MISSION DRAINAGE IMPROVEMENT PROJECT FOR ERMA STREET

A Bidder's Bond from a reliable surety company licensed to operate in the State of Texas or a certified Cashier's Check, payable without recourse to the City of Mission, for the amount of not less than 5% of the total bid must accompany the bid as a guaranty that, if awarded the contract, the bidder will enter into a contract with the City of Mission. Payment and Performance Bonds shall be executed.

Plans and specifications may be OBTAINED at the office of:

Javier Hinojosa Engineering
416 E. Dove Avenue
McAllen, Texas 78504
(956) 668-1588

upon a non-refundable deposit of **$150.00** per set.

The City of Mission reserves the right to refuse and reject any or all bids and to waive any or all formalities or technicalities, or to accept the bid considered the best and most advantageous to the City, and to hold the bids for a period of 60 days without taking action thereon. Any bid received past the date and time will not be accepted.

The City of Mission does not discriminate on the basis of race, color, national origin, sex, religion, age, and handicapped status in employment or provision of service.

Bid proposal must be clearly marked on the envelope:

BIDS: CITY OF MISSION DRAINAGE IMPROVEMENT PROJECT
FOR ERMA STREET
BID NO. 20-278-08-14

INSTRUCTIONS TO BIDDERS

Bids will be submitted in sealed envelopes upon the blank form of proposal attached hereto, and marked in the upper left hand corner with the name of Bidder and Title of Project.

Bid Opening Meeting:
ebelmarez@missiontexas.us is inviting you to a scheduled Zoom meeting.

Topic: City of Mission Bid Opening Meeting: City of Mission Drainage Improvement Project for Erma Street
Time: Aug 14, 2020 02:00 PM Central Time (US and Canada)

Join Zoom Meeting
https://us02web.zoom.us/j/2205476707?pwd=R1ZBeGRoUnJQTW1yZ2hUdVp3dnFEQT09

Meeting ID: 220 547 6707
Passcode: 9iYEY2
One tap mobile
+13462487799,,2205476707#,,,,,,0#,,966559# US (Houston)
+16699009128,,2205476707#,,,,,,0#,,966559# US (San Jose)

Dial by your location
+1 346 248 7799 US (Houston)
+1 669 900 9128 US (San Jose)
+1 253 215 8782 US (Tacoma)
+1 646 558 8656 US (New York)
+1 301 715 8592 US (Germantown)
+1 312 626 6799 US (Chicago)
Meeting ID: 220 547 6707
Passcode: 966559
Find your local number: https://us02web.zoom.us/u/kWfvXWYYb

In case of ambiguity, or lack of clearness in stating the price in the bids, the Owner reserves the right to consider the most advantageous construction thereof, or to reject the bid. Unreasonable (or unbalanced) prices will authorize the Owner to reject any bid.

The successful bidder must furnish a performance bond and a payment bond upon the forms which are attached hereto in the amount of 100% of the contract price from an approved surety companies holding a permit from the State of Texas to act as surety (and acceptable according to the latest list of company holding certificates of authority from the Secretary of the Treasury of the United States) or other surety or sureties acceptable to Owner within ten (10) days from date of award of contract.

Evaluation and Basis for Award

(A) **Award of Contract**

(a) If the competitive sealed bidding requirement applies to the contract for goods or services, the contract must be awarded to the lowest responsible bidder or to the bidder who provides goods or services at the best value for the municipality.

(b) In determining the best value for the municipality, the municipality may consider:

1) the purchase price;
2) the reputation of the bidder and of the bidder's goods or services;
3) the quality of the bidder's goods or services;
4) the extent to which the goods or services meet the municipality's needs;
5) the bidder's past relationship with the municipality;
6) the impact on the ability of the municipality to comply with laws and rules relating to contracting with historically underutilized businesses and nonprofit organizations employing persons with disabilities;
7) the total long-term cost to the municipality to acquire the bidder's goods or services; and
8) any relevant criteria specifically listed in the request for bids or proposals

(B) Item Pricing/One Award

Offerors may provide pricing for any one or more-line items on price schedule. One Award is anticipated for this contract. As such, multiple contract awards shall not be made.

(C) Unit and Extended Pricing

Offerors shall insert the unit price and extended amount for each line item offered on the price schedule. If a line item is offered at "No Cost," enter "No Cost" in the unit price column. Additionally, offerors shall calculate and insert the total price in the space provided on the price schedule. In the event of discrepancies in extended price, unit prices will govern. Bids subject to unlimited price increase will not be considered.

Insurance Requirements for Supply/Services and/or Construction

(a) Required Coverage. The Contractor shall, at all times during the term of this contract and extended terms thereof, provide and maintain the following types of insurance protecting the interests of the City of Mission and the Contractor with limits of liability not less than those specified below.

Commercial General Liability insurance or its equivalent, **listing City of Mission as an additional insured**, providing limits of not less than $500,000 for bodily injury and

property damage per occurrence, consistent with potential exposure to City under the Texas Tort Claims Act. Coverage should include injury to or death of persons and property damage claims arising out of the services, construction, etc. provided with a general aggregate of $1,000,000, and a products and completed operations aggregate of $1,000,000. Coverage should include: Damaged to rented premises at a minimum of $100,000 per occurrence. There shall not be any policy exclusions or limitations for the following as well:

Contractual Liability covering Contractor's obligations herein
Personal Injury Advertising Liability
Medical Payments
Fire Damage Legal Liability
Broad Form Property Damage
Liability for Independent Contractors

(b) Automobile liability insurance policy with combined single limit of at least Five Hundred Thousand Dollars ($500,000.00) per occurrence, consistent with potential exposure to City under the Texas Tort Claims Act.

(c) Uninsured/Underinsured motorist coverage in an amount equal to the bodily injury limits set forth immediately above;

(d) A Five Hundred Thousand Dollar ($500,000.00) Comprehensive General Liability insurance policy providing additional coverage to all underlying liabilities of City consistent with potential exposure of City under the Texas Tort Claims Act;

(e) Workers' Compensation and Employers' Liability- insurance is equivalent to State of Texas Workers' Compensation Statutory Limits, providing limits of not less than $1,000,000 for each accident, each disease per employee $1,000,000, and policy limit of no less than $1,000,000. There shall not be any policy exclusions or limitations.

(f) Certificates of Insurance. Before commencing execution of this contract, and within 7 calendar days from date of award of contract, the Contractor shall furnish Original proof of insurance via Certificates of Insurance satisfactory to the City of Mission at the following addresses,

City of Mission
Crissy Cantu, Purchasing Buyer
1201 E. 8th Street, R-101
Mission, TX 78572
Bid # 20-278-08-14

evidencing that insurance as required by paragraph (a) above is in force, stating policy number dates of expiration and limits of liability thereunder. All copies of policies and Certificates of Insurance submitted to the City shall be in a form and content acceptable to the City.

(g) Approval of Forms and Companies. All coverage described in this contract shall be in a form and content satisfactory to the Purchasing Agent. No party subject to the provisions of this contract shall violate or knowingly permit to be violated any of the provisions of the policies of insurance described herein. All insurance should be provided by insurance companies with a Best's rating of A- or better. Please include proof of such rating with your coverage documents.

(h) Additional Insured Endorsement. The policy or policies providing Commercial General Liability, and as otherwise required above, shall be endorsed to name City of Mission, their directors, officers, representatives, agents, and employees as Additional Insurers with respects to operations performed by or on behalf of the Contractor in the performance of this contract via ISO endorsements CG 2037 or its equivalent. The policy shall also be endorsed to name other interests as directed by City of Mission.

(i) Notice of Cancellation or Material Changes. Policies and/or Certificates shall **specifically** provide that a thirty (30) day notice of cancellation, non-renewal, or material change be sent to the City.

(j) Multiple Policies. The limits of liability as required above may be provided by a single policy of insurance or a combination of primary, excess, or umbrella liability policies. But in no event shall the total limit of liability of any one occurrence or accident be less that the amount shown above.

(k) Deductibles. Companies issuing the insurance policies and the Contractor shall have no recourse against the City for payment of any premiums or assessments for any deductibles, as all such premiums and deductibles are the sole responsibility and risk of the Contractor.

(l) Subcontractors. If any part of the work is sublet, the Contractor shall require any and all subcontractors performing work under this contract to carry General Liability and Products, and Construction Liability Insurance, with limits of liability that Contractor shall deem appropriate and adequate to protect the interests of the City. In the event a subcontractor is unable to furnish insurance in accordance to section (a) above, the Contractor shall endorse the subcontractor as an Additional Insured. Insurance certificates for subcontractors shall be furnished to the City of Mission upon request.

(m) No Release. The carrying of the above-described coverage shall in no way be interpreted as relieving the Contractor of any other responsibility or liability under this agreement, or any applicable law, statute, regulation, or order.

Bidders are advised that they must be in compliance with the below mentioned law:

CHAPTER 176 OF THE TEXAS LOCAL GOVERNMENT CODE

Effective January 1, 2006, Chapter 176 of the Texas Local Government Code requires that any vendor or person considering doing business with a local government entity disclose in the Questionnaire Form CIQ, the vendor or person's affiliation or business relationship that might cause a conflict of interest with a local government entity. By law, this questionnaire must be filed with the records administrator of the City of Mission not later than the 7th business day after the date the person becomes aware of facts that require the statement be filed. See Section 176.006, Local Government Code. A person commits an offense if the person violates Section 176.006, Local Government Code. An offense under this section is a Class C misdemeanor.

For more information or to obtain Questionnaire CIQ go to the Texas Ethics Commission web page at www.ethics.state.tx.us/forms/CIQ.pdf.

IF YOU HAVE ANY QUESTIONS ABOUT COMPLIANCE, PLEASE CONSULT YOUR OWN LEGAL COUNSEL. COMPLIANCE IS THE INDIVIDUAL RESPONSIBILITY OF EACH PERSON OR AGENT OF A PERSON WHO IS SUBJECT TO THE FILING REQUIREMENT. AN OFFENSE UNDER CHAPTER 176 IS A CLASS "C" MISDEMEANOR.

Disclosure of Interested Parties

Contractor is to comply with Government Code Section 2252.908 enacted by H.B. 1295, which prohibits a government entity or state agency from entering into certain contracts with a business entity unless the business entity submits a disclosure of interested parties. For more information go to the Texas Ethics Commission web page at: https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm

Appeal Process

An appeal may be brought by the lowest bidder deemed to have been non-responsive and/or not responsible. Appeals are limited to the following:

1. Matters of bias, discrimination, or conflict of interest
2. Computing errors and alleged improprieties or ambiguities in bid specifications; and
3. Non-compliance with procedures described in solicitation or City Policy.

The appeal must be in writing and shall be filed with the Purchasing Director at:

City of Mission
1201 E. 8th Street, Room R-101
Mission, Texas 78572

Appeals must include the following information:

a. Name, address, email, telephone and fax number of appellant;
b. Bid identification number;
c. A detailed description of the legal and factual basis of the appeal (include any and all relevant documents, diagrams, photos, etc.);
d. The desired outcome/solution;
e. Signed and dated

All appeals must be filed within three (3) working days from the date of award by City Council. Untimely appeals will not be considered. Upon receipt of the appeal, the Purchasing Director will have three (3) working days to attempt to clarify or resolve any issues addressed in the request for appeal.

If the appeal is not resolved with the Purchasing Director, then it shall be considered at a public hearing at the next City Council meeting. All determinations made by the City Council are final.

***Successful contractor must provide the City of Mission with proof of worker's compensation insurance prior to award of contract as stated in Section K "Supplemental General Conditions of Contract for Engineer/Architectural Construction":**

Requirements

Prime contractor shall assign a project superintendent who is directly employed by the prime contractor, that superintendent will be required to be on the job on a daily basis. No subcontractors will be allowed to act as project superintendents at any point during the construction of this project.

80% of the proposed construction shall be completed by the prime contractor, only 20% of the work can be subcontracted.

Prime Contractor shall have a significant business presence with the Rio Grande Valley Area, the business must be headquartered in either Hidalgo, Cameron, or Starr County or a local office must be located in either of the three counties (Hidalgo, Cameron, Starr) with at least 30% of the total company workforce employed at the local office. City reserves the right to request payrolls and any necessary documentation to confirm that the local office meets these requirements.

Bidders shall carefully examine the plans, specifications and other documents, visit the site of work, and fully inform themselves as to all conditions and matters which can in any way affect the work or the cost thereof. Should the bidder find discrepancies in, or omissions from the plans, specifications or other documents, or should he be in doubt as to their meaning, he should at once notify the Engineer and obtain clarification by addendum prior to submitting any bid.

The City of Mission encourages the hiring of minority women subcontractors and/or suppliers whenever and wherever feasible.

The bidder is specifically advised that the bid must be accompanied by a certified Cashier's Check or a Bidder's Bond from a reliable surety company licensed to operate in the State of Texas totaling five (5%) of the greatest amount bid as a guaranty that, if awarded the bid, the successful contractor will enter into a contract with the City of Mission Cashier checks and/or bid bonds will be returned to all except the three lowest bidders within five (5) days after opening of bids. The remaining cashier checks and/or bid bonds will be returned promptly after the successful contractor has entered into a contract with the City of Mission If no award has been made within sixty (60) days after opening of bids, cashier checks and/or bonds will be returned accordingly.

Sales Tax Requirements – It shall be mandatory requirement of this contract that the successful contractor be the holder of a "Sales Tax Permit" issued by the Comptroller of Public Accounts State of Texas. The successful contractor for purposes of this contract shall be a seller of materials incorporated into this project.

This contract shall be a "Separated Contract" and the successful contractor shall provide the City of Mission with the following information when executing the contract documents:

Materials (Permanent part of Project): $_____

Materials (Not permanent part of Project): $_____

Service: $_____

Total: $_____

CITY OF MISSION

Attachment 1 to General Terms and Conditions - Schedule of Subcontractor(s)/Subconsultant(s)

Offerors should provide information on **all** of their prospective subcontractor(s)/subconsultant(s) who submit bids/proposals in support of this solicitation. Use additional sheets as needed.

Project Name: **"City of Mission Drainage Improvement Project for Erma Street.."**
Solicitation Number: **Bid No: 20-278-08-14**

Name of Prime Contractor:_____

NAMES AND ADDRESSES OF SUBCONTRACTOR(S)/SUBCONSULTANT(S)	TYPE OF WORK TO BE PERFORMED	MINORITY OR WOMAN FIRM? (Check all that apply)	PREVIOUS YEAR'S ANNUAL GROSS RECEIPTS
NAME: ADDRESS: PHONE: FAX: E-MAIL: TAX ID #: CONTACT PERSON:	TYPE OF WORK: AGE OF FIRM:	YES ☐ NO ☐ IF YES: DBE ☐ OR MBE ☐ OR WBE ☐	☐ less than $500K ☐ $500K - $2 mil. ☐ $2 mil. - $5 mil. ☐ more than $5 mil.
NAME: ADDRESS: PHONE: FAX: E-MAIL: TAX ID #: CONTACT PERSON:	TYPE OF WORK: AGE OF FIRM:	YES ☐ NO ☐ IF YES: DBE ☐ OR MBE ☐ OR WBE ☐	☐ less than $500K ☐ $500K - $2 mil. ☐ $2 mil. - $5 mil. ☐ more than $5 mil.
NAME: ADDRESS: PHONE: FAX: E-MAIL: TAX ID #: CONTACT PERSON:	TYPE OF WORK: AGE OF FIRM:	YES ☐ NO ☐ IF YES: DBE ☐ OR MBE ☐ OR WBE ☐	☐ less than $500K ☐ $500K - $2 mil. ☐ $2 mil. - $5 mil. ☐ more than $5 mil.
NAME: ADDRESS: PHONE: FAX: E-MAIL: TAX ID #: CONTACT PERSON:	TYPE OF WORK: AGE OF FIRM:	YES ☐ NO ☐ IF YES: DBE ☐ OR MBE ☐ OR WBE ☐	☐ less than $500K ☐ $500K - $2 mil. ☐ $2 mil. - $5 mil. ☐ more than $5 mil.
NAME: ADDRESS: PHONE: FAX: E-MAIL: TAX ID #: CONTACT PERSON:	TYPE OF WORK: AGE OF FIRM:	YES ☐ NO ☐ IF YES: DBE ☐ OR MBE ☐ OR WBE ☐	☐ less than $500K ☐ $500K - $2 mil. ☐ $2 mil. - $5 mil. ☐ more than $5 mil.
NAME: ADDRESS: PHONE: FAX: E-MAIL: TAX ID #: CONTACT PERSON:	TYPE OF WORK: AGE OF FIRM:	YES ☐ NO ☐ IF YES: DBE ☐ OR MBE ☐ OR WBE ☐	☐ less than $500K ☐ $500K - $2 mil. ☐ $2 mil. - $5 mil. ☐ more than $5 mil.

Name/Title of Person completing this form: _____

Signature_____ Date_____

CITY OF MISSION
ADDENDA CHECKLIST

Bid of: _____
(Bidder Company Name)
To: City of Mission
Ref.: City of Mission Drainage Improvement Project for Erma Street. RFB No.: 20-278-08-14

Ladies and Gentlemen:

The undersigned Bidder hereby acknowledges receipt of the following Addenda to the captioned RFB (initial if applicable).

No. 1 _____ No. 2 _____ No. 3 _____ No. 4 _____ No. 5 _____

Respectfully submitted,

Bidder: _____

By: _____

(Authorized Signature for Bidder)

Name: _____

Title: _____

Date: _____

City of Mission

GENERAL BUSINESS QUESTIONNAIRE

(SUPPLIES, SERVICES AND CONSTRUCTION)

This questionnaire, the requested list of references and the authorization to release financial information are used in part to assist in determining a potential contractor's responsibility. Offerors shall submit the General Business Questionnaire information with the bid/proposal, as indicated in the Table of Contents page 2 of the Solicitation, Offer and Award Form. All information must be current and traceable. Each venturer of a joint venture must submit a separate signed form.

City of Mission reserves the right to make additional inquiries based on information submitted, or the lack thereof. Questions concerning this questionnaire or the authorization form should be directed to the contact person identified on the Solicitation, Offer and Award Form. In cases where a question does not apply or if unable to respond, offeror should refer to the item number, repeat the question, and indicate N/A (Not Applicable) or N/R (No Response), as appropriate. Offeror will explain the reason when responding N/A or N/R.

1. Name of Offeror ("Business"): _____

2. List name(s) and business address of owners, officers and directors for corporations, partners for partnerships, and ventures for joint ventures sole proprietors (attach additional pages as necessary).

   _____
   _____
   _____

3. Number of years in business under present business name: _____

4. If applicable, list all other names under which the Business identified above operated in the last 5 years.

   _____
   _____
   _____

5. Annual Gross Revenue (Past year): (M represents millions, K represents thousands)
   ☐ $100K or less ☐ $100K-$500K ☐ $500K-$1M ☐ $1M-$5M ☐ $5M-$10M
   ☐ $10M-$16M ☐ $16M or Over

6. Will bidder/proposer provide a copy of its financial statements for the past two (2) years, if requested by City of Mission? ☐ Yes ☐ No

7. Number of current employees: _____

8. Has the Business, or any officer or partner thereof, failed to complete a contract? ☐ Yes ☐ No

9. Is any litigation pending against the Business? ☐ Yes ☐ No

10. Is offeror currently for sale or involved in any transaction to expand or to become acquired by another business entity? If yes, offeror needs to explain the expected impact, both in organizational and directional terms. ☐ Yes ☐ No

    _____
    _____
    _____

11. Has the Business ever been declared "not responsible" for the purpose of any governmental agency contract award? ☐Yes ☐No

12. Has the Business been debarred, suspended, proposed for debarment, declared ineligible, voluntarily excluded, or otherwise disqualified from bidding, proposing, or contracting?
☐Yes ☐No

13. Are there any proceedings pending relating to the Business' responsibility, debarment, suspension, voluntary exclusion, or qualification to receive a public contract?
☐Yes ☐No

14. Has the government or other public entity requested or required enforcement of any of its rights under a surety agreement on the basis of a default or in lieu of declaring the Business in default?
☐Yes ☐No

15. Is the Business in arrears on any contract or debt? ☐Yes ☐No

16. Has the Business been a defaulter, as a principal, surety, or otherwise? ☐Yes ☐No

17. Have liquidated damages or penalty provisions been assessed against the Business for failure to complete work on time or for any other reason? ☐Yes ☐No

18. Does offeror have a contingency plan or disaster recovery plan in the event of a disaster? If so, then Bidder will provide a copy of the plan. ☐Yes ☐No

19. Does offeror have quality assurance program? If yes, offeror will describe its quality assurance program, its quality requirements, and how they are measured. ☐Yes ☐No

20. If a "yes" response is given under questions 9 through 19, please provide a detailed explanation including dates, reference to contract information, contacts, etc. (attach additional pages as necessary).

_____
_____
_____
_____
_____
_____

I, individually and on behalf of the business named in this Business Questionnaire, do by my signature below, certify that the information provided in this questionnaire is true and correct. I understand that any false statements or misrepresentations regarding the Business named above may result in: 1) termination of any or all contracts which City of Mission has or may have with the Business; 2) disqualification of the Business from consideration for contracts; 3) removal of the Business from City of Mission's vendors' list; or/and 4) legal action(s) applicable under federal, state, or local law.

Name: _____ Title: _____

Signature: _____ Date: _____
(Owner, CEO, President, Majority Stockholder or Designated Representative)

LIST OF REFERENCES FOR SIMILAR PROJECTS

Use additional pages as necessary.

1. Project:
   Date of Completion (if applicable):
   Contact Person:
   Company Name:
   Address:
   Telephone Number:
   Fax Number:
   E-mail Address:

2. Project:
   Date of Completion (if applicable):
   Contact Person:
   Company Name:
   Address:
   Telephone Number:
   Fax Number:
   E-mail Address:

3. Project:
   Date of Completion (if applicable):
   Contact Person:
   Company Name:
   Address:
   Telephone Number:
   Fax Number:
   E-mail Address:

4. Project:
   Date of Completion (if applicable):
   Contact Person:
   Company Name:
   Address:
   Telephone Number:
   Fax Number:
   E-mail Address:

SPECIAL PROVISIONS

1. The City of Mission reserves the right to remove any item within the proposal in order to meet the budget.

2. It shall be the Contractor's responsibility to locate underground utilities, whether shown or not shown on the drawings, sufficiently in advance of operations to preclude damage to same.

3. Water, sewer, or other utility services shall not be interrupted. Any damages to existing utilities will be Contractor's responsibility.

4. In the event of damage to underground facilities, whether shown or not shown in the drawings, the Contractor shall make the necessary repairs to place the facilities back in service at no increase in the Contractor's price and all such repairs shall conform to the requirements of the company or agency servicing the facility.

5. The Contractor shall exercise extra care to prevent damage to all other structures in the area including buildings, fence, roads, pipelines, utilities, etc., whether publicly or privately owned.

6. Until acceptance by the Engineer of any part or all of the construction, as provided for in the plans and these specifications, it shall be under the charge and care of the contractor, and he shall take every necessary precaution against injury or damage to any part of the work. The Contractor shall rebuild, repair, restore and make good, at his own expense, all injuries or damage to any portion of the work before its completion and acceptance.

7. In case the Contractor deems extra compensation is due him for proposed work not covered in the contract, the Contractor shall notify the Engineer in writing of his claim for such extra compensation before he begins the work. Failure on the part of the Contractor to give such notification shall constitute a waiver of claim for such extra compensation. The Contractor shall not proceed until a written Change Order is approved by the Owner, Engineer, and Contractor.

8. Upon failure of the Contractor to satisfactorily repair or to remove and replace) rejected work or materials immediately after receiving formal notice from the Engineer, the Owner may recover for such defective work or materials on the Contractor's bond, or by action a court having proper jurisdiction over such matters, or may employ labor and equipment and satisfactorily repair or remove and replace such work and charge the cost of the same to the Contractor, which cost will be deducted from any money due him from this contract.

9. Prospective bidders should make a careful examination of the project sites.

10. Contractor shall review his overall method and schedule of construction with the City Prior to construction for proper coordination of inspection.

11. Contractor shall repair all asphalt pavement and concrete curb, gutter, sidewalk, or drainage structures damaged during construction.

12. The Contractor shall repair any landscaped areas, fences, etc. damaged during construction.

13. The Contractor shall at all times provide access to existing homes.

14. No open trenches or excavation shall be left open overnight.

15. The Contractor to provide proper traffic control during the construction approved by the City of Mission and Engineer to insure the safety of the public.

16. The Contractor to provide any and all temporary graphic construction signs, directional signs and other signs that may be required during construction.

PROPOSAL

TO OWNER:

The undersigned, as bidders, declared that the only person or parties interested in this proposal as principals are those named herein, that this proposal is made without collusion with any other person, firm or corporation; that he has carefully examined the form of contract, Notice to Contractors, specifications and the plans thereon referred to, and has carefully examined the locations, and conditions and classes or materials of the proposed work; and agrees that he will provide all the necessary labor, machinery, tools, and apparatus, and other items incidental to construction, and will do all the work and furnish all the materials called for in the contract and specifications in the manner prescribed therein and according to the requirements of the Engineer/Architect as therein set forth.

The Bidder shall attach to his bid sheet a list of any exceptions to the specifications.

It is understood that the following quantities of work to be done at unit prices are approximately only and are intended principally to serve as a guide in evaluating bids.

It is further agreed that the quantities of work to be done at unit prices and materials to be furnished, may be increased or diminished as may be considered necessary, in the opinion of the Engineer/Architect, to complete the work fully as planned and contemplated, and that all quantities of the work, whether increased or decreased, are to be performed at the unit prices set forth below except as provided for in the specifications.

It is further agreed that lump sum prices may be increased to cover additional work ordered by the Engineer/Architect, but not shown on the plans or required by the specifications, in accordance with the provisions of the General Conditions. Similarly, they may be decreased to cover deletion of work so ordered.

The bid security accompanying this proposal shall be returned to the bidder, unless in case of the acceptance of the proposal the bidder shall fail to execute a contract and file a performance bond and payment bond within the ten (10) days after its acceptance, in which case the bid security shall become the property of the OWNER, and shall be considered as a payment for damages due to delay and other inconveniences suffered by the Owner on account of such failure of the bidder. It is understood that the Owner reserves the right to reject any and all bids.

BIDDER'S BOND in the amount of $___5%___ in compliance with the INSTRUCTION TO BIDDERS.

The above check or Bidder's Bond is to become the property of the City of Mission, Texas, in the event the construction contract (when offered by Owner) and bonds are not executed within the time set forth.

ENGINEER'S ESTIMATE OF QUANTITIES – APPROXIMATE ONLY:

CITY OF MISSION DRAINAGE IMPROVEMENT PROJECT FOR ERMA STREET

ITEM DESCRIPTION	QUANTITY		UNIT PRICE		ITEM TOTAL
A. Mile 1 South/Erma Street Drainage Improvements					
1. Remove Exist. 18" Drain Line	40 LF	@	$_____	=	$_____
2. Remove Exist. Curb Inlets	2 EA	@	$_____	=	$_____
3. 42" RJRCP	1,900 LF	@	$_____	=	$_____
4. 30" RJRCP	450 LF	@	$_____	=	$_____
5. 24" RJRCP	40 LF	@	$_____	=	$_____
6. Trench Protection	2,390 LF	@	$_____	=	$_____
7. 5' Dia. Manhole	1 EA	@	$_____	=	$_____
8. 7' Dia. Manhole	3 EA	@	$_____	=	$_____
9. 8' X 8' Junction Box	2 EA	@	$_____	=	$_____
10. Curb Inlet with Extension	2 EA	@	$_____	=	$_____
11. Tie To Exist. 18" Line	1 EA	@	$_____	=	$_____
12. Remove and Replace Curb & Gutter	40 LF	@	$_____	=	$_____
13. Remove and Replace 5' Sidewalk	200 LF	@	$_____	=	$_____
14. 8" Water Line Adjustments	2 EA	@	$_____	=	$_____
15. 12" Water Line Adjustments	2 EA	@	$_____	=	$_____

16. Erosion Control (Construction Excavation, 1500 LF Silt Fence, Inlet Protection Socks)	LUMP SUM	@	$_____	=	$_____
17. Saw Cut and Pavement and Patch with 8” Flex Base and 2” HMAC	550 LF	@	$_____	=	$_____
18. Remove and Replace 6’ Valley Gutter	40 LF	@	$_____	=	$_____
*****19. Utility Adjustments	Stated Amount	@	$50,000.00	=	$50,000.00
20. 42” Down Drain	1 EA	@	$_____	=	$_____

Total Base Bid (Item A): $_____

***Note: Any part of the Stated Allowance for the Utility Adjustments shall only be utilized if authorized by the Engineer in writing. A cost proposal for this item must be submitted by the Contractor and approved by the Engineer prior to work performed.**

Number of calendar days to complete contract 90**.**

The undersigned agrees, unless hereinafter stated otherwise to furnish all materials as shown and specified in the Plans and Specifications.

Bidder hereby agrees to commence work under this contract within 10 days after notice to proceed is issued and complete the work within **90** calendar days.

Receipt is acknowledged of the following addenda:

No. _____ Dated _____

No. _____ Dated _____

Bidder agrees that the Owner has the right to accept or reject any or all bids and to waive all formalities.

DATE:_____

Respectfully submitted,

By: _____
(Signature)

_____
(Type or Print Name)

(SEAL – IF BIDDER IS A CORPORATION)

_____
(Company)

_____
(Address)

_____

_____
(Phone Number)

_____
(Fax Number)

BID BOND

KNOW ALL MEN BY THESE PRESENTS, That we, the undersigned _____ _____ as Principal, and _____ _____ as Surety, are hereby held and firmly bound unto _____ as Owner in the penal sum of _____ _____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

Signed, the _____ day of _____, 20_____.

The condition of the above obligation is such that whereas the Principal has submitted to _____ a certain Bid, attached hereto and hereby made a part hereof to enter into a contract in writing for the _____
_____
_____
_____
_____

NOW, THEREFORE,

(a) If said Bid shall be rejected, or in the alternate,

(b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid, then this obiligation shall be be void, otherwise the same shall remain in force and affect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation is herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____(L.S.)
Principal

By:_____

_____
Surety

SEAL

By:_____

REQUEST BY CONTRACTOR FOR CERTIFICATE OF

EXEMPTION FROM TEXAS LIMITED SALES, EXCISE

AND USE TAX

TO: City of Mission DATE:_____

RE: Owner Contract For: City of Mission Drainage Improvement Project
For Erma Street

The undersigned contractor hereby requests a Certificate of Exemption from payment of taxes under Chapter 20, Title 122a, Revised Civil Statutes of Texas, in amount of $_____, which is an amount not exceeding the contract price of all materials and other tangible personal property to be furnished in connection with the subject project.

The undersigned hereby represent that such materials and property have been or will be utilized in the performance of the contract to the contract to the full extent of the amount for which such Certificate of Exemption is required.

_____
Contractor

By: _____

NON-COLLUSION AFFIDAVIT OF PRIME BIDDER

State of _____
County of _____

_____, being first duly sworn, deposes and says that:

(1) He is _____, of _____, the Bidder that has submitted the attached Bid;

(2) He is fully informed respecting the preparation and contents of this attached bid and of all partinent circumstances respecting such bid;

(3) Such bid is genuine and is not a collusive or sham Bid;

(4) Neither the said Bidder nor any of its officers, partners, owners, agents, representative:, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firm or person to submit a collusive or sham Bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm or person to fix the price or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the Owner or any person interested in the proposed Contract; and

(5) The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant.

(Signed) _____

_____
(Title)

Subscribed and sworn to before me on this _____

day of _____, 20___.

_____
Notary Public

My Commission expires:_____

FORM OF AGREEMENT FOR ENGINEERING CONSTRUCTION
UNIT PRICE BASIS

THIS AGREEMENT, MADE ON THE _____ day of _____ 2020, by and between the **CITY OF MISSION** party of the first part, hereinafter called the OWNER, and _____ party of the second part, hereinafter called the CONTRACTOR.

It is understood ENGINEER representing OWNER shall be:

Javier Hinojosa Engineering
416 E. Dove Avenue
McAllen, Texas 78504

WITNESSETH, That the Contractor and the Owner, for the considerations hereinafter named, agree as follows:

ARTICLE I – SCOPE OF WORK.

The Contractor hereby agrees to furnish all of the material and all of the equipment and labor necessary, and to perform all of the work shown on the drawings and described in the specifications for the project entitled:

CITY OF MISSION DRAINAGE IMPROVEMENT PROJECT FOR ERMA STREET

CONTRACT AMOUNT: $_____

(a.) Drawings prepared for **CITY OF MISSION** by Javier Hinojosa Engineering.

(b.) Specifications consisting of:

1. "Standard General Specifications" issued by the **CITY OF MISSION** and as issued in the contract documents.

2. "Special Provisions" as prepared by Javier Hinojosa Engineering dated **June, 2020.**

2. The "General conditions for Engineering Construction."

3. Addenda

No._____ Dated _____

No._____ Dated _____

No._____ Dated _____

ARTICLE II – Time of Completion

"If the contractor fails to complete this contract in the **90 calendar days** specified, the time charge will be made for each calendar day thereafter."

The time set forth in the proposal for the completion of the work is an essential element of the contract. For each calendar day in addition to the calendar days hereinbefore stated as extended by the Owner, the amount per day given in the following schedule will be deducted from the money due or to become the Contractor not as a penalty, but as added expense for Engineering supervision.

FOR AMOUNT OF CONTRACT	COST PER DAY
$5,000.00 or less ……..	$ 10.00
$5,001.00 to $25,000.00……	$ 15.00
$25,0001.00 to $50,000.00……	$ 25.00
$50,000.00 to $100,000.00……	$ 50.00
over $100,000.00……..	$250.00

ARTICLE III – The Contract Sum

(a) The owner shall pay to the Contractor for the performance of the work the amounts determined for the total number of each of the following units of work completed at the unit price stated thereafter. The number of units contained in this schedule is approximate only, and the final payment shall be made for the actual number of units that are incorporated in or made necessary by the work covered by the contract.

"Should the completed work vary 25% from the number of units stated in such schedule of units, either the Owner or the Contractor may request a revision of the unit price for the item so affected, and both parties agree that under such conditions an equitable revision of the price shall be made".

(b) Changes in the work made under Section 18 of the General Condition, and not included in Article I, that cannot be classified as coming under any of the Contract units may be done at mutually agree-upon unit prices, or on a lump sum basis, or under the provisions of Article V "Extra Work".

ARTICLE IV –Progress Payments

The Owner shall make payments on account of the Contract as follows:

(A) On not later than the fifth day of every month the Contractor shall present to the Engineer an invoice covering the total quantities under each item of work that has been completed from start of the job to an including the last day of the preceding month, and the value of the work so completed determined in accordance with the schedule of unit process for such items together with such supporting evidence as may be required by the Engineer.

Measurements of units for payment shall be made in accordance with the Special Conditions of the Contract.

(B) One not later than the 30th of the month, the Owner shall pay to the Contractor 90 percent of the amount of the invoice less previous payments made. The 10 percent retained percentage may be held by the Owner until the value of the work completed at the end of any month equals 50 percent of the total amount of the Contract after which, if the Engineer finds that satisfactory progress is being made, he shall recommend that all of the remaining monthly payments be paid in full. Payments for work under, Subcontracts of the General Contractors, shall be subject to the above conditions applying to the General Contract after the work under a Subcontract has been 50 percent completed.

(C) Final payment of all monies due on the contract shall be made within 30 days of completion and acceptance of the work.

(D) If the owner fails to make payments as herein provided, or as provided in Article V (d), in addition to those remedies available to the Contractor under Section 25 of the General conditions, there shall be added to each such payment daily interest at the rate of 6% per annum commencing on the first day after said payment is due and continuing until the payment is delivered or mailed to the Contractor.

ARTICLE V EXTRA WORK

If the Engineer orders, in writing, the performance of any work not covered by the Drawings or included in the Specifications, and for which no item in the contract is provided, and for which no unit price or lump sum basis can be agreed upon, then such extra work shall be done on a cost plus percentage basis of payment as follows:

The contractor shall be reimbursed for all costs incurred in doing the work, and shall receive an additional payment of 5% of all such cost to cover his indirect overhead costs, plus 15% of all costs including indirect overhead, as his fee.

The "Cost of the Work" shall be determined as the net sum of the following items:

1. Job office and all necessary temporary facilities such as building, use of land not furnished by the Owner, access roads, and utilities. The costs of these items include construction, furnishing and equipment, maintenance during the period that they are needed, demolition and removal. Salvage values agreed or received by the Contractor shall be credited to the Owner.

2. All materials used on the work whether for temporary or permanent construction.

3. All small tools and supplies; all fuel, lubricants, power, light, water and telephone service.

4. All plant and equipment at specified rental rates and terms of use. If the rental rates do not include and allowance for running repairs and repair parts needed for ordinary maintenance of the plant and equipment, then such items of cost are to be included in the Cost of the Work.

5. All transportation costs on equipment, materials and men.

6. All labor for the project and including the salaries of superintendents, foremen, engineers, inspectors, clerks and other employees while engaged on the work but excluding salaries of general supervisory employees or officers, who do not devote their full time to the work.

7. All payroll charges such as Social Security payments, unemployment, insurance, workmen's compensation insurance premiums, vacation and sick-leave allowances applicable to wages or salaries park to employees for work done in connection with the contract.

8. All premiums on fire, public liability, property damage or other insurance coverage authorized or required by the Engineer or the Owner, or regularly paid by the contractor in the conduct of his business.

9. All sales, use, excise, privilege, business, occupation, gross receipt and all other taxes paid by the Contractor in connection with the work, but excluding state income derived from this contract and Federal income taxes.

10. All travel or other related expense of general supervisory employees for necessary visits to the job excluding expenses of such employees uncured at the Home Office of the contractor.

11. All Subcontractors approved by the Engineer or Owner.

12. (Insert other costs proper for inclusion in this contract.)

    a._____

    b._____

    c._____

13. Any other cost incurred by the Contractor as a direct result of executing the Order, subject to approval by the Engineer.

14. Credit to the Owner of the following items:

    a. Such discounts on invoices as may be obtained provided that the Owner advances sufficient funds to pay the invoices within the discount period.

    b. The mutually agreed salvage value of materials, tools or equipment charged to the Owner and take over by the Contractor for his use or sale the completion of the work.

    c. Any rebates, refunds, returned deposits or other allowances properly credited to the cost of the work.

(c) The cost of the work done each day shall be submitted to the Engineer in a satisfactory form on the succeeding day, and shall be approved by him or adjusted at once.

(d) Monthly payments of all charges for the Extra Work in any one month shall be made in full on or before the 15th day of the succeeding month. Those payments shall include the full amount of fee earned on the cost of the work done.

IN WITNESS WHEREOF the parties hereto have executed this Agreement, the day and year first above written.

_____	CITY OF MISSION_____
CONTRACTOR	OWNER
BY:_____	BY:_____
(NAME/TITLE)	DR. ARMANDO O'CAÑA, MAYOR
WITNESS:	WITNESS:
_____	_____
(NAME/TITLE)	ANNA CARRILLO, CITY SECRETARY

P E R F O R M A N C E B O N D

STATUTORY PERFORMANCE BOND PURSUANT TO ARTICLE 2253
OF THE TEXAS LOCAL GOVERNMENT CODE AS AMENDED BY ACTS OF THE 1993,
73RD LEGISLATURE, CH. 268 §1, EFF. SEPT. 1, 1993
****

KNOW ALL MEN BY THESE PRESENTS, THAT_____

_____

_____

_____

(hereinafter called the Principal(s), as Principal(s), and_____

_____

_____

_____

(hereinafter called the Surety(s), as Surety(s), are held and firmly bound unto

_____

_____

_____

_____

(hereinafter called the Obligee), in the amount of_____

_____ Dollars ($_____)

for the payment whereof the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the _____ day of _____, 20_____, for the_____

_____

which contract is hereby referred to and made a part hereof as fully and to the same extent as if copies at length herein.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully perform the work in accordance with plans, specifications and contract documents, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Article 5160 of the Revised Civil Statutes of Texas as amended by the Acts of the 56th Legislature, Regular Session, 1959, and provisions of said Article to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, this instrument is executed in four counterparts, each one of which shall be deemed an original, this the _____ day of _____ A.D., 20____.

_____
Principal

ATTEST:

_____
(Principal) Secretary
(SEAL)

_____
Signature

_____
Witness as to Principal

_____
(Print/Type Name)

_____
(Address)

_____
(Address)

ATTEST:

_____
Surety

_____
(Surety) Secretary
(SEAL)

_____
Attorney-in-Fact (Signature)

_____
Witness as to Surety

_____
(Print/Type Name)

_____
(Address)

_____
(Address)

NOTE: Date of Bond must not be prior to date of Contract

(1) Correct name of Contractor; (2) A Corporation, a Partnership or an Individual, as case may be; (3) Correct name of Surety; (4) Correct name of Owner; (5) County or Parish and State; (6) Owner; (7) If Contractor is Partnership, all partners should execute bond.

P A Y M E N T B O N D

STATUTORY PAYMENT BOND PURSUANT TO ARTICLE 2253
OF THE TEXAS LOCAL GOVERNMENT CODE AS AMENDED BY ACTS OF THE 1993,
73RD LEGISLATURE, CH. 268 §1, EFF. SEPT. 1, 1993
****

KNOW ALL MEN BY THESE PRESENTS, that_____

_____

_____

_____

_____

(hereinafter called the Principal(s), as Principal(s), and_____

_____

_____

_____

(hereinafter called the Surety(s), as Surety(s), are held and firmly bond unto_____

_____

_____

_____

(hereinafter called the Obligee), in the amount of _____
_____ Dollars ($_____)

for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the _____ day of _____, 20_____, to _____

_____

which contract is hereby referred to and made a part hereof as fully and to the same extent as if copies at length herein.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall pay all claimants supplying labor and material to him or a subcontractor in the prosecution of the work provided for in said contract, then, this obligation shall be void; otherwise to remain in full force and affect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Article 5160 of the Revised Civil Statutes of Texas as amended by the Acts of the 56th Legislature, Regular Session, 1959, and all liabilities on this bond shall be determined in accordance with the provisions of said Article to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, this instrument is executed in four counterparts, each one of which shall be deemed an original, this the _____ day of A.D., 20_____.

_____
Principal

ATTEST:

_____	_____
(Principal) Secretary (SEAL)	Signature
_____	_____
Witness as to Principal	(Print/Type Name)
_____	_____
(Address)	(Address)

ATTEST:

_____
Surety

_____	_____
(Surety) Secretary (SEAL)	Attorney-in-Fact (Signature)
_____	_____
Witness as to Surety	(Print/Type Name)
_____	_____
(Address)	(Address)

NOTE: Date of Bond must not be prior to date of Contract

(1) Correct name of Contractor; (2) A Corporation, a Partnership or an Individual, as case may be; (3) Correct name of Surety; (4) Correct name of Owner; (5) County or Parish and State; (6) Owner; (7) If Contractor is Partnership, all partners should execute bond.

P A Y M E N T B O N D

STATUTORY PAYMENT BOND PURSUANT TO ARTICLE 2253
OF THE TEXAS LOCAL GOVERNMENT CODE AS AMENDED BY ACTS OF THE 1993,
73RD LEGISLATURE, CH. 268 §1, EFF. SEPT. 1, 1993
****

KNOW ALL MEN BY THESE PRESENTS, that_____

_____

_____

_____

_____

(hereinafter called the Principal(s), as Principal(s), and_____

_____

_____

_____

(hereinafter called the Surety(s), as Surety(s), are held and firmly bond unto_____

_____

_____

_____

(hereinafter called the Obligee), in the amount of _____
_____ Dollars ($_____)

for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the _____ day of _____, 20_____, to _____

_____

which contract is hereby referred to and made a part hereof as fully and to the same extent as if copies at length herein.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall pay all claimants supplying labor and material to him or a subcontractor in the prosecution of the work provided for in said contract, then, this obligation shall be void; otherwise to remain in full force and affect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Article 5160 of the Revised Civil Statutes of Texas as amended by the Acts of the 56th Legislature, Regular Session, 1959, and all liabilities on this bond shall be determined in accordance with the provisions of said Article to the same extent as if it were copied at length herein.

IN WITNESS WHEREOF, this instrument is executed in four counterparts, each one of which shall be deemed an original, this the _____ day of A.D., 20_____.

_____
Principal

ATTEST:

_____	_____
(Principal) Secretary (SEAL)	Signature
_____	_____
Witness as to Principal	(Print/Type Name)
_____	_____
(Address)	(Address)

ATTEST:

_____
Surety

_____	_____
(Surety) Secretary (SEAL)	Attorney-in-Fact (Signature)
_____	_____
Witness as to Surety	(Print/Type Name)
_____	_____
(Address)	(Address)

NOTE: Date of Bond must not be prior to date of Contract

(1) Correct name of Contractor; (2) A Corporation, a Partnership or an Individual, as case may be; (3) Correct name of Surety; (4) Correct name of Owner; (5) County or Parish and State; (6) Owner; (7) If Contractor is Partnership, all partners should execute bond.

CERTIFICATE OF OWNER'S ATTORNEY

I, the undersigned, _____, the duly authorized and acting legal representative of _____.

_____, do hereby certify as follows:

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

Date:_____

_____
Signature

By:_____
Print Name

GENERAL CONDITIONS OF CONTRACT FOR ENGINEERING CONSTRUCTION

SEC. 1 – Definitions

(a) The Contract Documents shall consist of the Advertisement for Bids, Instructions to Bidders, The Proposal, The Contract Agreement, Performance Bond, Payment Bond, General Conditions of the Contract, Special Conditions of the Contract, Construction Specifications, Construction Drawings, Addendas, Change Orders and the Construction Plans including all modifications thereof incorporated in any of the documents before the execution of the Agreement.

(b) The Owner, the Contractor and the Engineer are those named as such in the Agreement. They are treated throughout the contract Documents as if each were of singular number and masculine gender.

(c) Wherever in this contract the word "Engineer" is used it shall be understood as referring to the Engineer of the Owner, acting personally or through assistant duly authorized in writing by the Engineer.

(d) Written notice shall be deemed to have been duly served if 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 to an authorized representative of such individual, firm, or corporation, or if delivered at or sent by registered mail to the last business address known to him who gives the notice, with a copy sent to the central office of the Contractor.

(e) The term "Subcontractor" shall mean anyone (other than the contractor) who furnished at the site, under and Agreement with the contractor, labor, or labor and materials, or labor and equipment, but shall not include any person who furnished services of a personal nature.

(f) Work shall mean the furnishing of all labor, materials, equipment, and other incidentals as are required to complete the Contract for the purpose for which it was intended but was not shown on the Drawing or called for in the Specifications, or is desired by the Owner in addition to that work called for in the Drawings and Specifications.

(g) Dispute shall mean lack of agreement between any parties that have any obligations, duties, or responsibilities under the terms of the contract, Drawings, or Specifications.

SEC. 2 – Execution and Correlation of Documents

The contract Documents shall be signed in duplicate by the Owner and the Contractor.

The contract Documents are complementary and what is called for by any one shall be as binding as if called for by all. In case of conflict between Drawings, and Specifications, the Specifications shall govern. Materials or work described in words which so applied have a well-known technical or trade meaning shall be held to refer to such recognized standards.

SEC. 3 – Design, Drawings and Instructions

It is agreed that the Owner will be responsible for the adequacy of design and sufficiency of the Drawings and Specifications. The Owner, through the Engineer, or the Engineer as the Owner's representative, shall furnish Drawings and Specifications which adequately represent the requirements of the work to be performed under the contract. All such Drawings and instructions shall be consistent with the Contract Documents and shall be true developments thereof. In the case of lump-sum Contracts, Drawings and Specifications which adequately represent the work to be done shall be furnished prior to the time of entering into the Contract. The Engineer may, during the life of the Contract, and in accordance with Section 18, issue additional instructions by means of Drawings or other media necessary to illustrate changes in the work.

SEC. 4 – Copies of Drawings Furnished

Unless otherwise provided in the Contract Documents, the Engineer will furnish the Contractor, free of charge, all copies of Drawings and Specifications reasonably necessary for the execution of the work.

SEC. 5 – Order of Completion

The contractor shall submit, at such times as may be reasonably requested by the Engineer, schedules which shall show the order in which the Contractor proposed to carry on the work, with dates at which the Contractor will start the several part of the work, and estimated dates of completion of the several parts.

SEC. 6 – Ownership of Drawings

All drawings, Specifications and copies thereof furnished by the Engineer shall not be reused on other work and, with the exception of the signed Contract, sets are to be returned to him on request, at the completion of the work. Owner may keep one set of Drawings for future use on the Project, including for maintenance of the Project.

SEC. 7 – Familiarity with Work

The Owner shall make known to all prospective bidders, prior to the receipt of bids, all information that he may have as to subsurface conditions in the vicinity of the work, topographical maps, or other information that might assist the bidder in properly evaluation the amount and character of the work that might be required. Such information is given, however, as being the best factual information available to the Owner. The Contractor, by careful examination, shall satisfy himself as to the nature and location of the work, the character of equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions, and all other matters which can in any way affect the work under this Contact.

SEC. 8 – Change Conditions

The Contractor shall promptly, and before such conditions are disturbed, notify the Owner in writing of: (1) Subsurface or latent physical conditions at the site differing materially from those indicated in this Contract; or (2) previously unknown physical or other conditions at the site, or an unusual nature, differing materially from those ordinarily encountered and generally recognized as ingerent in work of the character provided for in this Contract. The Engineer shall promptly investigate the conditions, and if he finds that such conditions, do so materially differ and cause an increase or decrease in the cost of, or the time required for, performance of this Contract, an equitable adjustment shall be made and the Contract modified in writing accordingly. Any claim of the Contractor for adjustment hereunder shall not be allowed unless he has given notice as above required; provided that the Engineer may, if he determines the facts so justify, consider and adjust any such claims asserted before the date of final settlement of the Contract. If the parties fail to agree upon the adjustment to be made, the dispute shall be determined as provided in Section 39 hereof.

SEC. 9 – Materials and Appliances

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power transportation and other facilities necessary for the execution and completion of the work. Unless otherwise specified, all materials incorporated in the permanent work shall be new and both workmanship and materials shall be of good quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

SEC. 10 – Employees

The Contractor shall at all times enforce strict discipline and good order among his employees, and shall seek to avoid employing on the work any unfit person or anyone not skilled in the work assigned to him.

SEC. 11 – Royalties and Patents

The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from less on account thereof except that the Owner shall be responsible for all such loss when a particular process or the project of a particular manufacturer or manufactures is specified, unless the Owner has notified the Contractor prior to the signing of the contract that the particular process or product is patented or is believed to be patented.

SEC. 12 – Surveys

Unless otherwise specified, the Owner shall furnish all land surveys and establish all base lines for locating the principal component parts of the work together with a suitable number of bench marks adjacent to the work. From the information provided by the Owner, the Contractor shall develop and make all detail surveys needed for construction such as slopes stakes, batter boards, stakes for pile locations and other working points, lines and elevations.

The contractor shall carefully preserve bench marks, reference points and stakes and, in case of willful or careless destruction, he shall be charged with the resulting expense and shall be responsible for any mistakes that may be caused by their unnecessary loss or disturbance.

SEC. 13 – Permits, Licenses and Regulations

Permits and licenses of a temporary nature necessary for the prosecution of the work shall be secured and paid for by the Contractor. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by the Owner, unless otherwise specified. The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the contractor observes that the Drawings and Specifications are at variance therewith, he shall promptly notify the Engineer in writing, and any necessary changes shall be adjusted as provided in the Contract for changes in the work.

SEC. 14 – Protection of the Public and of Work and Property

The Contractor shall provide and maintain all necessary watchmen, barricades, warning lights and signs and take all necessary precautions for the protection, and safety of the public. He shall take all reasonable precautions to protect the Owner's property from injury or loss arising in connection with this contract. He shall made good any damage, injury or loss to his work and to the property of the Owner resulting from lack of reasonable protective precautions, except such as any be due to errors in the Contract Documents, or caused by agents or employees of the Owner. He shall adequately protect adjacent private and public property, as provided by law and the Contract Documents.

In an emergency affecting the safety of life, of the work, or of adjoining property, the Contractor is, without special instructions or authorization from the Engineer, hereby permitted to act at his discretion to prevent such threatened loss or injury. He shall also act, without appeal, if so authorized or instructed by the Engineer.

Any compensation claimed by the Contractor on account of emergency work, shall be determined by agreement.

SEC. 15 – Inspection of Work

The Owner shall provide sufficient competent personnel, working under the supervision of a qualified engineer, for the inspection of the work while such work is in progress to ascertain that the completed work will comply in all respects with the standards and requirements set forth in the Specifications. Notwithstanding such inspection, the contractor will be held responsible for the acceptability of the finished work.

The Engineer and his representatives shall at all times have access to the work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for such access, and for inspection.

If the Specifications, the Engineer's Instructions, laws, ordinances, or any public authority require any work to be specially tested or approved, the Contractor shall give the Engineer timely notice of its readiness for inspection, and if the inspected is by an authority other than the Engineer of the date fixed for such inspection. Inspections by the Engineer shall be made promptly, and where practicable at the source of supply. If any work should be covered up without approval or consent of the Engineer, it must, if required by the Engineer be uncovered for examination and properly restored at the Contractor's expense, unless the Engineer has unreasonably delayed inspection.

Re-examination of the work may be ordered by the Engineer, and, if so ordered, the work must be uncovered by the Contractor. If such work is found to be in accordance with the Contract Documents, the Owner shall pay the cost of re-examination and replacement. If such work is not in accordance with the Contract Documents, the Contractor shall pay such cost.

SEC. 16 – Superintendence

The Contractor shall keep on his work, during its progress, a competent superintendent and any necessary assistants. The superintendent shall represent the Contractor, and all direction give to him shall be binding as if given to the Contractor. Important directions shall be so confirmed on written request in each case. The Contractor shall give efficient superintendence to the work, using his best skill and attention.

SEC. 17 – Discrepancies

If the Contractor, in the course of the work, finds any discrepancy between the Drawings and the physical conditions of the locality, or any errors or omissions in Drawings or in the layout as given by survey point and instruction, he shall immediately inform the Engineer, in writing, and the Engineer shall promptly verify the same. Any work done after such discovery, until authorized will be done at the Contractor's risk.

SEC. 18 – Changes in the Work

The Owner may make changes in the Drawings and Specifications of scheduling of the Contract within the general scope at any time by a written order. If such changes add to or deduct from the contractor's cost of the work, the contract shall be adjusted accordingly. All such work shall be executed under the conditions of the original Contract except that any claim for extension of time caused thereby shall be adjusted at the time of ordering such change.

In giving instructions, the Engineer shall have authority to make minor changes in the work not involving extra cost, and not inconsistent with the purpose of the work, but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Engineer, and no claim for an addition to the Contract Sum shall be valid unless the additional work was so ordered.

The Contractor shall proceed with the work as changed and the value of any such extra work or change shall be determined as provided in the Agreement.

SEC. 19 – Extension of Time

Extension of time stipulated in the Contract for completion of the Work will be made when changes in the work occur, as provided in Section 18; when the work is suspended as provided in Section 23; and when the work of the Contractor is delayed on account of conditions which could not have been foreseen, or which were beyond the control of the Contractor, his subcontractor or suppliers, and which were not the result of their fault or negligence. Extension of time for completion shall also be allowed for any delays in the progress of the work caused by any act (except as provided elsewhere in these General Conditions) or neglect of the Owner or of his employees or by other contractors employed by the Owner, or by any delay in the furnishing of Drawings and necessary information by the Engineer, or by any other case which in the opinion of the Engineer entitled the Contractor to an extension of time, including but not restricted to, acts of the public enemy, acts of any government in either its sovereign or any applicable contractual capacity, acts of another contractor in the performance of a contract with the Owner, fires, floods, epidemics, quarantine restriction, freight embargoes, unusually severe weather, or labor disputes.

The Contractor shall notify the Engineer promptly of any occurrence or conditions which in the Contractor's opinion entitle him to an extension of time. Such notice shall be in writing and shall be submitted in ample time to permit full investigation and evaluation of the Contractor's claim. The Engineer shall acknowledge receipt of the Contractor's notice within 5 days of its receipt. Failure to provide such notice shall constitute a waiver by the Contractor of any claim.

SEC. 20 – Claims

If the Contractor claims that any instructions by Drawings or other media issued after the date of the Contract involve extra cost under this Contract, he shall give the Engineer written notice thereof within __7__ days after the receipt of such instructions, and in any event before proceeding to execute the work, except in emergency endangering life or property, and the procedure shall then be as provided for changes in the work. No such claim shall be valid unless so made.

SEC. 21 – Deductions for Uncorrected Work

If the Engineer deems it inexpedient to correct work that has been damaged or that was not done in accordance with the Contract, an equitable deduction from the Contract price shall be made therefore, unless the Contractor elects to correct the work.

SEC. 22 – Correction of Work Before Final Payment

The contractor shall promptly remove from the premises all materials and work condemned by the Engineer as failing to meet contract requirements, whether incorporated in the work or not. The contractor shall promptly replace and re-execute his own work in accordance with the Contract and without expense to the Owner and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.

If the Contractor does not take action to remove such condemned material and work within 10 days after written notice, the Owner may remove them and may store the material at the expense of the Contractor. If the Contractor does not pay the expense of such removal and storage within ten days time thereafter, the Owner may, upon ten days' written notice, sell such materials at auction or at private sale and shall pay to the Contractor any net proceed thereof, after deducting all the costs and expenses that should have been borne by the Contractor.

SEC. 23 – Suspension of Work

The Owner may at any time suspend the work, or any part thereof by giving __1__ days' notice to the Contractor in writing. The work shall be resumed by the Contractor within ten (10) days after the date fixed in the written notice from the Owner to the Contractor so to do. The Owner may reimburse the Contractor for expense incurred by the Contractor in connection with the work under this Contract as a result of such suspension, eligibility and amount of reimbursement to be determined by the Engineer.

The contractor may at the Owner's option, be allowed an increase in the contract price or an extension of the contract time, or both; directly attributable to any suspension if Contractor demonstrates an approved claim. Any increases or decreases in the contract price shall be governed by all state and local laws, statutes, codes, ordinances, rules and regulations governing competitive bidding or sealed proposals and change orders.

If the work, or any part thereof, shall be stopped by notice in writing aforesaid, and if the Owner does not give notice in writing to the Contractor to resume work at a date within 15 days of the date fixed in the written notice to suspend, then the contractor may abandon that portion of the work so suspended and he will be entitled to the estimates and payment for all work done on the portions so abandoned.

SEC. 24 – The Owner's Right to Terminate Contract

If the Contractor should be adjudged as bankrupt, or if he should make a general assignment for the benefit of this creditors, or if a receiver should be appointed as a result of his insolvency, or if he should be guilty of a substantial violation of the contract, then the Owner, upon the certificate of the Engineer that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor and his Surety seven days' written notice terminate the employment of the Contractor and take notice terminate the employment of the Contractor and take possession of the premises and of all materials, tools, equipment and other facilities installed on the work and paid for by the Owner, and finish the work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Contract price shall exceed the expense of finishing the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner as herein provided, and the damage incurred through the Contractor's default, shall be certified by the Engineer.

SEC. 25 – Contractor's Right to Stop Work or Terminate Contract

If the work should be stopped under an order of any court, or other public authority, for a period of more than three months, through no act or fault of the contractor or of anyone employed by him, or if the Engineer should fail to issue any estimate for payment within seven days after it is due, or if the Owner should fail to pay the Contractor within seven days of its maturity then the Contractor may, upon seven days' written notice to the Owner and the Engineer, stop work.

SEC. 26 – Removal of Equipment

In the case of termination of this Contract before completion from any cause whatever, the Contractor, if notified to do so by the Owner, shall promptly remove any part or all of his equipment and supplies from the property of the Owner, failing which the Owner shall have the right to remove such equipment and supplies at the expense of the Contractor.

SEC. 27 – Responsibility for Work

The Contractor assumes full responsibility for the work. Until its final acceptance, the Contractor shall be responsible for damage to or destruction of the work (except for any part covered by partial acceptance as set forth in Sec. 28): He agrees to make no claims against the Owner for damages to the work from any cause.

Existing Structures : The Contractor shall, at his own expense immediately make permanent repairs and restore to original condition any structure that are to remain in place and damaged by the Contractor's equipment or workmen during the performance of work under this contract or damaged as a result of improperly executed work.

Traffic Areas, Driveways, Entrances : All traffic areas, driveways and entrances shall be restored to usable condition at the Contractor's expense as the work progresses. The Contractor shall make every effort to cooperate with the wishes of the individual property owners in providing access to private property along the site of the work.

Detours : The contractor shall do such work as may be necessary to provide and maintain a detour adjacent to all road structures for public travel. The Contractor shall maintain the detours in such condition that the public can travel over same in comfort and safety, and shall at his own expense perform such work as may be required to keep said detours open to the public at all times. The Contractor shall cooperate with the Engineer in the regulation of traffic and shall so govern his work that when it becomes necessary to suspend construction for a considerable period of time, the roadways will be re-opened to public travel. Material and equipment shall be stored and work shall be so conducted as to obstruct public travel as little as possible, and in no case shall there be less than eighteen (18) foot in width of obstructed roadway for the use of traffic shall be protected with barricades, flags and markers in conformance with the Texas Manual of Uniform Traffic Control Devices. (TMUTCD)

Barricades and Danger Warning and Detour Signs : When any section of the construction site is closed to traffic, the Contractor shall furnish and maintain at each end of the closed section and at all intersecting barricades, adequate warning directional signs. If at any time the barricades are not, in the opinion of the Engineer, sufficient to prevent traffic from entering the closed portions of the street-road-construction site, the Contractor shall provide and maintain watchmen at such points and for such periods of time as the Engineer may direct. When directed by the Engineer or required by the (TMUTCD), the Contractor shall provide and maintain such standard barricades, signs, lights and flags within the closed portion of the street-road- construction site as may be necessary to protect the work and safeguard local traffic.

No direct compensation except as specifically provided in these specifications will be made to the Contractor for the work and material involved in constructing, and maintaining detours and approaches; furnishing installing and maintaining barricades, danger, warning, and detour signs and their subsequent removal; and all other incidentals necessary for the proper direction, safety, and convenience of traffic during the Contract period, as this work is to be considered subsidiary to the several items for which unit prices are requested in the proposal.

SEC. 28 – Partial Completion and Acceptance

If at any time prior to the issuance of the final certificate referred to in Section 42 hereinafter, any portion of the permanent construction has been satisfactorily completed, and if the Engineer determines that such portion of the permanent construction is not required for the operations of the Contractor but is needed by the Owner, the Engineer shall issue to the Contractor a certificate of partial completion, and thereupon or at any time thereafter the Owner may take over and use the portion of the permanent construction described in such certificate, and exclude the Contractor therefrom.

The issuance of a certificate of partial completion shall not be constructed to constitute an extension of the Contractor's time to complete the portion of the permanent construction to which it relates if he has failed to complete it in accordance with the terms of this contract. The issuance of such a certificate shall not operate to release the Contractor or his sureties from any obligations under this contract or the performance bond.

If any prior use increases the cost of or delay the work, the Contractor shall be entitled to extra compensation, or extension of time, or both, as the Engineer may determine, unless otherwise provided.

SEC. 29 – Payments Withheld Prior to Final Acceptance of Work

The Owner, as a result of subsequently discovered evidence, may withhold or nullify the whole or part of any payment certificate to such extent as may be necessary to protect himself from loss caused by:

(a) Defective work not remedied.
(b) Claims filed or reasonable evidence indicating probable filing of claims by other parties against the Contractor.
(c) Failure of the Contractor to make payments properly to Subcontractors or for material or labor.
(d) Damage to another contractor.

When the above grounds are removed or the Contractor provides a Surety Bond satisfactory to the Owner which will protect the Owner in the amount withheld, payment shall be made for amounts withheld, because of them.

No money may be withheld under (b) and (c) above if a payment bond is included in the Contract.

SEC. 30 – Assignment

Neither party to the Contract shall assign the Contractor or sublet is as a whole without the written consent of the other, nor shall the Contractor assign any moneys due to him or to become due to him hereunder, except to bank or financial institution acceptable to the Owner.

SEC. 31 – Rights of Various Interests

Whenever work being done by the Owner's or by other contractor's forces is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Engineer, to secure the completion of the various portions of the work in general harmony.

SEC. 32 – Separate Contracts

The Owner reserves the right to let other contracts in connection with this project. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work, and shall properly connect and coordinate his work with theirs.

If the proper execution or results of any part of the Contractor's work depends upon the work of any other contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for such proper execution and results.

SEC. 33 – Subcontracts

The Contractor shall, as soon as practicable after signing of the Contract, notify the Engineer in writing of the names of Subcontractors proposed for the work.

The Contractor agrees that he is fully responsible to the Owner for the acts and omissions of his subcontractors and of persons either directly or indirectly employed by them, as he is for the acts and omissions or persons directly employed by him.

Nothing contained in the Contract Documents shall create any contractual relation between any Subcontractor and the Owner.

SEC. 34 – Engineer's Status

The Engineer shall perform technical inspection of the work. He has authority to stop the work whenever such stoppage may be necessary to insure the proper execution of the contract. He shall also have authority to reject all work and materials which do not conform to the Contract and to decide questions which arise in the execution of the work.

SEC. 35 – Engineer's Decisions

The Engineer shall, within a reasonable time after their presentation to him, make decisions in writing on all claims of the Owner or the Contractor and on all other matters relating to the execution and progress of the work or the interpretation of the Contract Documents.

SEC. 36 – Land of Work

The Contractor shall provide as indicated on Drawings No. – N/A and not later than the date when needed by the Contractor the lands upon which the work under this Contract is to be done, rights of way for access to same, and such other lands which are designated on the Drawings for the use of the Contractor. Such lands and rights of ways shall be adequate for the performance of the Contract. Any delay in the furnishing of these lands by the Owner shall be deemed proper cause for an equitable adjustment in both Contract price and time of completion.

The Contractor shall provide at his own expense and without liability to the Owner any additional land and access thereto that may be required for temporary construction facilities, or for storage of materials.

SEC. 37 – Cleaning Up

The Contractor shall remove at his own expense from the Owner's property and from all public and private property all temporary structures, rubbish and waste materials resulting from his operations. This requirement shall not apply to property used for permanent disposal of rubbish or waste materials.

SEC. 38 – General Guaranty

Neither the final certificate of payment nor any provision in the Contract Documents nor partial or entire occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall guarantee all material and equipment furnished and Work performed for a period of one (1) year from the date of Substantial Completion. The Contractor warrants and guarantees for a period of one (1) year from the date of Substantial Completion of the system that the completed system is free from all defects due to faulty material or workmanship and the Contractor shall promptly make such correction as may be necessary be reason of such defects including the repairs of any damage to other parts of the system or other work resulting from such defects.

The Owner will give notice of observed defects with reasonable promptness. In the event that the Contractor should fail to make such repairs, adjustments, and charge the Contractor the cost thereby incurred. The Performance Bond shall remain in full force and effect through the guarantee period.

SEC. 39 – Shop Drawings

The approval of (shop) drawings by the Engineer shall not construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Approval of such drawings will not relieve the contractor of the responsibility for any error which any exist as the contractor shall be responsible for the dimensions and design of adequate connections, details and satisfactory construction of all work.

SEC. 40 – Testing

A testing allowance will be a part of the contract to cover costs of testing authorized by the Engineer. All tests that meet specifications will be paid out of this allowance. All failing tests will be paid directly by the Contractor.

SEC. 41 – Additional Insureds

The Contractor shall name the OWNER & ENGINEER as added insured on all insurance policies required under the contract. The Contractor shall hold the OWNER & ENGINEER harmless for claims resulting from the Contractors' work. The Contractor shall defend all claims against the OWNER & ENGINEER resulting from the Contractor's work.

SEC. 42 – Contractor's Duty and Superintendence

The CONTRACTOR shall give adequate attention to the faithful prosecution and completion of this contract and shall keep on the work, during its progress, a competent superintendent and any necessary assistants. The superintendent shall represent the CONTRACTOR in his absence and all direction given to him shall be as binding as if given to the CONTRACTOR.

The CONTRACTOR is and at all times shall remain an independent contractor, solely responsible for the manner and method of completing his work under this contract, with full power and authority to select the means, method and manner of performing such work, so long as such methods do not adversely affect the completed improvements, the OWNER and ENGINEER being interested only in the result obtained and conformity of such completed improvements to the plans, specifications and contract.

Likewise, the CONTRACTOR shall be solely responsible for the safety of himself, his employees and other persons, as well as for the protection of the safety of the improvements being erected and the property or himself or any other person, as a result of his operations hereunder. Engineering construction drawings, and specifications and as well as any additional information concerning the work to be performed passing from or through the ENGINEER shall not be interpreted as requiring or allowing CONTRACTOR to deviate from the plans and specifications, the intent of such drawings, specifications and any other such instruction being to define with particularity the agreement of the parties as to the work the CONTRACTOR is to perform. CONTRACTOR shall be fully and completely liable, at his own expense, for design, construction, installation and use, or non-use, of all items and methods incident to performance of the contract, and for all loss, damage or injury incident thereto, either to person or property, including, without limitation, the adequacy of all temporary supports, shoring, bracing, scaffolding, machinery or equipment, safety precautions or devices, and similar items or devices used by him during construction.

Any review of work in process, or any visit or observation during construction, or any clarification of plans and specifications, by the ENGINEER, or any agent, employee, or representative of either of them, whether through personal observation on the project site or by means of approval of shop drawings for temporary construction or construction processes, or by other means or method, is agreed by the CONTRACTOR to be for the purpose of observing the extent and nature or work completed or being performed, as measured against the drawings and specifications purpose of enabling CONTRACTOR to more fully understand the plans and specifications so that the completed construction work will conform thereto, and shall in no way relieve the CONTRACTOR from full and complete responsibility for the proper performance of his work on the project, including but without limitation the propriety of means and methods of the CONTRACTOR in performing said contract, and the adequacy of any designs, plans or other facilities for accomplishing such performance. Deviation by the CONTRACTOR from plans and specification that may have been in evidence during any such visitation or observation by the ENGINEER, or any of his representatives, whether called to the CONTRACTOR’S attention or not shall in no way relieve CONTRACTOR form his responsibility to complete all work in accordance with said plans and specifications.

PREVAILING WAGE LEGAL REQUIREMENTS

The Contractor's attention is called to Articles 5159A and 5160 of the Revised Civil Statutes of Texas, which Statutes must be complied with. These articles are as follows:

ARTICLE 5159A;

SECTION 1. Not less than the general prevailing rate of per diem wages for work of a similar character in the locality which the work is performed and not less than the general prevailing rate of per diem wages for legal holiday and overtime work, shall be paid to all laborers, workmen and mechanics employed by or on behalf of any County, City and County, City, Town, District or other political subdivision of the State, engaged in the construction of public works, exclusive of maintenance work. Laborers, workmen, and mechanics employed by contractors or subcontractors in the execution of any contract or contracts for public works with the State, or any officer or public body thereof, or in the execution of any contract or contracts for public works, with any County, City and County, City, Town, District or other political subdivision of this State, or any officer or public body thereof, shall be deemed to be employed upon public work.

SECTION 2. The Public body awarding any contract for public work on behalf of the State, or on behalf of any County, City and County, City, Town, District or other political subdivision thereof, or otherwise undertaking any public work, shall ascertain the general prevailing rate of per diem wages in the locality in which the work is to be performed for each craft or type of workmen or mechanic needed to execute the contract, and shall specify in the call for bids for said contract, and in the contract itself, what the general prevailing rate of per diem wages in the said locality is for each craft or type of workmen needed to execute the contract, and shall specify in the call for bids for said contract, and in the contract itself, what the general prevailing rate of per diem wages in the said locality is for each craft or type of workmen needed to execute the contract, also the prevailing rate for legal holiday and overtime work, and it shall be mandatory upon the Contractor to whom the contract is awarded, and upon any subcontractor under him, to pay not less than the said specified rates to all laborers, workmen and mechanics employed for each calendar day, or portion thereof, such laborer, workman or mechanics is paid less than the stipulated rates for any work done under said contract, by paid less than the stipulated rates for any work done under said contract, by him, or by any subcontractor under him, and the said public body awarding the contract shall cause to be inserted in the contract a stipulation to this effect. It shall be the duty of such public body awarding the contract, and its agents and officers to take cognizance of complaints of all violations of the provisions of this Act committed in the course of the execution of the contract, and when making payments to the contractor of moneys becoming due under said contract to withhold and retain therefrom all sums and amounts which shall have been forfeited pursuant to the herein said stipulation and the terms of this Act; provided, however, that no sum shall be so withheld, retained or forfeited, except from the final payment, without a full investigation by the awarding body.

It shall be lawful for any contractor to withhold from any subcontractor under him sufficient sums to cover any penalties withheld from him by the awarding body on account of said subcontractor's failure to comply with the terms of this Act, and if payment has already been made to him the contractor may recover from him the amount of the penalty or forfeiture in a suit at law.

SECTION 3. The contractor and each subcontractor shall keep, or cause to be kept, an accurate record showing the name and occupations of all laborers, workmen and mechanics employed by him, in connection with the said public work, and showing the actual per diem wages paid to each of such workers, public body awarding the contract, its officers and agents.

SECTION 4. Any construction or repair work done under contract, and paid for in whole or in part out of public funds, other than work done directly by any public utility company pursuant to order of the Railroad Commission or other pubic authority, whether or not done under public supervision or direction or paid for wholly or in part out of public funds, shall be held to be "public works" within the meaning of political subdivision of this State in which the building, highway, road, excavation, or other structures, project, development or improvement is situated in all cases in which the contract is awarded by the States, or any public body thereof, and shall be held to mean the limits of the County, City and County, City, Town, District or other political subdivision on whose behalf the contract is awarded in all other cases. The term "general prevailing rate of per diem wages" shall be the rate determined upon as such rate by the public body awarding the contract, or authorizing the work, whose decision in the matter shall be final. Nothing in this Act, however, shall be constructed to prohibit the payment to any laborer, workman or mechanic employed on any public work as aforesaid of more than the said general prevailing rate of wages.

ARTICLE 5160. Bond for Wages:

Any person or person, firm or corporation, entering into a formal contract with this State or its counties or school districts or other subdivisions thereof or any municipality therein for the construction of any public building, or the prosecution and completion of any public work shall be required, before, commencing such work, to execute the usual Penal Bond, with additional obligation that such contractor shall promptly make payments to all persons supplying him or them with labor and materials in the prosecution of the work provided for in such contract. Any person, company, or corporation who has furnished labor or materials used in the construction or repair or any public building or public work, and payment for which has not been made, shall have the right to intervene and be made a party to any action instituted by the State or any adjudicated in such action and judgment rendered thereon, subject, however, to the priority of the claims and judgment of the State or municipality.

If the full amount of the liability of the surety on said bond is insufficient to pay the full amount of said claims and demands, then after paying the full amount due to the State or municipality, the remainder shall be distributed pro-rata among said intervenors. Provided, further, that all claims for labor and materials furnished to said Contractor, and all claims for labor and material furnished to any contractor shall be itemized and sworn to as required by Statutes as to mechanic's lien claims, and such claims shall be filed with the County Clerk of the County, in which said work is being prosecuted, within ninety days from the date of the delivery of said material and lien record, the name of the claimant, the amount claimed, the name of the contractor and the name of the County, School District, other subdivisions, or municipality with which the contract was made; and the County Clerk shall index the claim under the name of the contractor and under the name of the County, School District, other subdivision or municipality; with which the contract was made.

Provided further, that after completion and acceptance of completed project all moneys due contractor under said contract shall be held by the state or it's counties or school districts or other subdivision, thereof or an affidavit made by Contractor that all just bills for labor and material under this contract has been paid in full by the Contractor.
Acts 1913, P. 185; Acts 1929, 41st leg., P. 4881, Ch. 22 paragraph 1.

"General Decision Number: TX20200003 01/03/2020

Superseded General Decision Number: TX20190003

State: Texas

Construction Types: Heavy and Highway

Counties: Cameron, Hidalgo and Webb Counties in Texas.

HEAVY & HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.80 for calendar year 2020 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.80 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2020. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2020

* SUTX2011-003 08/02/2011

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (Paving & Structures)	$ 12.46	
FORM BUILDER/FORM SETTER (Structures)	$ 12.30	
FORM SETTER (Paving & Curb)	$ 12.16	
LABORER		
Asphalt Raker	$ 10.61	
Flagger	$ 9.10	
Laborer, Common	$ 9.86	
Laborer, Utility	$ 11.53	
Pipelayer	$ 11.87	

Work Zone Barricade
Servicer.....$ 12.88

POWER EQUIPMENT OPERATOR:
Asphalt Distributor.....$ 13.48
Asphalt Paving Machine.....$ 12.25
Broom or Sweeper.....$ 10.33
Crane, Lattice Boom 80
Tons or Less.....$ 14.39
Crawler Tractor.....$ 16.63
Excavator, 50,000 lbs or
less.....$ 12.56
Excavator, over 50,000 lbs..$ 15.23
Foundation Drill, Truck
Mounted.....$ 16.86
Front End Loader Operator,
Over 3 CY.....$ 13.69
Front End Loader, 3 CY or
less.....$ 13.49
Loader/Backhoe.....$ 12.77
Mechanic.....$ 15.47
Milling Machine.....$ 14.64
Motor Grader Operator,
Rough.....$ 14.62
Motor Grader, Fine Grade....$ 16.52
Scraper.....$ 11.07

Servicer.....$ 12.34

Steel Worker (Reinforcing).....$ 14.07

TRUCK DRIVER
Lowboy-Float.....$ 13.63
Single Axle.....$ 10.82
Single or Tandem Axle Dump..$ 14.53
Tandem Axle Tractor with
Semi Trailer.....$ 12.12

WELDER.....$ 14.02

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

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within

the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

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

Union Rate Identifiers

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

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

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

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

Union Average Rate Identifiers

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

the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

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

WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

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

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

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

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

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

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END OF GENERAL DECISION

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TECHNICAL SPECIFICATIONS

SECTION	DESCRIPTION
02221	Trench Excavation, Backfill and Compaction
02223	Trench Excavation Protection
02224	Pipe Boring, Drilling and Jacking
02226	Excavation, Backfill and Compaction for Pavement
02227	Excavation, Backfill and Compaction for Utilities
02575	Manholes
02580	Storm Sewer Appurtenances
02590	Reinforced Concrete Pipe
02601	Flexible Base
02612	Hot Mix Asphalt Concrete Pavement
03300	Cast In Place Concrete

02221 TRENCH EXCAVATION, BACKFILL AND COMPACTION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK

A. Excavation, shoring, dewatering, pipe bedding, trench backfill, compaction, grading and cleanup of all pipeline trenching.

B. All work must be performed in accordance with these specifications and the safety requirements of the State and OSHA standards.

1.02 JOB CONDITIONS

A. Site Acceptance

1. Contractor shall accept the site conditions existing during the Contract Time.

2. Ground water and surface water are conditions of the contract and the responsibility of Contractor.

B. Adverse Weather

1. Place no backfill that is wet or frozen.

2. Place no backfill in wet or frozen trenches.

PART 2 - PRODUCTS

2.01 PIPE BEDDING AND BACKFILL

The types of material to be used for bedding and backfill are identified on the Drawings or in the Special Provisions of the contract documents. Material types are defined either by class in accordance with ASTM D2321, or by product description. Contractor is responsible for determination of source of materials and shall submit characterization analysis and physical sample of proposed bedding material for approval prior to construction.

A. Class Designations Based on Laboratory Testing (ASTM D2321 and by reference ASTM D2487 and D653).

1. Class IA: Manufactured aggregates (angular crushed rock/gravel), open-graded, clean.

a. Plasticity Index: Non-plastic.

b. Gradation: 100% passing 1½" sieve, ≤ 10% passing No. 4 sieve, and < 5% passing No. 200 sieve.

2. Class IB: Mixture of manufactured aggregates (Class 1A) and sand, dense-graded, clean.

   a. Plasticity Index: Non-plastic.

   b. Gradation: 100% passing 1½" sieve, ≤ 50% passing No. 4 sieve, and < 5% passing No. 200 sieve.

3. Class II: Well and poorly graded gravels and sands, clean or with little to moderate fines (silt and clay).

   a. Plasticity Index: Non-plastic.

   b. Gravel: 100% passing 1½" sieve, < 5% passing No. 200 sieve (i.e. <5% fines), and < 50% of the non-fines passing a No. 4 sieve.

   c. Sand: 100% passing 1½" sieve, < 5% passing No. 200 sieve (i.e. <5% fines), and > 50% of the non-fines passing a No. 4 sieve.

   d. Gravel, Sand with Fines: 100% passing 1½" sieve, and 5% to 12% passing No. 200 sieve (i.e. 5% to 12% fines).

4. Class III: Silty/clayey gravels and sands, gravel-sand-silt/clay mixtures.

   a. Plasticity Index: (Refer to ASTM D2321)

   b. Gradation: 100% passing 1½" sieve, 12% to 50% passing No. 200 sieve.

* Note: Dense-graded (i.e. well graded) and open-graded (i.e. poorly graded) materials are defined on the basis of the coefficient of uniformity, $Cu = D_{60}/D_{10}$, and the coefficient of curvature, $Cc = (D_{30})^2/(D_{10} \times D_{60})$, where D_{60}, D_{30}, and D_{10} represent the sieve opening dimensions through which 60%, 30%, and 10% of the material would pass, respectively:

Dense-graded: $1 \leq Cc \leq 3$ for both gravel and sand, plus $Cu \geq 4$ for gravel; $Cu \geq 6$ for sand.
Open-graded: Either Cc or Cu criteria for dense gradation are not met.

B. Designations Based on Product Descriptions:

1. Excavated Material Backfill: Excavated material may be used in the trench backfill, provided that all hard rock and stones having any dimensions greater than 6" and frozen earth, debris and roots larger than 2" are removed for the initial backfill. Plasticity Index shall be less than 30. Excavated backfill material must be approved by Engineer.

2. Select Backfill: Select Backfill shall be gravel, fine rock cuttings, sand, sandy loam or loam free from excessive clay. Rock cuttings shall have no dimensions greater than 2 inches. Plasticity Index shall be between 7 and 22. Select backfill must be approved by Engineer.

3. Sand Backfill: Sand backfill shall be clean, hard, durable, uncoated grains, free from lumps and organic material. All materials must pass a No. 8 sieve with less than 5% passing a No. 200 sieve (equivalent to ASTM 2321 Class II Sand Gradation excluding material captured on No. 8 sieve).

4. Granular Backfill: Granular backfill shall be free flowing, such as sand or hydraulically graded stone fines, or mixed sand and gravel, or sandy loam. The material shall be free from lumps, stones over 2 inches in diameter, clay and organic matter.

5. Controlled Density Fill: Use high slump mixture of portland cement, fly ash and fine aggregate formulated, licensed and marketed as K-Krete or equal. Provide mixture having 28-day compressive strength of 70 psi minimum and 150 psi maximum with no measurable shrinkage or surface settlement.

2.02 CRADLING ROCK

A. Use crushed rock or stone with 70-100% passing 1½ inch sieve and no more than 50% passing 1 inch sieve.

2.03 GEOTEXTILE MATERIAL FOR UNSTABLE TRENCHES

A. Where unstable wall or trench bottom conditions are present as determined by the Engineer, a geotextile material shall be installed.

B. The geotextile shall be designed to prevent loss of trench support caused by migration of sand and fines into the embedment matrix and secure the embedment around the pipe.

C. The geotextile shall be a nonwoven, needle point construction and shall consist of long-chain polyethylene or polyamide. The fibers shall be oriented into a stable network whereby they retain their positions with each other. The textile shall be free of any chemical treatment commonly found in soil. The geotextile

shall conform to the following properties:

Tensile Strength: ASTM D 4632	130 LBS.
Elongation: ASTM D 4632	50%
Mullen Burst Strength: ASTM D 3786	250 psi
Coefficient of Permeability: K-cm/sec. (20 CFMC-GET-2, Constant Head) ASTM D 4491	0.10cm/sec.
Puncture Strength:	80 LBS.

D. The geotextile shall be furnished in protective wrapping to protect the material from ultraviolet radiation, contamination from other substances, and abrasion or shipping damage. Any material received damaged, shall be rejected.

PART 3 - EXECUTION

3.01 GENERAL

A. Dewatering

1. Execute work "dry". No pipe or conduits shall be laid or concrete poured on wet soil.

2. Prevent surface water from flowing into excavation.

3. Provide equipment for handling water encountered as required. Obtain Engineer's prior approval of proposed method of dewatering.

4. No sanitary sewer shall be used for disposal of trench water.

B. Protection of Existing Utilities

1. Notify all utility companies of location and schedule of work.

2. Locations and elevations of utilities shown on plans are to be considered approximate only. Notify utility companies and Engineer of conflicts between existing and proposed facilities.

3. Repair, relay or replace existing utilities damaged, destroyed or disrupted during work. Unless specified otherwise, replacement will be at the Contractor's expense.

C. Sheeting, Shoring and Bracing

1. All sheeting, shoring, and bracing shall be in accordance with the Contractor's Excavation Safety System Plan and the safety requirements of the State and OSHA Standards.

2. Provide as necessary to hold walls of excavation, prevent damage to adjacent structures, and to protect workmen and property.

3. Leave Sheeting and shoring in place where removal might cause personal injury or damage to the work.

4. When movable trench shield is used below spring line of pipe, it shall be lifted prior to any forward movement to avoid pipe displacement.

D. Changes in Grade

1. Grades may be adjusted by written field order from the Engineer to suit unforeseen construction conflicts or conditions. Where the bid includes a single bid price for all depths, no additional compensation will be made for adjustments within 1.5 feet of the plan grades.

3.02 EXCAVATION AND TRENCHING

A. General

1. Method of excavation is Contractor's option.

2. Allow no more than 300 feet of trench to be open at one time.

3. Excavate by hand under and around structures, utilities, and roots of trees required to be left in place.

4. Stockpile and replace topsoil to a minimum of 8 inches for surface restoration in grassed or agricultural areas.

B. Trench Characteristics

1. Depth: As indicated for pipe installation to lines and grades required with proper allowance for thickness of pipe and type of bedding specified.

2. Width: Trench width shall be no less than pipe O.D. plus 16 inches or pipe

O.D. × 1.25 + 12 inches, whichever is greater.

3. Trench walls must be vertical below top of pipe and may be vertical or sloped above pipe to conform to excavation codes.

4. Trench boxes and shoring shall not be set below the top of the embedment zone.

5. Provide bell holes for each pipe joint where pipe bears on undisturbed earth.

6. Trench bottom shall be free of large stones and other foreign material.

3.03 SOFT, SPONGY OR UNSTABLE MATERIALS (e.g. peat, muck, and highly expansive soils)

A. Stop work and notify Engineer.

B. Perform remedial work as directed.

C. If material is judged unsuitable and removal is authorized, remove and replace with trench stabilizing material as directed by Engineer.

3.04 ROCK EXCAVATION

A. Excavate any rock to maintain minimum 6-inch clearance around pipe.

B. Dispose of rock material not suitable for backfill as directed by Engineer.

C. Use of explosives not permitted without prior written authorization from Owner and Engineer.

D. Provide Special Hazard Insurance covering liability for blasting operations.

3.05 PIPE EMBEDMENT

Pipe embedment includes materials placed in the zone surrounding the pipe including bedding, haunching, and initial backfill over the top of pipe. Refer to the pipe bedding details on the Drawings for material types to be used in the pipe embedment zone.

A. Bedding

1. Place after bottom of trench has been excavated to proper depth and grade.

2. Place, compact and shape bedding material to conform to barrel of pipe and bell to insure continuous firm bedding for full length of pipe.

B. Haunching (bottom of pipe to springline)

1. Place after pipe has been bedded and checked for alignment, grade and internal obstructions.

2. Do not backfill until any required concrete or mortar has sufficiently cured.

3. Work bedding material under pipe haunches and compact by hand to springline of pipe in 6-inch lifts.

C. Initial Backfill

1. From springline to not less than 12 inches above top of pipe, place backfill and compact in 6-inch layers using vibratory compactors.

2. Backfill simultaneously on both sides of pipe to prevent displacement.

3. Record location of connections and appurtenances before backfilling.

D. Embedment in Unstable Soils

1. Where the Engineer determines that the trench bottom or wall is unstable at the bedding zone, special pipe embedment material stabilization shall be required.

2. Unstable bedding zone conditions shall be determined immediately after trench excavation by checking soil bearing strength capacities at the bedding zone using a Standard Pocket Penetrometer or other appropriate means. A minimum of three readings shall be obtained and averaged. The soil to be tested in the bedding zone shall not be allowed to dry, and shall be tested under “in-situ” conditions. If, in the Engineer’s opinion, the soil has dried, the Penetrometer Test shall be taken after removing a sufficient amount of soil from the wall or bottom surface in order to obtain a representative sample.

3. If the average reading is less than 8 blows per foot, then the pipe bed shall be prepared as follows:

   a. The trench shall be dewatered to the greatest extent possible and rock shall be placed and compacted to form a firm trench bottom. No pipe shall be laid until stabilization is to the satisfaction of the Engineer.

   b. A geotextile material shall be placed in the trench and the embedment material and pipe installed as indicated on the Drawings. Overlap geotextile around the top of the pipe envelope a minimum of 12 inches.

c. The geotextile shall be installed in accordance with the manufacturer's recommendations. Prior to installation, the geotextile shall be stretched, aligned, and placed without any wrinkles. If the material is damaged or punctured, the damaged area shall be patched by overlapping and stitching.

4. Where the trench wall is unable to support trench boxes at a level above the top of the embedment zone, sheeting shall be used for trench wall stabilization to enable such use of trench boxes or as stand-alone trench protection in lieu of trench boxes. Sheeting installed below the top of the embedment zone shall be extracted vertically in incremental steps of one (1) foot or less. Embedment material shall be placed in loose lifts before each extraction step and thoroughly compacted immediately after each step to ensure that no compacted lift is disturbed by subsequent extraction. Contractor shall ensure the soils of the trench walls on both sides of the embedment zone remain as dense as the original unexcavated condition so that the pipe embedment remains firmly supported. In no case shall a trench box be permitted to rest below the top of the embedment zone.

E. Embedment of Flexible Pipe in Saturated Soils (Sewer Pipe Only)

1. Consolidated Soils: Pipe embedment may be installed using least restrictive, open-graded material.

2. Unconsolidated, Stable Soils: Dense-graded material shall be used to prevent loss of trench support caused by migration of soil into the embedment matrix. Alternately, open-graded embedment may be used in combination with geotextile fabric as specified for unstable soil.

3.06 TRENCH BACKFILL

A. Final Backfill

1. Place backfill into trench at an angle so that impact on installed pipe is minimized.

2. Compaction of all backfill material shall be performed in a manner that shall not crack, crush, or cause the installed pipe to be moved from the established grade and alignment.

3. Place minimum cushion of 3 feet of compacted backfill above pipe envelope before using heavy compacting equipment.

4. Use excavated material for final backfill subject to the requirements for Excavated Backfill unless otherwise specified.

5. Areas under or within 5 feet of pavement, and under or within 2 feet of utilities, buildings, or walks shall be backfilled with sand and mechanically compacted to the top of the subgrade in 8-inch lifts to a minimum of 95% Standard Proctor Density.

6. Areas not subject to vehicular traffic shall be backfilled in layers not more than 12 inches.

7. Structural and non-structural backfill shall be mechanically compacted. Compaction method is at discretion of Contractor with following exceptions:

    a. If in Owner's opinion compaction method presents potential damage to pipe, it will not be allowed.

    b. Flooding or water jetting may be permitted only if a geotechnical report justifying the use of water jetting is submitted to the Engineer and approval is granted.

8. Mound excavated materials no greater than 6 inches in open areas only.

9. Fill upper portion of trench with topsoil as specified hereinbefore.

B. Controlled Density Fill

1. Use where shown on plans.

2. Provide suitable forms to limit volume of control density fill material.

3. Prevent flow of material into existing drain lines.

4. Protect exposed utility lines during placement.

5. Place material in accordance with suppliers' written recommendations unless directed otherwise by Engineer.

3.07 EXCESS MATERIAL

A. Disposal of excess excavated material shall be the responsibility of the Contractor.

3.08 TESTING

A. Unless specified elsewhere, testing will be responsibility of Owner.

B. Standard Proctor Density

1. ASTM D698.

2. One (1) required for each type of material encountered.

C. In Place Density

1. ASTM D1556 (Sand Cone)

2. ASTM D2167 (Balloon)

3. ASTM D3017 (Nuclear)

D. One (1) test per 250 linear feet of trench on alternating lifts, with a minimum of three tests per visit, for non-structural areas. One (1) test per 100 linear feet of trench on alternating lifts, with a minimum of three tests per visit, for structural areas.

E. Contractor will be responsible for any costs associated with testing performed as a result of failed tests

PART 4 - MEASUREMENT AND PAYMENT

4.01 TRENCH EXCAVATION

A. Trench excavation shall be considered incidental to pipeline installation.

B. Payment shall be made at the contract unit price per cubic yard <u>only</u> if a bid item is established in the contract.

4.02 BACKFILL

A. Backfill shall be considered incidental to pipeline installation.

B. Payment for backfill shall be made at the contract unit price per cubic yard <u>only</u> if a separate bid item is established in the contract.

C. No allowance for waste shall be made.

D. If Engineer orders a bedding backfill material other than that specified in contract, it shall be paid for as an extra in price per cubic yard as compacted in place, EXCEPT if a higher class embedment is ordered by Engineer because the Contractor has over-excavated the trench.

E. If the Engineer orders the excavated material to be removed and disposed of

and replaced with another material and a separate bid item for that material has not been established, the material shall be paid as an extra.

F. If the Contractor fails to compact the backfill to the density requirements, the Engineer may order the material removed and replaced at no cost to the Owner.

G. The disposal of rejected material shall be at no cost to the Owner.

H. Payment for geotextile envelopment in unstable trench soils shall be made at the bid price for “Trench Stabilization in Unstable Soils” in the bid form.

END OF SECTION

SECTION 02223 TRENCH EXCAVATION PROTECTION

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK

A. This work shall consist of shoring, bracing, bank stabilization, bank sloping, providing trench boxes or trench shields or other equivalent means to protect employees from the effects of moving ground or cave-ins.

B. These specifications apply to any trench excavation which is over five (5) feet in depth from the ground surface, or trench excavations that are less than five (5) feet in depth located in areas where unstable soil conditions are present (Ref. OSHA Safety and Health Regulations, Part 1926, Subpart P, Paragraph 29 CFR 1926.652, Subparagraph (a).

C. All work shall be done in conformance with OSHA Safety and Health Standards (29 CFR 1926/1010 Chapter XVII Subpart P-Excavations, Trenching and Shoring.). It is the Contractor's responsibility that all excavation work and site conditions are within the regulations as established by OSHA. Any property damage or bodily injury (including death) that arises from use of the trench safety systems, from the Contractor's negligence in performance of the contract work, shall remain the sole responsibility and liability of the Contractor.

1.02 DEFINITIONS APPLICABLE TO THIS SPECIFICATION

A. "Accepted engineering requirements (or practices)" - Those requirements or practices which are compatible with standards required a Registered Professional Engineer, or other duly licensed or recognized authority.

B. "Angle of repose" - The greatest angle above the horizontal plane at which a material will lie without sliding.

C. "Bank" - A mass of soil rising above a digging level.

D. "Belled excavation" - A part of shaft or footing excavation, usually near the bottom and bell-shaped; i.e., an enlargement of the cross section above.

E. "Braces (trench)" - The horizontal members of the shoring system whose ends bear against the uprights or stringers.

F. "Excavation" - Any manmade cavity or depression in the earth's surface, including its sides, walls, or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation. If installed forms

or similar structures reduce the depth-to-width relationship, an excavation may become a trench.

G. "Faces" - See paragraph (K) of this section.

H. "Hard compact soil" - All earth materials not classified as running or unstable.

I. "Kickouts" - Accidental release or failure of a shore or brace.

J. "Sheet pile" - A pile, or sheeting, that may form one of the continuous interlocking line, or a row of timber, concrete, or steel piles, driven in close contact to provide a tight wall to resist the lateral pressure of water, adjacent earth, or other materials.

K. "Sides", "Walls", or "Faces" - The vertical or inclined earth surfaces formed as a result of excavation work.

L. "Slope" - The angle with the horizontal at which a particular earth material will stand indefinitely without movement.

M. "Stringers" (wales) - The horizontal members of a shoring system whose sides bear against the uprights or earth.

N. "Trench" - A narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than 15-feet.

O. "Trench shield" - A shoring system composed of steel plates and bracing, welded or bolted together, which support the walls of a trench from the ground level to the trench bottom and which can be moved along as work progresses.

P. "Unstable soil" - Earth material, other than running, that because of its nature of the influence of related conditions cannot be depended upon to remain in place without extra support, such as would be furnished by a system of shoring.

Q. "Uprights" - the vertical members of a shoring system.

R. "Wales" - See paragraph M of this section.

S. "Walls" - See paragraph K of this section.

PART 2 - PRODUCTS

No information for this section

PART 3 - EXECUTION

3.01 GENERAL PROTECTION REQUIREMENTS

A. Walkways, runways, and sidewalks shall be kept clear of excavated material or other obstructions and no sidewalks shall be undermined unless shored to carry a minimum live load of one hundred and twenty-five (125) pounds per square foot.

B. If planks are used for raised walkways, runways, or sidewalks they shall be laid parallel to the length of the walk and fastened together against displacement.

C. Planks shall be uniform in thickness and all exposed ends shall be provided with beveled cleats to prevent tripping.

D. Raised walkways, runways, and sidewalks shall be provided with plank steps on string stringers. Ramps, used in lieu of steps, shall be provided with cleats to insure a safe walking surface.

E. All employees shall be protected with personal protective equipment for the protection of the head, eyes, respiratory organs, hands, feet and other parts of the body as set forth in OSHA Standards.

F. Employees exposed to vehicular traffic shall be provided with and shall be instructed to wear warning vests marked with or made or reflectorized with high visibility material.

G. Employees subjected to hazardous dusts, gases, fumes, mists, or atmospheres deficient in oxygen, shall be protected with approved respiratory protection as set forth in OSHA Standards.

H. No person shall be permitted under loads handled by power shovels, derricks, or hoists. To avoid any spillage, employees shall be required to stand away from any vehicle being loaded.

I. Daily inspections of excavations shall be made by a competent person. If evidence of possible cave-ins or slides is apparent, all work in the excavation shall cease until the necessary precautions have been taken to safeguard employees.

3.02 SPECIFIC EXCAVATION REQUIREMENTS

A. Prior to opening an excavation, effort shall be made to determine whether underground installations, i.e., sewer, telephone, water, fuel, electric lines,

etc., will be encountered, and if so, where such underground installations are located. When the excavation approaches the estimated location of such an installation, the exact location shall be determined and when it is uncovered, proper supports shall be provided for the existing installation. Utility companies shall be contacted and advised of proposed work prior to the start of actual excavation.

B. Trees, boulders, and other surface encumbrances, located so as to create a hazard employees involved in excavation work or in the vicinity thereof at any time during operations, shall be removed o made safe before excavating is begun.

C. The walls and faces of all excavations in which employees are exposed to danger from moving ground shall be guarded by a shoring system, sloping of the ground or some other equivalent means.

D. Excavations shall be inspected by a competent person after ever rainstorm or other hazard-increasing occurrence, and the protection against slides and cave-ins shall be increased if necessary.

E. The determination of the angle of repose and design of the supporting system shall be based on careful evaluation of pertinent factors such as: Depth of cut; possible variation in water content of the material while the excavation is open; anticipated changes in materials from exposure to air, sun, water, or freezing; loading imposed by structures, equipment, overlying materials, or stored material; and vibration from equipment, blasting, traffic, or other sources.

F. Supporting systems, i.e., piling, cribbing, shoring, etc., shall be designed by a qualified person and meet accepted engineering requirements. When tie rods are used to restrain the top of sheeting or other retaining systems, the rods shall be securely anchored well back of the angle of repose. When tight sheeting or sheet piling is used, full loading due to ground water table shall be assumed, unless prevented by weep holes or drains or other means. Additional stringers, ties, and bracing shall be provided to allow for any necessary temporary removal of individual supports.

G. All slops shall be excavated to at least the angle of repose except for areas where solid rock allows for line drilling or presplitting.

H. The angle of repose shall be flattened when an excavation has water conditions, silty materials, loose boulders, and areas were erosion deep frost action and slide planes appear.

I. Clearances:

1. In excavations which employees may be required to enter, excavated or other material shall be effectively stored and retained at least 2-feet or more from the edge of the excavation.

2. As an alternative to the clearance prescribed in subparagraph 1, the Contractor may use effective barriers or other effective retaining devices in lieu thereof in order to prevent excavated or other materials from falling into the excavation.

J. Sides, slopes, and faces of all excavations shall meet accepted engineering requirements by scaling, benching, barricading, rock bolting, wire meshing or other equally effective means. Special attention shall be given to slopes which may be adversely affected by weather or moisture content.

K. Support systems shall be planned and designed by a qualified person when excavation is in excess of 20-feet in depth, adjacent to structures or improvements, or subject to vibration or ground water.

L. Materials used for sheeting, sheet piling, cribbing, bracing, shoring and underpinning shall be in good serviceable condition, and timbers shall be sound, free from large or loose knots, and of proper dimensions.

M. Special precautions shall be taken in sloping or shoring the sides of excavations adjacent to previously backfilled excavation for a fill, particularly when the separation is less than the depth of the excavation. Particular attention also shall be paid to joints and seams of material comprising a face and the slope of such seams and joints.

N. Except in hard rock, excavations below the level of the base of footing of any foundation or retaining wall shall not be permitted, unless the wall in underpinned and all other precautions taken to insure the stability of the adjacent walls for the protection of employees involved in excavation work or in the vicinity thereof.

O. If the stability of adjoining building or walls is endangered by excavations, shoring, bracing or underpinning shall be provided as necessary to insure their safety. Such shoring, bracing or underpinning shall be inspected daily or more often, as conditions warrant, by a competent person the protection effectively maintained.

P. Diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation. Water shall not be allowed to accumulate in an excavation.

Q. If it is necessary to place or operate power shovels, derricks, trucks, materials, or other heavy objects on a level above and near an excavation, the side of the excavation shall be sheet-piled, shored, and braced as necessary to resist the extra pressure due to such superimposed loads.

R. Blasting and the use of explosives are not allowed unless authorized in other portions of the specifications.

S. When mobile equipment is utilized or allowed adjacent to excavations, substantial stop logs or barricades shall be installed. If possible, the grade should be away from the excavation.

T. Adequate barrier physical protection shall be provided at all remotely located excavations. All wells, pits shafts, etc., shall be barricaded or covered. Upon completion of exploration and similar operations, temporary wells, pits, shafts, etc. shall be backfilled.

U. If possible, dust conditions shall be kept to a minimum by the use of water, salt, calcium chloride, oil, or other means.

V. In locations where oxygen deficiency or gaseous conditions are possible, air in the excavation shall be tested. Controls, as set forth in OSHA Standards shall be established to assure acceptable atmospheric conditions. When flammable gases are present, adequate ventilation shall be provided or sources of ignition shall be eliminated. Attended emergency rescue equipment, such as breathing apparatus, a safety harness and line, basket stretcher, etc. shall be readily available where adverse atmospheric conditions may exist or develop in an excavation.

W. Where employees or equipment are required or permitted to cross over excavations, walkways or bridges with standard guardrails shall be provided.

X. Where ramps are used for employees or equipment, they shall be designed and constructed by qualified persons in accordance with accepted engineering requirements.

Y. All ladders used on excavation operations shall be in accordance with requirements of OSHA Standards.

3.03 SPECIFIC TRENCHING REQUIREMENTS

A. Banks more than 5-feet shall be shored, laid back to a stable slope or some other equivalent means of protection shall be provided where employees may be exposed to moving ground or cave-ins. Refer to Figure 19000-1 as a guide in sloping of banks. Trenches less than 5-feet in depth shall also be

effectively protected when examination of the ground indicates hazardous ground movement may be expected.

B. Sides of trenches in unstable or soft material, 5-feet or more in depth, shall be shored, sheeted, braced, sloped, or otherwise supported by means of sufficient strength to protect the employees working within them. See Figure 19000-1 and Table 19000-1.

C. Sides of trenches in hard or compact soil, including embankments, shall be shored or otherwise supported when the trench is more than 5-feet in depth and 8-feet or more in length. In lieu of shoring, the sides of the trench above the 5-foot level may be sloped to preclude collapse, but shall not be steeper than a 1-foot rise to each 1/2-foot horizontal. When the outside diameter of a pipe is greater than 6-feet, a bench of 4-foot minimum shall be provided at the toe of the sloped portion.

D. Materials used for sheeting and sheet piling, bracing, shoring, and underpinning, shall be in good serviceable condition, and timbers used shall be sound and free from large or loose knots, and shall be designed and installed so as to be effective to the bottom of the excavation.

E. Additional precautions by way of shoring and bracing shall be taken to prevent slides or cave-ins when excavations or trenches are made in locations adjacent to backfilled excavations, or where excavations are subjected to vibrations from railroad or highway traffic, the operation of machinery, or any other source.

F. Employees entering bell-bottom pier holes shall be protected by the installation of a removable-type casing of sufficient strength to resist shifting of the surrounding earth. Such temporary protection shall be provided for the full depth of that part of each pier and securely fastened to shoulder harness, shall be worn by each employee entering the shafts. This lifeline shall be individually manned and separate from any line used to remove materials excavated from the bell footing.

G. Minimum requirements for trench timbering shall be in accordance with Table 19000-1. Braces and diagonal shores in a wood shoring system shall not be subjected to compressive stresses in excess of values given by the following formula:

$$S + 1300 - \frac{20L}{D}$$

Maximum Ratio $\frac{L}{D} = 50$

Where:

L = Length, unsupported, inches
D = Least side of the timber in inches
S = Allowable stress in pounds per square inch of cross-section.

H. When employees are required to be in trenches 4-feet deep or more, an adequate means of exit, such as a ladder or steps shall be provided and located so as to require no more than 25-feet of lateral travel.

I. Bracing or shoring of trenches shall be carried along with the excavation.

J. Cross braces or trench jacks shall be placed in true horizontal position, be spaced vertically and be secured to prevent sliding, falling, or kickouts.

K. Portable trench boxes or sliding trench shields may be used for the protection of personnel in lieu of a shoring system or sloping. Where such trench boxes or shields are used, they shall be designed, constructed, and maintained in a manner which will provide protection equal to or greater than the sheeting or shoring required for the trench. The Contractor shall provide a statement certified by a Registered Professional Engineer of the adequacy of trench boxes or shields.

L. Backfilling and removal of trench supports shall progress together from the bottom of the trench. Jacks or braces shall be released slowly and, in unstable soil, ropes shall be used to pull out the jacks or braces from above after employees have cleared the trench.

M. The Contractor's trench safety system shall be designed to take into account all surcharge loads including, but not limited to adjacent structures, contractor's equipment and heavily loaded truck traffic which will be routed near the work site.

3.05 CONSTRUCTION REQUIREMENTS

A. The Contractor unless provided for in the plans otherwise shall provide the minimum shoring shown in Table 02223-1 for the soil class noted in the plans. If approved by the Engineer, the Contractor may slope the excavation in accordance with Table 02223-1

B. Should the soil conditions differ from those specified or should ground water be encountered in the excavation the contractor shall notify the Engineer immediately. The Contractor shall refrain from operating in that portion of the trench where changed conditions are noted until such time as an inspection of conditions takes place and the contractor is notified of measures necessary for continued operation.

C. The Contractor shall prepare and submit a plan of operation. This plan of operation shall identify material, equipment, methods and installation and shall be inspected by a Registered Professional Engineer. The Contractor's Engineer shall certify the adequacy of the trench protection system and its adherence of OSHA Standards.

PART 4- MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Providing shoring in trenches or other alternate means in accordance with this specification shall be measured by the linear foot of trench irrespective of size of pipe or depth or lump sum as shown or implied in the plans, or as provided in the proposal and contract. Additional depth for foundations, etc. shall be considered incidental to the price bid for the protection.

B. If the plans require sloping the excavation or the excavation is sloped in accordance with Figure 19000-1 after receiving permission from the Engineer, no payment will be made under this item.

C. The Contractor shall provide shoring systems for construction of structures 5-feet or greater in depth. There will be no direct payment for these systems but it shall be considered incidental to the price bid for the structure.

4.02 PAYMENT

A. Payment shall be made at the unit price bid for "Trench Excavation Protection" and include all components for design and construction of the Trench Protection System which can include, but not be limited to sloping, sheeting, trench boxes or trench shields, sheet piling, cribbing, bracing, shoring, dewatering or diversion of water to provide adequate drainage. Payment shall also include the additional excavation and backfill required, any jacking, jack removal, and removal of the trench supports after completion.

B. When not listed as separate contract pay item, Trench Excavation Protection shall be considered as incidental work, and the cost thereof including furnishing all materials, labor equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications, shall be incorporated in such contract pay items as are provided in the proposal contract.

END OF SECTION

SECTION 02224 PIPE BORING, DRILLING AND JACKING

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of boring, drilling or jacking operations related to the installation of water pipe, sanitary and storm sewer pipe, and traffic conduit in areas where trenching is not feasible.

PART 2 - PRODUCTS

2.01 STEEL CASING:

A. The steel casing shall be seamless or electric resistance-welded tubing for sizes under 24-inch O.D. and standard double-submerged arc-weld for sizes over 24".

B. Tubing shall be A-106, Grade B with bevelled ends.

C. Table 02224-1 notes the steel casing size and thickness as related to the ductile iron carrier pipe.

2.02 CASING SPACERS/END SEALS:

A. Placement of Casing Spacers

1. Casing spacers shall be sized to securely fasten on to the carrier pipe barrel O.D. and shall be furnished with a minimum runner height to prevent the pipe from resting or sliding on its joint during and after installation. Casing spacers shall be bolted epoxy coated steel body with polyethylene runners or polyethylene projection type as shown in the detail drawings. Redwood or cedar skid blocks, treated with pentachlorophenol with stainless straps.

2. Positioning of spacers should ensure that the carrier pipe is adequately supported throughout its length.

3. Spacers at each end shall not be further than 6-inches from the end of the casing regardless of the size of casing and carrier or type of spacer used.

4. For pipe with mechanical joints, flanges or bell and spigot joints, casing spacers shall be installed within one foot on each side of the bell or flange and one in the center of the joint when 18 to 20-foot long joints are used. Maximum spacing for spacers is 10-feet or as shown in the plans

and details.

B. End Seals

1. End seals shall be sized to securely attach to the exterior of casing and carrier pipe to prevent water, dirt and debris from entering the annular space between the installed pipe.

2. Synthetic rubber end seals as shown in the details, minimum 1/8-inch thick.

3. Banding straps to secure end seals shall be T-304 stainless steel with non-magnetic worm gear securing mechanism.

C. Refer to Details

D. Engineering approval

TABLE 02224-1

CASING SIZE VERSUS CARRIER SIZE

Steel Casing Diameter and Wall Thickness	Ductile Iron Carrier Pipe (Inside Diameter)
14" Schedule 30	6"
16" Schedule 30	~8"
18" Standard Class	~10"
22" Standard Class	12"
24" Schedule 20	14"
26" Schedule 20	16"
30" 0.375" Wall	18"
36" 0.375" Wall	24"

PART 3 - EXECUTION

3.01 BORING:

A. Boring shall be performed to alignment and grade as shown on the construction drawings.

B. The earth and/or rock augers shall not exceed the O.D. (outside diameter) of the steel casing by more than 1/4 of an inch. The boring and insertion of the steel casing shall be performed with equipment capable of simultaneous operations.

C. The feed rate of augers and hydraulic pushing of the casing shall be the same. Under no circumstances will boring be allowed unless operations are simultaneous.

D. Every effort shall be made to avoid loss of earth.

E. Excavated material shall be removed from the casing as excavation progresses and no accumulation of such material within the casing shall be permitted.

F. Upon completion of the boring operations, all voids around the outside face of the casing shall be filled by grouting. Grouting equipment and material shall be on the job site before boring operations are started in order that grouting around the bored casing may be started immediately after the boring operations have finished.

G. The allowable tolerance as to grade and alignment of the installed casing shall not exceed 1/10 of a foot per hundred feet of casing length.

H. The Contractor shall be responsible for locating any underground utilities and for any damage resulting thereto.

I. The Contractor shall be fully responsible for producing a sound, tight installation, true to line and grade. All carrier pipe installed in casing installed by jacking, boring or tunneling shall be supported by bolt on style or projection type casing spacers or on redwood, Wolmanized stainless steel tied skids as shown in the plans and details. Carrier pipe shall be skidded through casing.

J. A suggested method is shown in the Standard Detail Drawings. Other methods shall be approved in writing by the Engineer.

3.02 INSTALLATION DETAILS

A. Prior to the start of the boring operations, the Contractor shall submit the following details to the Engineer:

1. Boring pit bracing

2. Casing boring head

B. Only workmen experienced in boring operation shall perform the work.

3.03 DRILLING AND JACKING FOR ELECTRICAL CONDUIT

A. Metallic conduit shall be installed under existing pavement by approved jacking or drilling methods.

B. Non-metallic conduit shall not be installed by jacking. Non-metallic conduit may be installed by drilling if a hole larger than the conduit is pre-drilled and the conduit is hand-installed.

C. Jacking or drilling pits shall be at least 2 feet from the edge of any type of any pavement, measured from the side of the pit nearest to the pavement.

3.04 JACKING:

A. If the grade of the pipe at the jacking end is below the ground surface, suitable pits or trenches shall be excavated for the purpose of conducting the jacking operations and for placing end joints of the pipe. Such work shall be sheeted securely and braced in a manner to prevent earth cavings and to provide a safe, stable work area.

B. Heavy duty jacks suitable for forcing the pipe through the embankment shall be provided. In operating jacks, even pressure shall be applied to all jacks used so that pressure will be applied to the pipe uniformly around the ring of the pipe.

C. A suitable jacking frame or back stop shall be provided. The pipe to be jacked shall be set on guides properly braced together, to support the section of the pipe and to direct it in the proper line and grade.

D. The whole jacking assembly shall be placed so as to line up with the direction and grade of the pipe. In general, embankment material shall be excavated just ahead of the pipe and material removed through the pipe and the pipe forced through the embankment with jacks, into the space thus provided.

E. The excavation for the underside of the pipe, for at least 1/3 of the circumference of the pipe, shall conform to the contour and grade of the pipe. A clearance of not more than 2 inches may be provided for the upper half of the pipe. This clearance is to be tapered off to zero at the point where the excavation conforms to the contour of the pipe.

F. The distance that the excavation shall extend beyond the end of the pipe depends on the character of the material, but it shall not exceed 2 feet in any case. This distance shall be decreased if the character of the material being excavated makes it desirable to keep the advance closer to the end of the pipe.

G. The pipe, preferably, shall be jacked from the low or downstream end. Lateral or vertical variation in the final position of the pipe from the line and grade established by the Engineer will be permitted only to the extent of 1 inch in 10 feet, provided that such variation shall be regular and only in one direction and that the final grade or flow line shall be in the direction indicated.

H. If the Contractor desires, he may 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 the pipe.

I. When jacking of pipe is once begun, the operation shall be carried on without interruption, insofar as practical, to prevent the pipe from becoming firmly set in the embankment.

J. Any pipe damaged in jacking operations shall be removed and replaced by the Contractor at his entire expense.

K. Immediately after jacking is complete and the carrier or encasement pipe is accurately positioned and approved for line and grade, the clearance space between the pipe and soil shall be completely filled by pressure grouting for the entire length of the installation.

L. The pits or trenches excavated to facilitate jacking operations shall be backfilled immediately after the jacking of the pipe has been completed.

M. Treated wood skids may be used provided that the annular space between the carrier pipe and the casing is pressure grouted for the entire length of the bore. Treated wood skids shall be banded with 304 stainless steel straps within one foot of the bell and spigot, flanged or mechanical joint. Maximum spacing is 10 feet on centers or as per manufacture's recommendations.

PART 4 - MEASUREMENT AND PAYMENT:

4.01 MEASUREMENT:

A. BORING:

1. Measurement shall be per linear foot of bored casing, and shall include furnishing all labor, materials, equipment, and work involved in the boring operations.

2. The unit measurement shall also include casing spacers and end seals, steel ties, grouting, and other items associated with the boring and casing.

B. DRILLING AND JACKING FOR ELECTRICAL CONDUITS:

1. Measurement shall be per linear foot of installed electrical conduit and shall include all labor, materials, equipment, and work required for the operation.

C. JACKING:

1. Jacking pipe will be measured by the linear foot of pipe complete in place. Such measurement will be made between the ends of the pipe along the

central axis as installed.

4.02 PAYMENT:

A. BORING:

1. The accepted quantities for boring will be paid at the unit bid price per diameter of casing per linear foot.

2. Payment for carrier pipe will be paid in accordance with Section 02556 (Ductile iron pipe).

B. DRILLING AND JACKING FOR ELECTRICAL CONDUIT:

1. The accepted quantities for drilling and jacking for electrical conduit will be paid at the unit bid price per diameter per linear foot.

2. The accepted quantities for jacking will be paid at the unit bid price per linear foot of the type, size, and class indicated.

3. When not listed as a separate contract pay item, boring, drilling and jacking electrical conduit or jacking shall be considered as incidental work, and the cost there of shall be included in such contract pay item(s) as provided in the contract proposal.

4. Compensation, whether by contract pay item or incidental work will be for furnishing all materials, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

END OF SECTION

SECTION 02226 EXCAVATION, BACKFILL AND COMPACTION FOR PAVEMENT

PART 1 – GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. Prior to commencement of this work, all required erosion control and tree protection shall be in place.

B. Perform all required excavation, backfill and compaction within the limits of right of way and adjacent thereto (except excavations specifically described and provided for elsewhere in the specifications).

C. Remove, properly use, or dispose of all excavated materials.

D. Shape and finish all earth work in conformance with lines and grades as shown on the plans or as specified by the Engineer.

E. Schedule work to avoid property owner inconvenience as practical during construction.

F. Exercise care in operating applicable equipment beneath or adjacent to trees, sidewalks, poles, and other existing features to prevent damage.

G. Restore obstructions removed to accommodate construction equipment or to facilitate excavation.

1.02 CLASSIFICATION:

A. All street excavation shall be unclassified, regardless of material encountered.

B. Any reference to rock or any other material on the plans, or in these specifications, is not to be construed as classification of the excavation.

1.03 REFERENCES

A. ASTM D698 - Moisture-Density Relations of Soils (Standard).

B. ASTM D4318 - Test for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

1.04 EXISTING UTILITIES

A. Where pipes, ducts and structures are encountered in the excavation but are not shown on the Drawings, immediately notify the Engineer.

1.05 DEFINITIONS

A. Classification: Earthwork materials are classified in accordance with definitions in this Article.

B. Topsoil: Top 6 inches of natural surface soil possessing the characteristics of representative soils on the site that produce growths of grass or other vegetation. Topsoil includes roots and other vegetation.

C. Pavement Select Fill: Select fill material excavated on site or suitable borrow material consisting of inorganic sandy clay meeting specified requirements.

D. Natural Subgrade: Consists of that portion of the surface on which a compacted embankment or pavement is constructed, after removal of 6-inch topsoil layer, as described in Section 02210.

E. Compacted Embankment: A subgrade under pavement consisting of fill placed and compacted between the top of compacted natural subgrade and underside of pavement and including fill areas adjacent to paving within limits shown on Typical Cross Sections.

F. Finish Grading: Operations required for smoothing disturbed areas that are not overlaid with pavement.

G. Excavation: Excavation of every description and of whatever substances encountered within the grading limits of the project to the lines and grades indicated on the Drawings.

H. Compaction: Compaction of subgrade soil materials, shall be measured as a percent of Standard Proctor Density at the specified moisture content as determined by ASTM D698

PART 2 - PRODUCTS

2.01 MATERIALS

A. Fill Under Pavement

1. Inorganic sandy clay.

2. Optimal plasticity index between 7 and 20.

3. Optimal liquid limit of 35 or less.

4. No rock or pieces larger than 3 inches greatest dimension.

B. All fill soils shall be free of organic material and debris. A quality control program shall be established by the Contractor to check that zones of unsuitable soils are not allowed in the paving areas.

PART 3 - EXECUTION

3.01 HANDLING OF TOPSOIL

A. Remove top 6 inches of topsoil within limits of the paving section, and area adjacent to paving section as required, and stockpile on the Owners property in an approved location.

3.02 STRIPPING OF GROUND SURFACE

A. All vegetation, all decayed vegetable matter, rubbish and other unsuitable material within the areas to be graded, not removed by clearing, shall be stripped or otherwise removed to 18 inches below ground level before grading or other earthwork is started. In no case will such material be allowed to remain in or on the areas to be graded.

3.03 EXCAVATION

A. Objective: As shown on the Drawings, excavate to lines, grades and elevations required for subsequent construction of embankments, flexible base, or pavement. Remove materials within the indicated limits and dispose as directed.

B. Drainage: During excavation, maintain grades for complete drainage. When directed, install temporary drains or drainage ditches to intercept or divert surface water and prevent interference or delay of the work.

C. Stockpiling: If, at time of excavation, it is not possible to place material in the proper section of permanent construction, stockpile the material in approved areas for later use.

D. Stone or Rock: Stones or rock fragments larger than 1-inches in their greatest dimension will not be permitted in top 6 inches of subgrade.

E. Dressing: Uniformly dress, cut and fill slopes to slope, cross section and alignment, as shown.

3.04 NATURAL SUBGRADE UNDER PAVEMENTS

A. Remove existing earth as required for placement of pavement section as indicated on the Drawings. Proof roll excavated surface with a 20 ton or larger roller to identify soft or undesirable material and remove such soft or undesirable material to suitable material beneath at least 2 feet below grade. Break down sides of holes or depressions to flatten the slopes.

B. Fill any such hole or depression with appropriate soil with similar classification, moisture content, and density as adjacent soils.

C. Grade adjustments within pavement construction limits shall be accomplished with pavement select fill, placed in maximum 8-inch lifts moistened and compacted as specified in this Section.

D. After depressions have been filled, grade adjustments made, and immediately before placement of pavement section, thoroughly loosen the foundation material to a depth of 8 inches. Remove roots and debris turned up while loosening the soil. Adjust moisture and recompact the subgrade as specified in this Section.

3.05 PLACING EMBANKMENT FILL FOR GRADE ADJUSTMENTS

A. Inspection of Natural Subgrade: Proof roll excavated surface with a 20 ton or larger roller to identify soft or undesirable material and remove such soft or undesirable material to suitable material beneath. Any soft or compressible areas detected during the recompaction process shall be undercut such that sound subgrade soils are exposed and recompacted. Do not place select fill for grade adjustments to the natural subgrade until the surface has been approved.

B. Prior to placing pavement fill, scarify the natural subgrade to a depth of 6 inches. As needed, adjust the moisture content to between optimum and plus 4 percent. Recompact to the subgrade to a dry density between 95% of the maximum Standard Proctor Density, as determined by ASTM D698.

C. Removing Debris: During the dumping and spreading process, remove all roots, stones, and debris that are uncovered in the select material.

D. Spreading Fill: After dumping, spread the pavement select fill in horizontal layers over the entire fill area. The thickness of each layer before compaction shall not exceed 8-inches and compact to the moisture/density values specified above. Place fill adjacent to pavement sections to elevations indicated.

E. Attaining Proper Bond: If the compacted surface of a layer is too smooth to bond with succeeding layers, loosen the surface by harrowing or other approved method before continuing the work.

3.06 MOISTURE CONTROL

A. Intent: Developing the maximum density obtainable with the natural moisture of the material is preferred. However, the moisture content of the pavement base material shall not vary from -2 percent optimum, as determined by ASTM D698, to more than plus 3 percent of optimum. The moisture content of the natural subgrade under pavement sections, including grade adjustments with pavement select fill, as determined by ASTM D698 shall be maintained between optimum and plus 4 percent of optimum.

B. Adjustment: If the moisture content is too high, adjust to within the specified limits by spreading the material and permitting it to dry. Assist the drying process by disking or harrowing if necessary. When the material is too dry, sprinkle each layer with water. Work the moisture into the soil by harrowing or other approved method.

3.07 COMPACTION

A. Compact each layer of pavement select fill with suitable rollers as necessary to obtain a dry density of 95% maximum dry density within the specified range of the moisture content, according to ASTM D698.

3.08 MATERIAL DISPOSAL

A. Excess Excavated Material (soil material free of trees, stumps, logs, brush, roots, rubbish and other objectionable matter which has been approved) shall be removed from the construction site before Final Inspection. Approved excess material shall be deposited on the Owner's property in an approved location.

B. Waste Material (soil material including trees, stumps, logs, brush, roots, rubbish and other objectionable matter which has not been approved) shall be removed from the project site before Final Inspection. Legally dispose of material at a licensed site or with written and notarized permission from the property owner for a private disposal site. All costs associated with waste material removal and disposal shall be paid for by the Contractor.

3.09 TESTING AND CONTROL

The testing laboratory will make tests of in-place density in accordance with ASTM Standards (Specification Section 01460). Backfill operations will be monitored continuously by the testing laboratory.

3.10 MEASUREMENT AND PAYMENT

No separate payment shall be made to the CONTRACTOR for the work described in this Section. Such work shall be considered incidental to the project and the payments made under specific Pay Items shall be considered as full compensation for these requirements.

END OF SECTION

SECTION 02227 EXCAVATION, BACKFILL AND COMPACTION FOR UTILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES:

A. Excavating, trenching, backfilling and compacting for water distribution mains, sanitary sewers, manholes, drainage and other utility systems and appurtenances, and the disposal of excess excavated material.

1.2 RELATED SECTIONS:

A. Grading and earthwork - Section 02210.

B. Excavating, Backfilling and Compacting for Pavement - Section 02226.

1.3 REFERENCES:

A. ASTM C33 - Concrete Aggregates.

B. ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils.

C. ASTM D698 - Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 lbf/ft^3).

1.4 PROTECTION OR REMOVAL OF UTILITY LINES:

A. The Contractor shall anticipate all underground obstructions such as, but not limited to, water mains, gas lines, storm and sanitary sewers, telephone or electric light or power ducts, concrete, and debris. Any such lines or obstructions indicated on the Drawings show only the approximate locations and shall be verified in the field by the Contractor. The Engineer will endeavor to familiarize the Contractor with all known utilities and obstructions, but this shall not relieve the Contractor from full responsibility in anticipating all underground obstructions whether or not shown on the Drawings.

B. The Contractor shall, at his own expense, maintain in proper working order and without interruption of service all existing utilities and services which may be encountered in the work, except that with the consent of the Utility Owner such service connections may be temporarily interrupted to permit the Contractor to remove designated lines or to make temporary changes in the locations thereof as will aid in the completion of the work and at the same time maintain service to the property so originally benefited. The cost of making any temporary changes shall be at the Contractor's expense.

C. Before starting construction, the Contractor shall notify all utility companies involved to have their utilities located and marked in the field. All underground utilities shall then be uncovered to verify location and elevation before construction begins. The Contractor shall obtain all necessary permits.

PART 2 - PRODUCTS

2.1 EARTH BACKFILL:

A. Earth Backfill shall be free of lumps, stones, trash and spongy or otherwise objectionable material, and shall be approved by the Engineer. Approved backfill material may be from the excavation or borrowed.

2.2 SAND:

A. Use sand that is free from clay lumps, organic and other deleterious material, and having a plasticity index of not less than 4 or greater than 12, as determined by ASTM D424.

2.3 CRUSHED ROCK:

A. Provide durable crushed rock free of clay lumps, organic or other deleterious material. Crushed rock size shall be No. 57 or No. 67 in accordance with ASTM C33 Grading Requirements for Coarse Aggregates.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION:

A. Examine utility routes and coordinate excavation work to eliminate installation conflicts.

B. Allow room for stockpiling excavated material and utility construction material during utility construction.

3.2 TRENCH EXCAVATION:

A. Procedure: Excavate to indicated or specified depths.
   1. Excavate by open cut.

   2. Do not use excavated material composed of rocks, chunks or clods larger than 6-inches for backfill. Dispose of such material and provide other suitable material for backfill without additional expense.

   3. During excavation, stock pile material suitable for backfilling in an orderly manner far enough from the bank of the trench to avoid overloading, slides or cave-ins.

4. Grade as necessary to prevent surface water from flowing into trenches or other excavations.

5. Cut banks of trench in pipe zone as nearly vertical as practical. Remove stones as necessary to avoid point-bearing. Over-excavate wet or unstable soil from the trench bottom to permit construction of a more stable bed for pipe. Over excavation shall be filled and tamped with cement sand or other approved material to the required grade.

6. Dig the trench the proper width as shown. If the trench width below the top of pipe is wider than specified in this Section or shown on Civil Drawings, then install additional cement-sand compacted backfill. No additional payment will be made.

7. Accurately grade the trench bottom to provide proper bedding as required for pipe installation.

8. If any excavation is carried beyond the lines and grades required or authorized, the Contractor shall, at his own expense, fill such space with concrete or other suitable material as directed by the Engineer. No additional payment will be made.

B. Pipe Zone: The pipe zone is defined as including the pipe bedding, backfill to one-half the pipe diameter (the springline) and the initial backfill to 12 inches above the top of the pipe.

C. Pipe Bedding:
Class B Bedding: Accurately grade the bottom of the trench 6 inches below the bottom of the pipe and limit clear space on either side of the pipe to 9 inches at and below the top of the pipe. Place a minimum of 6 inches of natural rock or select fill up to the flow line of the pipe or above before pipe is laid. Install pipe and place additional crushed rock around the pipe and to the springline of the pipe. Lightly compact the crushed rock by tamping with mechanical tamper. Complete bedding with compacted sand to 12-inches above the top of the pipe. Crushed rock or select fill shall conform to size and gradation specified in Article 2.3 or Sect. 2234, 2.1.A.1 above.

D. Water in Excavation: Keep work free from ground or surface water at all times. Provide pumps of adequate capacity or other approved method to remove water from the excavation in such a manner that it will not interfere with the progress of the work or the proper placing of other work. Ground or surface water will not be allowed to drain into or be pumped into an existing sanitary sewer system. If the work includes connection to an existing sanitary sewer, a temporary water-tight plug shall be installed and maintained within the pipe for the duration of the contract and bedding material interrupted in a manner approved by the Engineer to isolate new construction from the existing system.

E. Do not endanger spread footings with trench excavations. Trench excavations shall not encroach within the area below a footing defined by a 1:1 slope away from the bottom corner of any footing.

3.3 UTILITY INSTALLATION:

A. Storm Sewer Culverts: Grade trenches to the line and grade required for proper installation of the pipe. Provide Class B bedding for concrete pipe or culvert installation.

B. Excavation for Appurtenances: Excavate sufficiently for manholes, utility pull boxes, barscreen structure, and similar structures to leave at least 2 feet clear between the outer surfaces and the embankment or timber that may be used to hold and protect the banks. Any over-depth excavation below such appurtenances not directed will be considered unauthorized and will be refilled with cement-sand or concrete, as directed by the Engineer, at no additional cost to the Owner.

3.4 BACKFILLING:

A. Criteria: Do not backfill trenches to a point greater than 2 feet above top of pipe until all required pressure tests are performed and utility systems as installed conform to specified requirements of appropriate sections. Backfill trenches to ground surface with material as specified. Reopen trenches improperly backfilled to depth required for proper compaction. Refill and recompact as specified, or otherwise correct the condition in an approved manner.

B. Open Areas:

1. In the pipe zone, place backfill (bedding) evenly and carefully around, under and over pipe in lifts no thicker than 6 inches. Compact with mechanical hand tampers to 95 percent density according to ASTM D698, until there is a cover of not less than 1 foot over utility lines. Use bedding and backfill material as scheduled for on plans. Take special care not to damage pipe wrapping or coating.

2. Above the pipe zone, deposit earth backfill in 8-inch lifts. Compact each lift to 95 percent maximum dry density according to ASTM D698 at minus 1 to plus 3 percent of optimum moisture content.

3. All forms, lumber, trash and debris shall be removed from trenches, manholes and other utility structures. Backfill for manholes, utility pull boxes, solid waste wash rack, and other utility structures shall be placed symmetrically on all sides in lifts no thicker than 8 inches. Each lift shall be

compacted to 95 percent dry density according to ASTM D698. Use cement-sand backfill material of optimum moisture content to depth indicated and then complete backfilling with earth backfill to grade, compacted at a moisture content from minus 1 to plus 3 percent of optimum, allowing for depth of topsoil.

C. Pavement Sections:

1. In the pipe zone, deposit cement-sand backfill material in 6-inch lifts. Compact each lift to 95 percent density according to ASTM D698.

2. Above the pipe zone, deposit scheduled backfill in 8-inch lifts. Compact each lift to 95 percent maximum dry density according to ASTM D698 at optimum moisture content. Cement-sand backfill material shall be placed as required by the construction drawings. Cure cement-sand layer at least 3 days before placing pavement.

3. For manholes and utility pull boxes in pavement sections, backfill with cement-sand to bottom of proposed pavement. Cure cement-sand layer at least 3 days before placing pavement. Cement sand back fill material shall be deposited in 8-inch lifts, compacted to 95 percent density according to ASTM D698.

3.5 TESTS FOR DISPLACEMENT OF SANITARY SEWERS:

A. All plastic pipe shall be tested for deflection by pulling a mandrel with an outside diameter equal to 95 percent of the original inside diameter of the pipe through the pipe after backfilling is complete. Mandrel shall be pulled by hand line. Should the mandrel meet any resistance, the Contractor shall clean the line, or correct the resistance, and repeat the test. Any pipe not meeting this test shall be removed and installed, or replaced if damaged.

3.6 DISPOSAL OF EXCESS MATERIAL:

A. Excess Excavated Material (soil material free of trees, stumps, logs, brush, roots, rubbish and other objectionable matter which has been accepted by the Owner): Remove excess excavated material from the construction site before Pre-final Inspection. Approved excess material shall be deposited on the Owner's property as directed by the Owner.

B. Waste Material (soil material including trees, stumps, logs, brush, roots, rubbish and other objectionable matter which has not been accepted by the Owner): Remove waste material from the project site before Pre-final Inspection. Legally dispose of material at a licensed site or with written and notarized permission from the property owner for a private disposal site. All costs

associated with waste material removal and disposal shall be paid for by the Contractor.

PART 4 - TESTING AND CONTROL

A. The testing laboratory will make tests of in-place density in accordance with ASTM Standards. Backfill operations will be monitored continuously by the testing laboratory at structures. It will be the responsibility of the CONTRACTOR to notify the testing laboratory before backfill operations begin.

PART 5 - MEASUREMENT AND PAYMENT

A. No separate payment shall be made to the CONTRACTOR for the work described in this Section. Such work shall be considered incidental to the project and the payments made under specific Pay Items shall be considered as full compensation for these requirements.

END OF SECTION

SECTION 02575

MANHOLES

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work consist of materials for and the installation of manholes for sanitary and storm sewer systems.

B. Manholes shall be constructed in accordance with the design and details shown on the plans and as hereinafter provided.

C. Precast concrete cone units may be used on brick, concrete block, and poured concrete manholes.

D. Invert elevations shall not vary more than 0.05 feet from the grade designated by the ENGINEER.

E. Manholes will not be constructed with cast in place steps. Where steps are required by the ENGINEER, the steps will be installed after the manhole has been constructed. The step used shall be a 1/2" grade 60 steel reinforcing rod incapsulated in a co-polymer polypropylene as manufactured by M.A. Industries, Inc. (Model #P-2-PFS) or equal as approved by the ENGINEER. Installation of the steps shall be as recommended by the manufacturer.

PART 2 - PRODUCTS

2.01 GENERAL:

A. All cement used shall by Type II Portland Cement.

B. All manhole foundations or bases shall be concrete and constructed as shown on the plans and in no case shall the thickness be less than 6 inches.

2.02 BRICK MANHOLES:

A. Unless otherwise specified, manholes described herein shall be constructed of grade MS Brick and Type M Concrete Mortar.

2.03 CONCRETE MANHOLES:

A. Precast Manholes & Sections

1. Construct eccentric or concentric top manholes as indicated of precast pipe on conformance with ASTM C-478 using Type II Portland Cement.

2. Provide factory block-outs at base or cast-in-place rubber gasket for connection of required sewer line.

3. Minimum wall thickness will be 5 inches.

4. Concrete in foundation shall comply with Section 03300 - Cast-in-Place Concrete.

5. Reinforcing steel shall comply with Section 03330 - Reinforcing Steel.

B. Cast-in-Place Manholes

1. Concrete shall comply with Section 03300 - Cast-in-Place Concrete.

2. Reinforcing Steel shall comply with Section 03330 - Reinforcing Steel.

3. Minimum wall thickness will be 5 inches.

4. Provide cast-in-place rubber gasket for connection of required sewer line.

C. Precast Concrete Manhole Bases

1. Precast concrete manhole bases may be used when approved by the ENGINEER. If approved, it shall be with the understanding that the CONTRACTOR shall be responsible for placing the bases at the specified elevation, location, and alignment.

2. Precast bases shall be manufactured with cast-in-place sewer pipe gaskets, such as: "A-LOK" or approved equal.

2.04 COATING OF MANHOLES:

A. Exterior of Manholes

1. If required, the coating shall be a waterproofing type of bitumastic or asphaltic material, as approved by the ENGINEER.

2. Application shall be in accordance with the manufacturer's published recommendations.

B. Interior of Manhole

1. If required, drain manhole coating shall be an epoxy type material conforming with Section 02590 - Polyurethane Protective Coatings.

2. All sanitary sewer manhole shall require two coating applications of Inertal Standard as manufactured by the Inertal Company, Inc. or equal as approved by ENGINEER.

C. Plastering of Manholes

1. The work shall include the coating of the surface of existing brick or block manholes with plaster as required on the plans or directed by the ENGINEER.

2.05 FRAMES, GRATES, RINGS AND COVERS:

A. Welded Steel

1. Welded steel grates and frames shall conform to the member, size, dimensions and details indicated and shall be welded into an assembly in accordance with those details.

2. Steel shall conform to the requirements of ASTM A 36.

B. Castings

1. Castings, whether Carbon-Steel, Gray Cast Iron, or Ductile Iron shall conform to the shape and dimensions required and shall be clean substantial castings, free from sand or blowholes or other defects. Surfaces of the castings shall be free from burnt on sand and shall be reasonably smooth.

2. Runners, risers, fins and other cast on pieces shall be removed from the castings and such areas ground smooth.

3. Bearing surfaces between manhole rings and covers or grates and frames shall be cast or machined with such precision that uniform bearing shall be provided throughout the perimeter area of contact.

4. Pairs of machined castings shall be matchmarked to facilitate subsequent identification at installation.

5. Steel castings shall conform to ASTM A 27, "Mild to Medium Strength Carbon Steel Castings or General Application." Grade 70-36 shall be furnished unless otherwise specified.

6. Cast iron castings shall conform to ASTM A 48, "Gray Iron Castings," Class 30.

7. Ductile Iron castings shall conform to ASTM A 536, "Ductile Iron Castings." Grade 60-40-18 shall be used unless otherwise specified.

C. Rings

1. Adjusting rings shall conform to ASTM A 536, "Gray Iron Castings."

D. Nuts and Bolts

1. Commercial grade galvanized nuts and bolts shall be as indicated. The zinc coating shall be uniform in thickness, smooth, and continuous.

E. Mortar

Mortar for bedding castings shall consist of 1 part cement and 3 parts sand meeting the requirements of fine aggregate Grade No. 1 in Section 03300 - Cast-In-Place Concrete.

F. Manhole Accessories

1. Manhole lid and cover:

a. Gray cast iron, with minimum clear opening 24-inches.
b. Use Neenah R-1916-F or approved equal for bolted covers.
c. Use Neenah R-1670-D or approved equal for lids not requiring bolting features.
d. Provide anchor bolt holes for exposed manhole tops.

2. Manhole Rings - provide minimum of three throat rings between cone and manhole lid and cover.

PART 3 - EXECUTION

3.01 GENERAL:

A. Foundations shall be poured in place

B. Construct manhole foundation and channel inverts integrally. See Plan details.

C. Precast manhole sections may be installed after foundation concrete has attained 75% of design strength.

D. Forms for cast-in-place manhole may be installed after foundation concrete has attained 75% of design strength.

E. Manhole foundation and manhole may be installed simultaneously if manhole section is supported on concrete blocks and foundation concrete placed under and around bottom section.

F. Completely fill joints with pre-formed plastic gasket.

G. Heat materials in freezing weather and protect work from cold; maintain temperature of work at 40o F. for at least 24 hours after placing.

H. Invert Channels:

1. Form invert channel as required.

2. Make changes in direction of flow with smooth curves of as large a radius as size of manhole permits.

3. Make changes in size and grade smoothly and uniformly.

4. Slope floor of manhole adjacent to channel and drain thereto.

5. Finish channel bottom smoothly without roughness, irregularity, or pockets.

I. Pipe Connections:

1. Make watertight.

2. Use rubber gasket.

3. All connections shall be at flowline of manhole, unless otherwise required.

J. Exterior Pipe Support:

1. Support vitirified clay pipe on concrete cradle from manhole connection to first joint.

2. Provide first pipe joint within 18 inches of manhole wall.

K. Castings, frames, and fittings:

1. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is place.

2. The unit shall be protected until mortar or concrete is set.

L. Coatings shall be applied after ENGINEER's approval of structure.

M. Soil foundations, one foot beyond perimeter of concrete to base shall be compacted to a depth of one foot to 95% maximum density of ASTM D 1557.

3.02 BRICK MANHOLES:

A. Brick shall be clean, saturated surface dry before laying and shall be laid on a full mortar bed with "push joints."

B. In no event will slushing or grouting of a joint be permitted nor shall a joint be made by working in mortar after the brick has been laid.

C. Joints between the courses of bricks in manholes and other structures shall be as nearly as possible to a uniform thickness of 3/8 inch.

D. The inside and outside of all brick sewer structures shall be neatly plastered with Type M mortar 1/2 inch thick and cured.

E. Brick work shall not be laid upon a concrete foundation less than 24 hours after such foundation has been poured.

F. No brick work shall be laid in water nor, except as prescribed for curing, shall water be allowed to stand or run on any brick work until the mortar has thoroughly set.

G. Where new work is joined to existing unfinished work, the contact surfaces of the latter shall be thoroughly cleaned and moistened.

3.03 CONCRETE MANHOLES

A. Manholes constructed of poured concrete (reinforced or non-reinforced) or precast reinforced concrete risers and tops shall comply with the requirements of ASTM C 478.

B. Circular precast manhole sections shall be provided with a rubber or mastic gasket to seal joints between sections.

C. All lifting holes, except Type "C" manhole cover lids, and gaps at joints shall be filled with a non-shrink grout.

3.04 ABANDONMENT OF MANHOLES:

A. Abandonment of manhole, which is part of a sewer line being abandoned, shall entail the following work and materials.

1. Manhole will not be removed but will be abandoned in place.

2. All manhole inlet and outlet lines shall be plugged with a 12-inch long concrete mortar plug.

3. Salvageable material shall be stockpiled on the job site. The CONTRACTOR shall contact the OWNER to inspect the materials for usability. Salvageable materials shall be transported for usability. Salvageable materials shall be transported by the CONTRACTOR to the OWNER'S storage yards. CONTRACTOR will receive a receipt for the turned-in materials. Receipts will be submitted to the ENGINEER prior to final acceptance of the Project.

4. Unusable material will be removed from the project site and properly disposed of by the CONTRACTOR.

5. Manhole bottom will be thoroughly pulverized, as directed by the ENGINEER.

6. The manhole shall be filled with cement treated base (CTB) material to the top of the proposed subgrade of the pavement or to the ground surface finished grade.

7. All labor, materials and equipment necessary to complete this work shall be furnished by the CONTRACTOR.

3.05 MANHOLE REHABILITATION IN REPLACEMENT WORK:

A. The work under this item shall be to replace the existing manhole frame and cover and to place a concrete pad around the existing manhole as required per the construction plans.

B. This work will be done when an existing manhole is encountered in the normal course of the replacement work that has a light weight, vented, multi-holed manhole cover.

C. This work shall include the following:

1. Remove any and all existing brick under frame and replace with new Grade MS brick as necessary to bring new frame and cover to street grade.

2. Remove and replace existing concrete pad, or construct a new pad around the collar.

3. Remove existing manhole steps and if manhole is greater than 10 feet deep, new steps will be installed.

4. Remove an repair pavement.

5. Excavation and compaction of backfill as required.

6. All materials, labor and equipment necessary to do the work under this item shall be furnished by the CONTRACTOR.

D. The work and materials under this item shall be done according to the manner set forth in the plan details and other sections of these specifications.

E. Salvageable material shall be stockpiled on the job site. The CONTRACTOR shall contact the OWNER to inspect the materials for usability. Salvageable materials shall be transported by the CONTRACTOR to the OWNER's Storage Yards. CONTRACTOR will receive a receipt for the turned-in materials. Receipts will be submitted to the ENGINEER prior to final acceptance of the Project. Unusable materials will be properly disposed of by the CONTRACTOR.

3.06 MANHOLE DATA SHEET:

A. Before this work is accepted, the CONTRACTOR shall provide to the ENGINEER a completed manhole data sheet for each new manhole constructed.

B. Manhole data sheet as shown in Exhibit 02575-1 will be completed in accordance with the following instructions:

1. A Manhole Data Sheet will be prepared for each manhole constructed.

2. The original copy of the Data Sheet will be filed with the ENGINEER. Distribution of copies will be made to all interested parties.

3. The Manhole Number will be assigned by the OWNER.

4. Manhole Type is the general description of the manhole, e.g.: 6 foot diameter Type C, or 4 foot diameter Type E as per plan details.

5. Manhole cover Size is the nominal diameter of the manhole cover. Type, Model and Pattern refers to the manufacturer, material made of, model number and design pattern to identify the identical manhole cover for replacement.

6. Section 3 requires the name of the CONTRACTOR, the name of the foreman, and the name of the inspector actually responsible for the construction of the manhole.

7. Under "Project Name" is the work order number under this contract.

8. Date Warranty Begins is the official date of acceptance of the Project or portion of the Project of which this manhole was a part.

9. Data Warranty expires is the expiration date under the Contract for requiring warranty repairs.

10. Street Location: Give both block number and street name. For manholes in intersections give both streets. The "Remarks" section may be used for further clarification of manhole location.

11. Disregard the section on coordinate location. To be filled in by the OWNER at a later date.

12. All applicable items on the Manhole Data Sheet should be filled in. However, accuracy is more important than filling in blank spaces. Therefore, if an item is unknown and cannot be determined, leave the space blank.

EXHIBIT 02575 - 1

MANHOLE DATA SHEET

SECTION 1

Manhole Number:

Manhole Type:

Date Installed:

Project Name:

SECTION 2

Manhole Cover Size:

Manhole Cover Type & Model:

Manhole Pattern:

Number of Rings Used:

SECTION 3

Contractor's Name:

Foreman's Name:

City Inspector's Name:

SECTION 4

Date Warranty Begins:

Date Warranty Expires:

SECTION 5

Street Location:

Intersection Location:

Remarks:

SECTION 6

Rim Elevation:

Invert Elevation:

SECTION 7 (To be completed by owner)

COORDINATE LOCATION

POINT	X (East) Departure	Y (North) Departure	Z Elevation
Center Manhole Invert:			
Center Manhole Cover:			
Electronic Marker Disc:			

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. New Manholes

1. Manholes of specified diameters with depths of 6 feet or less shall be measured per each.

2. Manholes of specified diameters with depths greater than 6 feet shall be measured per each. In addition, manholes for diameters specified shall be each measured per vertical linear foot of depth over 6 feet.

3. Measurements will be made to the nearest foot and will be from the manhole rim elevation to the manhole invert elevation.

B. Elevation Adjustments

1. When a new manhole is installed, no measurement or payment will be made for rim elevation adjustments to conform to proposed surface grades.

2. The following measurements for rim elevation adjustments on existing manholes will be made as follows:

a. Adjustment to a manhole frame by the addition of adjustment rings (s) will be measured per each manhole adjusted.

b. Leveling brick adjustment will be measured per each manhole adjusted.

c. Adjustment of manhole cone or barrel will be measured by the manhole diameter per vertical foot.

C. Manhole Coating

1. If required, exterior coating of manholes will not be measured and will be considered incidental to the appropriate manhole.

2. Plastering of the interior of manholes will be measured per each manhole of specified diameter.

3. Polyurethane protective coatings will be measured as provided in Section 02590 - Polyurethane Protective Coatings.

4. Protective Inertal coatings for sanitary sewer manholes shall not be measured for payment.

D. Manhole Steps

1. If required, manhole steps will not be measured and will be considered incidental to the appropriate manhole.

E. Abandonment of Manholes

1. Abandonment of manholes will be measured per each for the work specified.

F. Manhole Rehabilitation

1. Manhole rehabilitation will be measured per each for the work specified.

4.02 PAYMENT:

A. New Manholes

1. Manholes of specified diameters with depths of 6 feet or less shall be paid for at the contract unit price per each manhole.

2. Manholes of specified diameters with depths greater than 6 feet shall be paid for at the contract unit price per each manhole as in 4.02 A.1 above. Additional payment shall be made at the contract unit price per each vertical linear foot of depth in excess of 6 feet for manholes of specified diameters.

3. Payment for manholes of any diameter and depth will include: excavation, compacted backfilling, shelving, cover or cone, leveling bricks, frame and cover, and concrete pad or collar.

B. Elevation Adjustments

1. The following payments for accepted quantities of rim elevation adjustments on existing manholes will be as follows:

a. Adjustment of a manhole frame by addition of adjustment ring(s) will be paid for at the unit contract price per each manhole adjusted.

b. Leveling brick adjustment will be paid for at the unit contract price per each manhole adjusted.

c. Adjustment of manhole cone or barrel will be paid for at the unit contract price per manhole diameter per vertical foot.

C. Manhole Coating

1. If required, no direct payment shall be made for coating of the exterior of manholes and will be considered incidental to the appropriate manhole.

2. Plastering of the interior of manholes will be paid for at the unit contract price per manhole.

3. Polyurethane protective coatings will be paid for as provided in Section 02590 - Polyurethane Protective Coatings.

D. Manhole Steps

1. If required no direct payment shall be made for manhole steps, where required, and will be considered incidental to the appropriate manhole.

E. Payment for abandonment of manholes will be paid for at the unit price per each for the work specified.

F. Payment for manhole rehabilitation will be paid for at the unit price per each for the work specified.

G. If required, the following items will be included in the unit price per appropriate adjustment: pavement removal and repair, excavation, compacted backfill, concrete collar or pad, leveling bricks, adjusting rings, and frame and cover.

H. Compensation will be for furnishing all materials, labor, equipment, tools and incidentals required including polyurethane protective coating if not included as a separate pay item in this contract. All in accordance with the plans and specifications herein.

*** * * * END OF SECTION * * * ***

SECTION 02580 STORM SEWER APPURTENANCES

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of furnishing and installing appurtenances except manholes, for storm sewers in accordance with details on the plans and as specified herein as directed by the ENGINEER.

B. The various types of structures and appurtenances such as inlets, headwalls, energy dissipators, etc. are designated on the plans by letters or by numbers indicating the particular design of each. Each type shall be constructed in accordance with the details indicated and to the depth required by the profiles and schedules given.

PART 2 - PRODUCTS

2.01 GENERAL:

A. The construction plans will specify the size and material for the pipe between the storm sewer main and the storm water collection structure.

B. The various types of storm inlets and their relation to curb and gutter, or valley gutter are shown on the Standard Detail Drawings. Construction plans will identify the type to be constructed.

C. Grating size, material, and configuration shall conform to the Standard Detail Drawings.

2.02 MATERIALS:

A. Concrete

1. Concrete for cast in place miscellaneous structures shall be Class A concrete when used with precast pipe sewer construction and Class C concrete when used with monolithic pipe sewer construction.

2. Concrete for precast structures shall be 3000 psi and comply with the applicable requirements of ASTM C 478.

B. Mortar:

1. Mortar shall be composed of 1 part Portland Cement and 2 parts clean, sharp mortar sand suitably graded for the purpose by conforming in other respects to the provisions of Section 03300 for fine aggregate.

2. Hydrated lime or lime putty may be added to the mix, but in no case shall it exceed 10 percent by weight of the total dry mix.

C. Reinforcement:

Reinforcing Steel shall conform to Section 03330.

D. Brick:

1. Bricks shall be of first quality, sound, hard-burned brick. Shale bricks, if used, shall be homogeneous, thoroughly and uniformly burned.

2. Bricks shall not absorb more than 17 percent of water by weight submerged in water for 24 hours, having been in a completely dry state prior to placing in water.

3. Clay brick shall conform to the requirements of ASTM C 62, Grade SW. concrete brick meeting the requirements of ASTM C 55, Grade A, shall be acceptable.

E. Concrete Block:
Concrete blocks when indicated shall conform to ASTM C 139.

F. Frames, Grates, Rings and Covers:
Frames, grates, rings and covers shall conform to Section 02571.

G. Miscellaneous Items:

Cast iron for supports, steps and inlet units shall conform to the shape and dimensions indicated. The casting shall be clean and perfect, free from sand or blow holes or other defects. Cast iron casting shall meet the requirements of ASTM A 48, Class 30. Steel for temporary covers when used with Stage Construction shall be adequate for the loads imposed.

PART 3 - EXECUTION

3.01 INSTALLATION OF DRAINAGE FACILITIES:

A. Excavation and backfilling for the storm inlet shall be accomplished in accordance with Section 02227.

B. Trenching, backfilling, and compaction for the connecting pipe between the storm sewer main and the storm inlet shall conform to the specifications contained in Section 02221. Pipe shall be installed in accordance with Section 02590.

C. All pipe and structures shall be installed per location and elevations, as shown on the construction plans. If during the course of installation, an underground obstruction (i.e., existing utility line) the work shall stop and the ENGINEER shall be immediately notified so that the problem can be resolved.

D. Direct connection to storm sewer main will be permitted if the main is a minimum of 36 inches in diameter (I.D.) and the connecting line is not greater than 12-inches (I.D.). If storm sewer mains are 48 inches (I.D.) or larger, the connecting line diameter may be increased to 18 inches (I.D.). For connecting line sized greater than those specified above, the connecting to the main will be made into a manhole or by inserting into the main a factory constructed wye. Connection to the main will comply with the Standard Detail Drawings.

E. Removal of curb and gutter, and sidewalk for installation of a storm inlet shall be made at a scored or full depth joint.

F. Existing pavement removal and replacement shall conform to Part 6 and Section 02571 and shall conform to residential or arterial pavement sections of the same material (asphalt or Portland Cement concrete) as the existing pavement.

G. No width greater than 1/2 inch will be permitted between the inlet grate and the roadside portion of the inlet frame.

H. Private drainage facility installations, which are to be constructed under the authorization of "Drainage Facilities within Public Right-of-Way," shall comply with the Standard Detail Drawings and appropriate sections of this publication.

I. The construction inlets shall be done as soon as is practicable after sewer lines into the inlet are complete. All sewers shall be cut neatly at the inside face of the walls of the inlet and pointed up with mortar.

J. Bases for cast in place inlets may be placed prior to or at the CONTRACTOR'S option after the sewer is constructed.

K. The inverts passing out or through an inlet shall be shaped and grout across the floor of the inlet as indicated. This shaping may be accomplished by

adding shaping mortar or concrete after the base is cast or by placing the required additional material with the base.

L. All miscellaneous structures shall be completed in accordance with the details indicated. Backfilling to original ground elevation shall be in accordance with the provisions of the appropriate items and as directed by the ENGINEER.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. Pavement removal and replacement will be measured by the square yard.

B. Trenching, backfilling and compaction will not be measured or paid, but will be considered incidental to other items.

C. Frame, grates, rings and covers will not measured or paid, but will be considered incidental to other items.

D. Connecting pipe shall be measured by the linear foot along centerline of pipe from the main side wall of the inlet to the centerline of the main.

E. Storm sewer inlets shall be measured per each for the type and size specified.

F. All miscellaneous structures satisfactorily completed in accordance with the plan and specifications will be measured as complete units per each.

4.02 PAYMENT:

A. The accepted quantities of pavement removal and replacement shall be paid for at the unit bid price per square yard per type of replacement paving material.

B. The accepted quantities of connecting pipe shall be paid at the unit bid price per linear foot per type and size of pipe, and shall include pipe in place and all necessary jointing materials.

C. The accepted quantities of storm inlets will be paid at the unit price per each per type of storm inlet, and shall include: structure, grating, excavation, backfilling and compaction, and curb removal and replacement, as defined in Bid Proposal.

D. The accepted quantities of special complete structures shall be paid at the unit bid price per each.

E. Compensation, whether by contract pay item or incidental work will be for furnishing all material, labor, equipment, tools and incidentals required for the work, all in accordance with the plans and these specifications.

END OF SECTION

SECTION 02590 REINFORCED CONCRETE PIPE

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This Item shall govern for furnishing and installing all concrete pipe and materials and for constructing precast concrete pipe culverts or precast concrete sewer mains, laterals, stubs and inlet leads. The pipes shall be of the sizes, strengths and dimensions shown on the plans and shall include all connections to new or existing pipes, sewers, manholes, inlets, headwalls and other appurtenances and jointing materials as may be required to complete the work.

PART 2 - PRODUCTS

2.01 GENERAL:

A. Except as modified herein, precast reinforced concrete pipe shall conform to the design shown on the plans and to ASTM C76 or C655 for circular pipe.

B. All precast concrete pipe shall be machine made or cast by a process which will provide for uniform placement of the concrete in the form and compaction by mechanical devices which will assure a dense concrete. Concrete shall be mixed in a central batch plant or other approved batching facility from which the quality and uniformity of the concrete can be assured. Transit mixed concrete will not be acceptable for use in precast concrete pipe.

C. Unless otherwise shown on the plans, not more than two (2) holes may be placed in the top section of precast pipe for lifting and placing. The holes may be cast, cut, or drilled in the wall of the pipe. The holes shall not exceed three (3) inches in diameter at the inside surface of the pipe wall. Not more than one (1) longitudinal wire or two (2) circumferential wires may be cut per layer of reinforcing steel when locating lift holes in the pipe wall. After the pipe is in place, lift holes shall be filled with concrete or mortar or precast concrete plugs to the satisfaction of the Engineer.

TABLE A
CIRCULAR PIPE
(CLASS, D-LOAD EQUIVALENTS)

C76	C655
CLASS I	800D-LOAD
CLASS II	1000D-LOAD
CLASS III	1350D-LOAD
CLASS IV	2000D-LOAD
CLASS V	3000D-LOAD

2.02 DESIGN:

A. Reinforced concrete pipe for jacking, boring or tunneling shall meet the requirements of the pertinent ASTM specification with the following additional requirements:

   1. The pipe shall have circular reinforcement and for 30 inch and larger diameters shall have an additional layer of Class III reinforcement, 12 inches long, extending into both the tongue and groove of the joint to within 3/4 inch of the end of the tongue and the groove. The minimum wall thickness shall be wall "B" for the diameter specified, unless special designs are required. The minimum concrete compressive strength for jacking and boring pipe shall be 5000 psi. Variations in the laying length of opposite sides shall not exceed 3/8 inch for pipe diameters 24 inches through 60 inches and 1/2 inch for pipe diameters 66 inches and larger. The maximum joint taper shall be 7 degrees for tongue and groove pipe and 2 degrees for O-ring gasket pipe. Pipe manufactured to these additional requirements shall be marked to identify pipe for jacking and boring.

B. The Construction Plans will provide a summary indicating the locations and length for all pipes. Additionally, the diameter required D-load and/or class for full circle pipe, will also be shown.

2.03 PHYSICAL TEST REQUIREMENTS:

A. The acceptability of the pipe shall be determined by the results of the physical tests outlined herein; by appropriate material tests required in ASTM C76, C506, C507, or C655; by absorption tests on selected samples from the wall of the pipe; and by inspection of the finished pipe to determine its conformance with the required design and its freedom from defects. Three-Edge Bearing tests shall be performed on one (1) pipe for each 100’ of pipe or fraction thereof of each design or shape, size, class or D-load for the load to produce a 0.01 inch crack and, at the discretion of the Engineer, the pipe may be tested to ultimate load.

B. As an alternate to the Three-Edge Bearing test, concrete pipe 60 inches in diameter and larger may be accepted on the basis of compressive strength of cores cut from the wall of the pipe. The manufacturer shall furnish facilities and personnel for taking the cores and determining the compressive strength of the samples. Three-Edge Bearing tests and core tests shall be in accordance with ASTM C497.

C. The manufacturer shall plug and seal coreholes in the pipe wall, after testing, in a manner satisfactory to the Engineer.

2.04 MARKING:

The following information shall be clearly marked on each section of pipe:

A. The class or D-load of pipe.

B. The date of manufacture.

C. The name or trademark of the manufacturer.

D. One end of each section of pipe with elliptical reinforcement shall be clearly marked during the process of manufacture or immediately thereafter on the inside and the outside of opposite walls to show the location of the "top" or "bottom" of the pipe as it should be installed, unless the external shape of the pipe is such that the correct position of the top and bottom is obvious. Marking shall be indented on the pipe section or painted thereon with waterproof paint.

E. Pipe for jacking and boring shall be identified for the intended use.

2.05 INSPECTION:

The quality of materials, the process of manufacture, and the finished pipe shall be subject to inspection and approval by the Engineer at the pipe manufacturing plant. In addition, the finished pipe shall be subject to further inspection by the Engineer at the project site prior to and during installation.

A. Causes for Rejection. Pipe shall be subject to rejection for failure to conform to any of the specification requirements. Individual sections of pipe may be rejected because of any of the following:

1. Fractures or cracks passing through the shell, except for a single end crack that does not exceed the depth of the joint.

2. Defects that indicate imperfect proportioning, mixing and molding.

3. Surface defects indicating honeycombed or open texture.

4. Damaged ends, where such damage would prevent making a satisfactory joint.

5. Any continuous crack having a surface width of 0.01 inch or more and extending for a length of 12 inches or more, regardless of position in the wall of the pipe.

B. Repairs. Pipe may be repaired if necessary, because of occasional imperfections in manufacture or accidental injury during handling and will be acceptable if, in the opinion of the Engineer, the repairs are sound, properly

finished and cured, and the repaired pipe conforms to the requirements of the specifications.

C. Rejections. All rejected pipe will be plainly marked by the Engineer by painting colored spots over the Division of Materials and Tests monogram on the inside wall of the pipe and on the top outside wall of the pipe. The painted spots shall be sufficient to identify the rejected pipe but no larger than four (4) inches in diameter. Rejected pipe shall not be defaced in any other manner. The Contractor shall remove the rejected pipe from the project and replace with pipe meeting the requirements of this Item.

D. Jointing Materials. Unless otherwise specified on the plans the Contractor shall have the option of making the joints using any of the materials described herein. For all jointing materials except mortar, the Contractor shall furnish the Engineer the Manufacturer's Certificate of Compliance.

1. Mortar for joints shall be in accordance with the section, "Jointing", of this Item.

2. Cold Applied, Plastic Asphalt Sewer Joint Compound shall consist of natural and/or processed asphalt base, suitable volatile solvents and inert filler. The consistency is to be such that the ends of the pipe can be coated with a layer of the compound up to one-half inch thick by means of a trowel. The joint compound shall cure to a firm, stiff plastic condition after application. The material shall be of a uniform mixture and any small separation occurring in the container shall be stirred to a uniform mix before use.

   This material shall meet the following requirements when tested in accordance with Test Method Tex-526-C:

Asphalt Base, 100% - % Volatites - % Ash, % by weight	28-45
Volatiles, 212° F Evaporation, 24 h, % by weight	10-26
Mineral Matter, determined as Ash, % by weight	30-55
Consistency, Cone Penetration, 150 q, 5 sec, 77° F	150-275

3. Rubber Gaskets shall conform to ASTM C361 or C443. The design of the joints and permissible variations in dimensions shall be in accordance with ASTM C443. The Contractor shall furnish the Engineer the Manufacture's Certificate of Analysis.

4. Cold Applied Preformed Plastic Gaskets. Preformed plastic gaskets shall be suitable for sealing joints of tongue and groove concrete pipe. The gasket sealing the joint shall be produced from blends of refined hydrocarbon resins and plasticizing compounds reinforced with inert mineral filler and shall contain no solvents, irritating fumes or obnoxious odors. The gasket joint sealer shall not depend on oxidizing, evaporating, or chemical action for its adhesive or cohesive strength, and shall be supplied in extruded rope-form of suitable cross-section. The size of the plastic gasket joint sealer shall be in accordance with the manufacturer's recommendations and be of sufficient size to properly seal the joint. The plastic gasket joint sealer shall be so constructed as to provide evidence of proper installation either by means of "squeeze-out" of the gasket material on the inside or outside around the pipe joint circumference or by means of tabs, projections or other such indicators placed at established intervals around the circumference of the pipe joint. Plastic gasket joint sealers shall be Type 1 or Type 2. Type 1 gaskets shall meet the "squeeze-out" requirements and Type 2 gaskets shall meet the requirements for tabs, projections or other indicators. The gasket joint sealer shall be protected by a suitable wrapper designed that when removed, the jointing material maintains integrity.

   The chemical composition of the gasket joint sealing compound for Type 1 and 2, as shipped, shall meet the following requirements:

COMPOSITION	**TEST METHOD**	**ANALYSIS**
Bitumen, Petroleum Plastic Content, % by weight	ASTM D4	50-70
Ash-Inert Mineral Matter, % by weight	Tex-526-C	30-50
Volatile Matter, 325 F, % by weight	Tex-506-C	2.0 max.

   The gasket joint sealing compound when immersed for 30 days at ambient room temperature separately in five (5) percent solution of caustic potash; a five (5) percent solution of hydrochloric acid; a five (5) percent solution of sulfuric acid; and a saturated H2S solution, shall show no visible deterioration.

   The physical properties of the gasket joint sealing compound as shipped shall meet the following requirements:

PROPERTY	TEST METHOD	REQUIREMENT	
		Type 1	Type 2
Ductility @ 77 F (cm), min.	Tex-503-C	5.0	5.0
Softening Point, F	Tex-505-C	275	275
Penetration			
32 F (300g) 60 sec., min.	Tex-502-C	--	65
77 F (150g) 5 sec.	Tex-502-C	50-120	50-120
115 F (150g) 5 sec., max.	Tex-502-C	--	150

PART 3 – EXECUTION

3.01 CONSTRUCTION METHODS

A. Excavation. All excavation shall be in accordance with the requirements of Section 02221, "Trench Excavation, Backfill, and Compaction", except where tunneling or jacking methods are shown on the plans or permitted by the Engineer.

B. Shaping and Bedding. Shaping and bedding shall be in accordance with Section 02221, “Trench Excavation, Backfill, and Compaction".

C. Laying Pipe. Unless otherwise authorized by the Engineer, the laying of pipe on the bedding shall be started at the outlet end with the spigot or tongue end pointing downstream and shall proceed toward the inlet end with the abutting sections properly matched, true to the established lines and grades. Where bell and spigot pipe are used, cross trenches shall be cut in the foundation to allow the barrel of the pipe to rest firmly upon the bedding. These cross trenches shall be not more than two (2) inches larger than the bell ends of the pipe. Proper equipment shall be provided for hoisting and lowering the sections of pipe into the trench without disturbing the bedding and the sides of the trench. The ends of the pipe shall be carefully cleaned before the pipe is placed. As each length of pipe is laid, the mouth of the pipe shall be protected to prevent the entrance of earth or bedding material. The pipe shall be fitted and matched so that when laid in the bed the pipe shall form a smooth, uniform conduit. When elliptical pipe with circular reinforcing or circular pipe with elliptical reinforcing is used, the pipe shall be laid in the trench in such position that the markings "Top" or "Bottom", shall not be more than five (5) degrees from the vertical plane through the longitudinal axis of the pipe.

Multiple installations of reinforced concrete pipe shall be laid with the center lines of individual barrels parallel. Unless otherwise shown on the plans, the following clear distances between outer surfaces of adjacent pipes shall be used:

Diameter 18"	24"	30"	36"	42"	48"	54"	60" to 64"
Clear 0'-9" Distance Between Pipes	0'-11"	1'-1"	1'-3"	1'-5"	1'-7"	1'-11"	2'-0"

D. Jointing.

1. Joints sealed with portland cement mortar shall be made as follows:

   Mortar shall consist of one (1) part cement, two (2) parts sand and sufficient water to make a plastic mix. The pipe ends shall be cleaned and wetted before making the joint. The lower half of the bell or groove and the upper half of the tongue or spigot shall be plastered with mortar. After the pipes are tightly jointed, mortar shall be packed into the joint from both inside and outside the pipe. The inside shall be finished smooth and flush with adjacent joints of pipe. Over the joint outside the pipe, a bead shall be formed at least one (1) inch on either side of the joint and of semicircular cross section for tongue and groove joints, but for bell and spigot joints, the mortar shall form a 45° fillet between the outer edge of the bell and the spigot. Mortar joints shall be cured by keeping the joints wet for at least 48 hours or until the backfill has been completed, whichever comes first. No jointing shall be done when the atmospheric temperature is at or below 40 F. Mortared joints shall be protected against freezing by backfilling or other approved methods for at least 24 hours.

   No mortar banding on the outside of pipe will be required for driveway culverts.

   At the Contractor's option, and with the approval of the Engineer, pipes which are large enough for a man to enter may be furnished with the groove not less than one-half of an inch and not more than three-fourths of an inch longer than the tongue. Such pipe may be laid and backfilled without mortar joints. Care shall be exercised to avoid displacing the joints during the backfilling operations. After the backfilling has been completed, the space between the end of the tongue and the groove on the interior of the pipe shall be cleaned of all foreign material, thoroughly wetted and filled with mortar around the entire circumference of the pipe and finished flush.

   The Contractor shall make available for the use of the Engineer, an appropriate rolling device similar to an automobile mechanic's "Creeper" for conveyance through small size pipe structures.

   Mortar joints will be required for irrigation wells, vents and similar vertical

structures.

2. Joints using Cold Applied, Plastic Asphalt Sewer Joint Compound shall be made as follows:

   Both ends of the pipes shall be clean and dry. A one-half inch thick layer of the compound shall be troweled or otherwise placed in the groove end of the pipe covering not less than two-thirds of the joint face around the entire circumference. Next, the tongue end of the next pipe shall be shoved home with sufficient pressure to make a tight joint. After the joint is made any excess mastic projecting into the pipe shall be removed. Backfilling of pipe laid with asphalt mastic joints may proceed as soon as the joint has been inspected and approved by the Engineer. Special precautions shall be taken in placing and compacting backfill to avoid damage to the joints.

3. Joints using Rubber Gaskets shall be made as follows:

   Where rubber gasket pipe joints are required by the plans the joint assembly shall be made according to the recommendations of the gasket manufacturer. Water tight joints will be required when using rubber gaskets. Backfilling may begin when approved by the Engineer.

4. Joints using Cold Applied Preformed Plastic Gaskets shall be made as follows:

   Before laying the pipe in the trench, the plastic gasket shall be attached around the tongue or groove near the shoulder or hub of each joint in accordance with the gasket manufacturer's recommendations. The protective wrapper shall be removed and the gasket pressed firmly to the clean, dry surface of the pipe, as recommended by the manufacturer. The joint sealer must be placed in such a manner that no dirt or other deleterious materials will come in contact with the joint sealing material.

   After the tongue is correctly aligned with the flare of the groove, the wrapper or wrappers on the gasket shall be removed and the pipe shall be pulled or pushed home with sufficient force to properly seal the joint. Any joint material pushed out into the interior of the pipe that would tend to obstruct the flow shall be removed. (Pipe shall be pulled home in a straight line with all parts of the pipe on line and grade at all times.)
   Backfilling of pipe laid with plastic gasket joints may proceed as soon as the joint has been inspected and approved by the Engineer. Special precautions shall be taken in placing and compacting backfill to avoid damage to the joints.

   When the atmospheric temperature is below 60 F, plastic joint seal gaskets shall either be stored in an area warmed to above 70 F, or

artificially warmed to this temperature in a manner satisfactory to the Engineer. Gaskets shall then be applied to pipe joints immediately prior to placing pipe in trench, followed by connection to previously laid pipe.

5. Connections and Stub Ends. Connections of concrete pipe to existing pipes, pipe sewers or sewer appurtenances shall be as shown on the plan.

   The bottom of existing structures shall be mortared or concreted if necessary to eliminate any drainage pockets created by the connections. Any damage to the existing structure resulting from making the connection shall be repaired by the Contractor, to the satisfaction of the Engineer, at the Contractor's expense.

   Unless otherwise shown in the plans, connections between concrete pipe and corrugated metal pipe shall be made with a suitable concrete collar having minimum thickness of twelve (12) inches.

   Stub ends, for connections to future work not shown on the plans, shall be finished by installing watertight plugs into the free end of the pipe.

6. Backfilling. After the pipe has been placed, bedded and jointed as specified, filling and/or backfilling shall be done in accordance with the applicable requirements of Item 400, "Excavation and Backfill for Structures". When mortar joints are specified, no fill or backfill shall be placed until the jointing material has been cured for at least six hours. Special precautions shall be taken in placing and compacting the backfill to avoid any movement of the pipe or damage to the joints. For all pipe structures where joints consist of materials other than mortar, immediate backfilling will be permitted.

7. Re-use of Appurtenances. When existing appurtenances are specified on the plans for reuse, the portion to be reused shall be severed from the culvert and moved to the new position previously prepared by hoisting with a crane, rolling, or other approved methods. Connections shall conform to the requirements for joining sections of pipes, as designated herein or as shown on the plans. Any portion of the headwalls or pipe attached to the appurtenance damaged during the moving operations by the Contractor shall be restored to its original condition at the Contractor's expense. The Contractor may remove and dispose of the existing appurtenances and construct new appurtenances at his expense in accordance with the pertinent specifications and design shown on the plans or as furnished by the Engineer.

8. Protection of Pipe. Unless otherwise shown on the plans or permitted in writing by the Engineer, no heavy earth moving equipment will be permitted to haul over the structure until a minimum of four (4) feet of

permanent or temporary, compacted fill has been placed thereon. Pipe damaged by the Contractor's equipment shall be removed and replaced by the Contractor at the Contractor's expense.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

This Item will be measured by the linear foot. Such measurement will be made between the ends of the pipe barrel along the flow line. Where spurs or branches, or connections to existing pipe lines are involved, measurement of the spur or new connecting pipe will be made from the intersection of the flow line with the outside surface of the pipe into which it connects. Where inlets, headwalls, catch basins, manholes, junction chambers, or other structures are included in lines of pipe; that length of pipe tying into the structure wall will be included for measurement but no other portion of the structure length or width will be so included. For multiple pipes, the measured length will be the sum of the lengths of the barrels measured as prescribed above.

4.02 PAYMENT:

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Reinforced Concrete Pipe" and "Reinforced Concrete Pipe (Sewers)" of the size and D-load or class specified.

This price shall be full compensation for furnishing, hauling, placing and joining of pipes; for cutting of skews or slopes, for all connections to new or existing structures; for moving and reusing appurtenances where required; for removing and disposing of portions of existing structures as required; and for all labor, tools, equipment and incidentals necessary to complete the work.

Trenching, backfilling and compaction will not be measured or paid, but will be considered incidental to other items in accordance with Section 02221, "Trench Excavation, Backfill, and Compaction". Protection methods for excavation greater than 5 feet in depth will be measured and paid for as Item 02223, “Trench Protection System.”

END OF SECTION

SECTION 02601
FLEXIBLE BASE

PART I - GENERAL

1.01 GENERAL DESCRIPTION OF WORK:

A. This work shall consist of furnishing and placing a foundation course for surface courses or for other base courses.

B. Flexible base shall be composed of either caliche (argillaceous limestone, calcareous or calcareous clay particles, with or without stone, conglomerate, gravel, sand or other granular materials), crushed stone, gravel, iron ore topsoil, shell, or crushed slag.

C. Flexible base shall be constructed as specified herein in one or more courses in conformance with the details, lines and grades shown on the plans, and as established by the ENGINEER.

PART 2 -PRODUCTS

2.01 MATERIALS:

A. Materials for flexible base shall be crushed or uncrushed as necessary to comply with the requirements hereinafter specified.

B. Materials shall consist of durable, coarse aggregate particles mixed with approved binding materials.

2.02 LIME STABILIZATION:

A. Where shown on the plans, or directed by the ENGINEER, material for flexible base shall be lime stabilized in accordance with the provisions of Section 02240.

2.03 TYPES:

A. Type A - Crushed or broken aggregate (excluding gravel aggregate).

B. Type B - Gravel Aggregate

C. Type F - Caliche

2.04 GRADES:

A. Unless otherwise shown on the plans or directed by the ENGINEER, the final course of base material shall consist of Grades 1, 2, 3, or 4, as specified in Table 02601-1.

B. Base courses or subbase materials, unless otherwise noted on the plans or directed by the ENGINEER, may consist of Grades 1, 2, 3, or 4, as specified in Table 02601-1.

C. All grades shall, when tested in accordance with standard laboratory test procedures, meet the physical requirements set forth in Table 02601-1.

D. Testing of flexible base materials shall be in accordance with the following test procedures:

TEST	TESTING PROCEDURE
Preparation for soil constants and sieve analysis	TEX-101-E
Liquid Limit	TEX-104-E
Plastic Limit	TEX-105-E
Plasticity Index	TEX-106-E
Sieve Analysis	TEX-110-E
Wet Ball Mill	TEX-116-E
Triaxial Test	TEX-117-E (Part I or II)

E. Unless otherwise specified on the plans, samples for testing the material for Soil constants, Gradation and Wet Ball Mill shall be taken prior to the compaction operations.

F. Unless otherwise specified on the plans, samples for triaxial tests shall be taken from the stockpile or from production, as directed by the ENGINEER, where stockpiling is required and from production where stockpiling is not required.

TABLE 02601-1

PHYSICAL REQUIREMENTS FOR FLEXIBLE BASE MATERIALS

TYPES	GRADES							
	Grade 1		Grade 2		Grade 3		Grade 4	
	Triaxial Class 1, Min. compressive strength, psi: 45 to 0 psi lateral pressure and 175 at 15 psi lateral pressure		(Triaxial Class 1 to 2.4) Min. compressive strength, psi: 35 to 0 psi lateral pressure and 175 at 15 psi lateral pressure		(Unspecified Triaxial Class)		(Unspecified Triaxial Class)	
TYPE A	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%
Crushed or Broken Aggregate (excluding gravel aggregate)	1-3/4	0	1-3/4	0-10	1-3/4	0-10	As Shown on Plans	
	7/8"	10-35	No. 4	45-75	No. 40	60-85		
	3/8"	30-50	No. 40	60-85	Max LL	45		
	No. 4	45-65	Max LL	40	Max PI	15		
	No. 40	70-85	Max PI	12	Wet Ball			
	Max LL	35	Wet Ball		Bill Amt	55		
	Max PI	10	Wet Ball Bill Amt	40	Wet Ball Bill Amt	40		
	Wet Ball Bill Amt	40	Max Increase in Passing No. 40	20	Max Increase in Passing No. 40	20		
	Max Increase in Passing No. 40	20						
TYPE B	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%
Gravel Aggregate	N/A		1-3/4	0-10	2-3/4"	0	As Shown on Plans	
			No. 4	30-75	No. 40	45-65		
			No. 40	70-85	Max LL	35		
			Max LL	35	Max PI	12		
			Max PI	12				
			Max PI	12	Max LL	35		
			No. 4	45-65	No. 40	45-65		
			No. 40	50-70	Max LL	35		
			Max LL	35	Max PI	12		
			Max PI	12				

TYPE F	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%	Retained on Sq. Sieve	%
Caliche	N/A		1-3/4	0	1-3/4	0	As Shown on Plans	
			No. 4	45-75	No. 40	50-85		
			No. 40	50-85	Max LL	40		
			Max LL	40	Max PI	12		
			Max PI	12				

G. Materials exhibiting reasonably close conformity with the specified gradation and plasticity index are defined by the following criteria:

1. The ENGINEER may accept the material, providing not more than 2 of 10 consecutive gradation tests performed are outside the specified limits on any individual or combination of sieves by no more than 5% and where no two consecutive tests are outside the specified limits.

2. The ENGINEER may accept the material providing not more than 2 of 10 consecutive plasticity index samples tested are outside the specified limit by no more than two points and where no two consecutive tests are outside the specified limit.

2.05 STOCKPILING:

A. When specified on the plans, the material shall be stockpiled prior to delivery on the road. The stockpile shall be not less than the height indicated and shall be made up of layers of material not to exceed the depth shown on the plans.

B. After a sufficient stockpile has been constructed as specified on the plans, the CONTRACTOR may proceed with loading from the stockpile for delivery to the road.

C. In loading from the stockpile for delivery to the road, the material shall be loaded by making successive vertical cuts through the entire depth of the stockpile.

D. If the CONTRACTOR elects to produce the Type A material from more than one material or more than one source, each material shall be crushed separately and placed in separate stockpiles so that at least 75 percent of the material in the course aggregate stockpiles will be retained on the No. 4 sieve and at least 70 percent of the material in the fine aggregate stockpile will pass the No. 4 sieve.

E. The materials shall be combined in a central mixing plant in the proportions determined by the ENGINEER to produce a uniform mixture which meets all

of the requirements of the specification. In the event that combinations of the materials produced fail to meet all of the specification requirements, the CONTRACTOR will be required to secure other materials which will meet specifications requirements.

F. The central mixing plant shall be of either the batch or continuous flow type, and shall be equipped with feeding and metering devices which will add the materials into the mixer in the specified quantities.

G. Mixing shall continue until a uniform mixture is obtained.

PART 3 - EXECUTION

3.01 PREPARATION OF SUBGRADE:

A. The roadbed shall be excavated and shaped in conformity with the typical sections shown on the plans and to the lines and grades as established by the ENGINEER.

B. All unstable or otherwise objectionable material shall be removed from the subgrade and replaced with approved material.

C. Flexible base shall not be placed until the Contractor has verified by proof rolling that the subgrade has been prepared and compacted in conformity with Standard Specification Item 02220, "Subgrade Preparation," to the typical sections, lines and grades indicated on the Drawings. Any deviation shall be corrected and proof rolled prior to placement of the flexible base material.

D. All holes, ruts and depressions shall be filled with approved material and, if required, the subgrade shall be thoroughly wetted with water and reshaped and rolled to the extent directed in order to place the subgrade in an acceptable condition to receive the base material.

E. The surface of the subgrade shall be finished to line and grade as established and in conformity with the typical section shown on plans. Any deviation in excess of 1/2 inch in cross section and in a length of 16-feet measured longitudinally shall be corrected by loosening, adding or removing material, reshaping and re-compacting by sprinkling and rolling.

F. Sufficient subgrade shall be prepared in advance to insure satisfactory execution of the work.

G. Material excavated in the preparation of the subgrade shall be utilized in the construction of adjacent shoulders and slopes or otherwise disposed of as directed. Any additional material required for the completion of the shoulders and slopes shall be secured from sources indicated on plans or as directed by the ENGINEER.

3.02 PLACEMENT OF FIRST COURSE - TYPE A, TYPE B, TYPE F MATERIAL:

A. Immediately before placing the base material, the subgrade shall be checked as to conformity with grade and section.

B. The material shall be delivered in approved vehicles of a uniform capacity, and it shall be the charge of the CONTRACTOR that the required amount of specified material shall be delivered to each 100-foot station.

C. Material deposited upon the subgrade shall be spread and shaped the same day.

D. In the event that inclement weather, or other unforeseen circumstances, renders the spreading of the material during the first 24-hour period impractical, the materials shall be scarified and spread as directed by the ENGINEER.

E. Throughout the entire operation the material shall be sprinkled, if directed, and shall be maintained by blading and, upon completion, shall be smooth and shall conform to the typical section indicated on the Drawings and to the established lines and grades, shall then be bladed, dragged and shaped to conform to typical sections as shown on plans.

F. Each lift shall be sprinkled as required to bring the material to optimum moisture content, then compacted to the extent necessary to provide not less than 95 percent nor more than 100 percent of the maximum dry density as determined in accordance with Test Method Tex-114-E. In addition to the requirements specified for density, the full depth of flexible base material shall be compacted to the extent necessary to remain firm and stable under construction equipment. After each section of flexible base material is completed, tests, as necessary, will be made by the Engineer or designated representative. As a minimum, three in-place density tests per section per day will be taken. If the material fails to meet the density requirements, it shall be reworked as necessary to meet these requirements.

G. All areas and "nests" of segregated coarse or fine material shall be removed and replaced with well graded material, as directed by the ENGINEER.

H. If additional binder is considered desirable or necessary after the material is spread and shaped, it shall be furnished and supplied in the amount directed by the ENGINEER. Such binder material shall be carefully and evenly incorporated with the material in place by scarifying, harrowing, brooming or by other approved methods.

I. The course shall be compacted by methods of compaction hereinafter specified as the "Ordinary Compaction" method or the "Density Control" method of compaction as indicated on the plans, or as directed by the ENGINEER.

1. When the "Ordinary Compaction" method is to be used, the following provisions shall apply:

a) The course shall be sprinkled as required and rolled with approved compaction equipment as directed until a uniform compaction is secured. Throughout this entire operation, the shape of the course shall be maintained by blading. Upon completion, the surface shall be smooth and in conformity with the typical sections shown on plans and the established lines and grades.

b) In the area on which pavement is to be placed, any deviation in excess of 1/4 inch in cross section and in a length of 16-feet measured longitudinally shall be corrected by loosening, adding or removing approved material, as required reshaping and re-compacting by sprinkling and rolling.

c) All irregularities, depressions and weak spots which develop in the laid course shall be corrected immediately by scarifying the areas affected, adding approved material as required, reshaping and recompacting by sprinkling and rolling.

2. When the "Density Control" method of compaction is to be used, the following provisions shall apply:

a) The course shall be sprinkled as required and compacted to the extent necessary to provide not less than the percent density as hereinafter specified under "Density".

b) In addition to the requirement specified for density, the full depth of the flexible base shown on the plans shall be compacted to the extent necessary to remain firm and stable under construction equipment.

c) After each section of flexible base is completed, tests as necessary will be made by the ENGINEER. If the material fails to meet the density

requirements, it shall be reworked as necessary to meet these requirements.

d) Throughout this entire operation, the shape of the course shall be maintained by blading, and the surface upon completion shall be smooth and in conformity with the typical sections shown on the plans and to the established lines and grades.

e) In the areas on which pavement is to be placed, any deviation in excess of 1/4 inch in cross section and 16 feet in length, measured longitudinally, shall be corrected by loosening, adding or removing approved material as required, reshaping and recompacting by sprinkling and rolling.

f) All irregularities, depressions, and weak spots which develop shall be corrected immediately by scarifying the areas affected, adding approved material as required, reshaping and recompacting by sprinkling and rolling. Should the base course, due to any reason or cause, lose the required stability, density or finish before the surfacing is complete; it shall be re-compacted and refinished at the sole expense of the CONTRACTOR.

3.03 PLACEMENT OF SUCCEEDING COURSES - ALL MATERIAL TYPES:

A. Construction methods shall be the same as prescribed for the first course.

B. Prior to placing the surfacing on the completed base, the base shall be "dry cured" to the extent directed by the ENGINEER.

3.04 REWORKING AN EXISTING BASE COURSE

A. Existing base courses shall be reworked in accordance with TxDOT Item 251, or as directed by the ENGINEER, and result in a section that conforms the approved lines and grades.

3.05 DENSITY CONTROL:

A. When the "Density Control" method of compaction is indicated on the plans, each course of flexible base shall be compacted to the percent density shown on the plans.

B. The testing will be as outlined in Test Method Tex-114-E.

C. It is the intent of this specification to provide that the part of the base included in the top 8 inches, immediately below the finished surface of the roadway, be

not less than 100 percent of the density, as determined by the compaction ratio method.

D. Field density determination shall be made in accordance with Test Method Tex-115-E.

3.06 TOLERANCES:

A. Flexible base will be measured by the square yard of surface area of completed and accepted work based on the thickness of flexible base as shown on the plans.

1. The ENGINEER may accept the work providing not more than 25 percent of the density tests performed each day are outside the specified density by no more than three pounds per cubic foot and where no two consecutive tests on continuous work are outside the specified limits.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. Flexible base will be measure by the square yard of surface area of completed and accepted work based on the thickness of flexible base as shown on the plans.

1. The flexible base shall be measured for depth by the units of 2,000 square yards minimum, with one measurement taken at a location selected by the ENGINEER. There shall be a minimum of three (3) locations measured per project.

2. In that unit where flexible base is deficient by more than 1/2 inch in thickness, the deficiency shall be corrected by scarifying, adding material as required, reshaping and re-compacting by sprinkling and rolling.

1. No additional payment over the contract unit price will be made for any flexible base of a thickness exceeding that required by plans.

B. The CONTRACTOR shall schedule his operations in such a manner as to facilitate the measurement of the pay item.

D. The ENGINEER may accept the work provided no more than 20% depth tests performed are deficient by not more 1/2 inch and where no two consecutive tests on continuous work are outside the specified depth.

4.02 PAYMENT:

A. The accepted quantities of flexible base of the type, grade, and compaction method specified will be paid at the contract unit bid price per square yard, complete and in place.

B. Where "Ordinary Compaction" is used, all sprinkling, rolling, and manipulation required will not be paid for directly, but will be incidental to this bid items.

C. The unit prices bid shall each be full compensation for shaping and fine grading the roadbed; for securing and furnishing all materials, including all royalty and freight involved; for furnishing scales and labor involved in weighing the material when required; for loosening, blasting, excavating, screening, crushing and temporary stockpiling when required; for loading all materials for all hauling and delivering on the road; for spreading, mixing, blading, dragging, shaping and finishing, and for all manipulation, labor, tools and incidentals necessary to complete the work.

END OF SECTION

SECTION 02612

HOT MIX ASPHALT CONCRETE PAVEMENT

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Hot mix asphalt concrete (HMAC) pavement shall consist of a binder course, a leveling up course, a surface course or a combination of the courses as shown on the plans, or as directed by the ENGINEER.

B. HMAC pavement shall be composed of a compacted mixture of mineral aggregate and asphaltic material, constructed on previously completed and approved subgrade, subbase course, base course, or existing pavement.

C. HMAC pavement shall be in accordance with the specifications herein and in conformity with the lines, grades, quantities and typical sections in the contract and/or as directed by the ENGINEER.

1.02 QUALITY CONTROL:

A. HMAC pavement and its constituent part shall conform to the ASTM, AASHTO and/or TxDOT test methods noted below.

PART 2 - PRODUCTS

2.01 ASPHALTIC MATERIALS:

A. Asphalt cement binders shall be uncracked petroleum asphalt and shall be carefully refined, by steam, vacuum, or solvent, from asphaltic or semi-asphaltic base crude petroleum at a temperature not to exceed 700° F. Asphalt cements shall be free from thermal decomposition products and shall not be blended with any materials which have been subjected to cracking or produced from a crude petroleum source other than that of the original material. The asphalt cement shall not contain residues from non-asphaltic sources. Asphalt cement shall be homogeneous, free from water, and shall not foam when heated to 347° F.

B. Paving asphalt shall be classified by penetration or viscosity and shall conform to the requirements set forth in one of the following tables as designated by the ENGINEER. The CONTRACTOR may supply asphalt meeting the requirements of one of the following tables provided that the CONTRACTOR obtains prior approval of the ENGINEER and with the provision that once approval has been obtained, that the CONTRACTOR will remain with that grade throughout the project.

TABLE 2612-1

Specification	AASHTO Test	ASTM Test						
Designation	Method	Method	40 to 50	60 to 70	85 to 100	120 to 150	150 to 200	200 to 250
Flash Point (Open Cup) Min	T48	D92	--	450	450	450	450	350
Penetration of Orig. Sample at 77° F	T49	D5	40 to 50	60 to 70	85 to 100	120 to 150	150 to 200	200 to 250
Thin-Film Oven Loss, Hours at 325°F, % Max	T179	D1754	0.75	0.75	0.75	0.75	1.00	1.00
Test of Residue from Thin-Film Oven Test; % of Orig. Pen., Min.	T49	D5	52	50	50	50	50	50
Ductility at 77° F cm. after los at 325° F, Min.	T51	D113	50	50	100	100	100	100
Solubility in CCl_4 Min.	T44*	None	99.5	99.5	99.5	99.5	99.5	99.5
Reaction to Spot Test	T102**	None	0	0	0	0	0	0

* Procedure No. 1 with CCl_4 substituted for CS_2.

** Using 85% Standard Naphtha Solvent and 15% Xylene.

TABLE 2612-2

TYPE-GRADE	OA-30		OA-175*8		OA-400	
	Min	Max	Min	Max	Min	Max
Penetration at 32° F, 200 g, 60 sec	15	--	--	--	--	--
Penetration at 77° F, 100 g, 5 sec	25	35	150	200	--	--
Penetration at 115° F, 50 g, 5 sec	--	65	--	--	--	--
Ductility at 77° F, 5 cm/min, cms; Original OA	2	--	70	--	--	--
Flash Point COC, ^{o}F	450	--	425	--	425	--
Softening Point, R&B, ^{o}F	185	--	95	130	--	--
Thin Film Oven Test, 1/8 in. Film 50 g, 5 hrs, 325° F, % Loss by wt.	--	0.4	--	1.4	--	20
Penetration of Residue, at 77° F, 100 g, 5 sec % of Original Pen	--	--	40	--	--	--
Ductility of Residue at 77°F, 5 cm/min, cms	--	--	--	100	--	--
Solubility in Trichloroethylene, %	99	--	99	--	99	--
Spot Test on Original OA	Neg		Neg		Neg	
Float Test at 122° F, sec	--	--	--	--	120	150
Test on 85 to 115 Pen. Residue* Residue by Wt., %	--	--	--	--	75	--
Ductility, 77° F, 5 cm/min: Original Res, cms	--	--	--	--	100	--
Subjected to Thin Film Test, cms	--	--	--	--	100	--

*Determined by Vacuum Distillation (by evaporation if unable to reduce by vacuum).

** For use with Latex Additive only.

TABLE 2612-3

PROPERTIES	AC-1.5		AC-3		AC-5		AC-10		AC-20		AC-40	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
Viscosity, 140° F stokes …	150	50	300	100	500	100	1000	200	2000	400	4000	800
Viscosity, 275° F stokes …	0.7	--	1.1	--	1.4	--	1.9	--	2.5	--	3.5	--
Penetration, 77° F 100 g, 5 sec	250	--	210	--	135	--	85	--	55	--	35	--
Flash Point, COC, ° F	425	--	425	--	425	--	450	--	450	--	450	--
Solubility in trichloroethylene, percent …	99	--	99	--	99	--	99	--	99	--	99	--
Test on residues from thin film oven test: Viscosity, 140° F stokes …	--	450	--	900	1500	--	3000	--	6000	--	--	12000
Ductility, 77° F, 5 cms per min, cms	100	--	100	--	100	--	70	--	50	--	30	--
Spot Test	Negative for all grades											

C. A minimum of two percent, by weight, latex additive (solids basis) shall be added to the OA-175 Asphalt or to AC-5 Asphalt when specified in the contract. The latex additive shall be governed by the following specifications:

The latex is to be an anionic emulsion of butadiene-styrene low-temperature copolymer in water, stabilized with fatty-acid soap so as to have good storage stability, and possessing the following properties:

Monomer ratio, B/S	70/30
Minimum solids content	67%
Solids content per gal.@ 67%	5.3 lbs.
Coagulum on 80-mesh screen	0.01% max.
Type Anti-oxidant	staining
Mooney viscosity of Polymer (M/L 4@212° F)	100 min.
pH of Latex	9.4 - 10.5
Surface tension	28-42 dynes/cm2

The finished latex-asphalt blend shall meet the following requirements:

Viscosity at 140° F, stokes	1500 max.
Ductility at 39.2° F, 1 cm. per min., cm.	100 min.

D. Asphalt content shall be within the limits noted below:

Table 2612-4

HMAC Type	Percent of Mixture by Weight	Percent of Mixture by Volume
"A"	3.5 - 7.0	8.0 - 16.0
"B"	3.5 - 7.0	8.0 - 16.0
"C"	3.5 - 7.0	8.0 - 16.0
"D"	4.0 - 8.0	9.0 - 19.0
"F"	3.5 - 6.5	8.0 - 16.0

E. At the time of delivery of each shipment of asphalt, the vendor supplying the material shall deliver to the purchaser certified copies of the test report which shall indicate the name of the vendor, type and grade of asphalt delivered, date and point of delivery, quantity delivered, delivery ticket number, and results of the above-specified tests. The test report shall be certified and signed by an authorized representative of the vendor that the product delivered conforms to the specifications for the type and grade indicated.

F. Until the certified test reports and samples of the material have been checked by the ENGINEER to determine their conformity with the prescribed requirements, the material to which such report relates and any work in which it may have been incorporated as an integral component will be only tentatively accepted by the Owner. Final acceptance will be dependent upon the determination of the ENGINEER that the material involved fulfills the requirements prescribed therefor. The certified test reports and the testing required in connection with the reports will be at the expense to the Owner.

G. Unless otherwise specified in these specifications or in the Supplementary Specifications, the various grades of paving asphalt shall be applied at a temperature range of from 210° F to 325° F, the exact temperature to be determined by the ENGINEER.

H. Paving asphalt shall be heated in such a manner that steam or hot oils will not be introduced directly into the paving asphalt during heating. The CONTRACTOR shall furnish and keep on the site, at all times, an accurate thermometer suitable for determining the temperature of the paving asphalt.

I. HMAC asphalt shall be the grade having the highest penetration, within specified limits, to produce a mix having a maximum stability of the compacted mixtures.

J. Only one (1) grade of asphalt shall be required unless otherwise shown on the plans or as required by the ENGINEER.

2.02 AGGREGATES:

A. HMAC aggregate will be tested in accordance with the following test standards:

AASHTO T-30 Mechanic Testing
AASHTO T-27 Passing No. 200 Sieve
AASHTO T-89 Liquid Limit
AASHTO T-96 Los Angeles Abrasion
AASHTO T-104 Soundness (Magnesium Sulfate)
ASTM C – 131 Resistance to Degradation
ASTM C – 136 Sieve Analysis
ASTM C – 2419 Sand Equivalence Value
TxDOT Tex -106-E Method of Calculating Plasticity Index of Solids
TxDOT Tex-217 – F (I & II) Determination of Deleterious Materials and Decantation Test
TxDOT Tex-203 – F Quality Tests for Mineral Aggregates

B. Aggregates shall have an abrasion of not more than 40 for all courses except the non-skid surface course, which shall have an abrasion of not more than 35.

C. When properly proportioned, HMAC aggregate shall produce a gradation which will conform to the limitations for classification for HMAC type shown below, or as directed by the ENGINEER.

D. Course aggregate to be crushed limestone rock or crushed gravel with hydrated lime or limestone filler. (Crushed gravel shall be per TxDOT Specifications.)

E. Binder aggregate to be composed of 15% crushed limestone screening or as directed by the engineer.

1. Type "A" - Course Graded Base Course

	Percent Aggregate by Weight or Volume
Passing 2" sieve	100
Passing 1-3/4" sieve	95 to 100
Passing 1-3/4" sieve, retained on 7/8"sieve	16 to 42
Passing 7/8" sieve, retained on 3/8" sieve	16 to 42
Passing 3/8" sieve, retained on No. 4 sieve	10 to 26
Passing No. 4 sieve, retained on No. 10 sieve	5 to 21
Total retained on No. 10 sieve	68 to 84
Passing No. 10 sieve, retained on No. 40 sieve	5 to 21
Passing No. 40 sieve, retained on No. 80 sieve	3 to 16
Passing No. 80 sieve, retained on No. 200 sieve	2 to 16
Passing No. 200 sieve	1 to 8

2. Type "B" - Fine Graded or Leveling-Up Course

	Percent Aggregate by Weight or Volume
Passing 1" sieve	100
Passing 7/8" sieve	95 to 100
Passing 7/8" sieve, retained on 3/8" sieve	21 to 53
Passing 3/8" sieve, retained on No. 4 sieve	11 to 42
Passing No. 4 sieve, retained on No. 10 sieve	5 to 26
Total retained on No. 10 sieve	58 to 74
Passing No. 10 sieve, retained on No. 40 sieve	6 to 32
Passing No. 40 sieve, retained on No. 80 sieve	4 to 21
Passing No. 80 sieve, retained on No. 200 sieve	3 to 21
Passing No. 200 sieve	1 to 8

3. Type "C" - Course Graded Surface Course

	Percent Aggregate by Weight or Volume
Passing 7/8" sieve	100
Passing 5/8" sieve	95 to 100
Passing 5/8" sieve, retained on 3/8" sieve	16 to 42
Passing 3/8" sieve, retained on No. 4 sieve	11 to 37
Passing No. 4 sieve, retained on No. 10 sieve	11 to 32
Total retained on No. 10 sieve	54 to 74
Passing No. 10 sieve, retained on No. 40 sieve	6 to 32
Passing No. 40 sieve, retained on No. 80 sieve	4 to 27
Passing No. 80 sieve, retained on No. 200 sieve	3 to 27
Passing No. 200 sieve	1 to 8

4. Type "D" - Fine Graded Surface Course

	Percent Aggregate by Weight or Volume
Passing 1/2" sieve	100
Passing 3/8" sieve	85 to 100
Passing 3/8" sieve, retained on No. 4 sieve	21 to 53
Passing No. 4 sieve, retained on No. 10 sieve	11 to 32
Total retained on No. 10 sieve	54 to 74
Passing No. 10 sieve, retained on No. 40 sieve	6 to 32
Passing No. 40 sieve, retained on No. 80 sieve	4 to 27
Passing No. 80 sieve, retained on No. 200 sieve	3 to 27
Passing No. 200 sieve	1 to 8

5. Type "F" - Fine Graded Surface Course

	Percent Aggregate by Weight or Volume
Passing 3/8" sieve	100
Passing No. 4 sieve	95 to 100
Passing No. 4 sieve, retained on No. 10 sieve	58 to 73
Passing No. 10 sieve, retained on No. 40 sieve	6 to 26
Passing No. 40 sieve, retained on No. 80 sieve	3 to 13
Passing No. 80 sieve, retained on No. 200 sieve	2 to 11
Passing No. 200 sieve	1 to 8

2.03 PRIME COAT:

A. Prime coat, when specified on the plans, or directed by the ENGINEER, shall be in accordance with Section 02610 - Prime Coat, and as specified herein.

B. Prime coat shall be applied to the surfaces of bases at least 12 hours prior to placing the HMAC unless otherwise directed by the ENGINEER.

C. Asphalt prime shall be applied uniformly at the rate in accordance with Section 02610 - Prime Coat.

D. In order to prevent lapping at the junction of two applications, the distributor shall be promptly shut off. A hand spray shall be used to touch up all spots unavoidably missed by the distributor.

E. Immediately prior to application of the asphalt prime, an inspection will be made by the ENGINEER to verify that the base course has been constructed as specified. Also, all loose and foreign material shall be removed by light sweeping. Material so removed shall not be mixed with cover aggregate.

F. The surface to be primed shall be in a smooth and well-compacted condition, true to grade and cross section, and free from ruts and inequalities.

G. The pressure distributor used for applying prime coat material shall be equipped with pneumatic tires and shall be so designed and operated as to distribute the prime material in a uniform spray without atomization, in the amount and between the limits of temperature specified. It shall be equipped with a speed tachometer registering feet per minute and so located as to be visible to the truck driver to enable him to maintain the constant speed required for application at the specified rate.

H. The pressure distributor shall be equipped with a tachometer registering the pump speed, pressure gauge, and a volume gauge. The rates of application shall not vary from the rates specified by the ENGINEER by more than 10%. Suitable means for accuracy indicating at all times the temperature of the prime material shall be provided. The thermometer well shall be so placed as not to be in contact with a heating tube.

I. The distributor shall be so designed that the normal width of application shall be not less than 6 feet, with provisions for the application of lesser width when necessary. If provided with heating attachments, the distributor shall be so

equipped and operated that the prime material shall be circulated or agitated through the entire heating process.

J. The asphalt prime coat should preferably be entirely absorbed by the base course and, therefore, require no sand cover. If, however, it has not been completely absorbed prior to the start of placing the asphalt concrete mixture and in the meantime it is necessary to permit traffic thereon, sufficient sand shall be spread over the surface to blot up the excess liquid asphalt and prevent it from being picked it up by traffic. Also, sand shall be used in areas where traffic may pass over the prime coat. Prior to placing the asphalt concrete, loose or excess sand shall be swept from the base. If a sand cover is specified in the Supplementary Specifications or noted on the plans to cover asphalt prime, it shall be applied within 4 hours after the application of said prime coat, unless otherwise ordered by the ENGINEER.

K. Liquid asphalt shall be prevented from being sprayed upon adjacent pavements, structures, guard rails, guide posts, culvert markers, trees, and shrubbery that are not to be removed; adjacent property and improvements; other facilities or that portion of the traveled way being used by traffic.

L. The CONTRACTOR shall protect the prime coat against all damage and markings, both from foot and vehicle traffic. Barricades shall be placed where necessary to protect the prime coat. If, after the prime coat has been applied to the satisfaction of the ENGINEER and has been accepted, if it is disturbed by negligence on the part of the CONTRACTOR, it shall be restored at his expense to its condition at the time of acceptance. No material shall be placed until the prime coat is in a condition satisfactory to the ENGINEER.

2.04 TACK COAT:

A. If the asphalt concrete pavement is being constructed directly upon an existing hard-surfaced pavement, a tack coat shall be evenly and uniformly applied to the existing pavement prior to the placing of the new asphalt concrete. The surface shall be free of water, all-foreign material, or dust when the tack coat is applied. No area shall be treated in any one day greater than will be covered by the asphalt concrete during the same day. Traffic will not be permitted over tack coating.

B. Tack coat for HMAC shall consist of either rapid curing cut-back asphalt RC-2 diluted by addition of (not to exceed 15 percent by volume) an approved grade of gasoline and/or kerosene; emulsified asphalt, EA-11M diluted with 50 percent water, or a cut-back asphalt made by combining 50 to 70 percent of the asphaltic materials specified for the paving mixture with 30 to 50 percent gasoline and/or kerosene by volume.

C. Tack coat shall conform to the requirements of Section 02620 - Tack Coat, or as specified herein.

D. Application of tack coat shall be 0.10 to 0.15 gallons per square yard, or as directed by the ENGINEER.

E. A similar tack coat shall be applied to the surface of any course if, in the opinion of the ENGINEER, the surface is such that a satisfactory bond cannot be obtained between it and the succeeding course.

F. When required, the contact surfaces of all cold pavement joints, curbs, gutters, manholes, and the like shall be painted with a tack coat immediately before the adjoining asphalt concrete is placed. Asphalt tack coat shall be applied in controlled amounts as shown on the plans or determined by the ENGINEER. Surfaces where a tack coat is required shall be cleaned to the satisfaction of the ENGINEER before the tack coat is applied.

2.05 MINERAL FILLER:

A. Mineral filler, other than hydrated lime, shall consist of a thoroughly dry stone dust, portland cement or other mineral dust approved by the ENGINEER.

B. The mineral filler shall be free from foreign or other deleterious matter.

C. When tested by the method outlined in TxDOT Test Method Tex-200-F (Part 1 or 3), mineral filler shall meet the following gradations by weight:

Passing No. 30 Sieve	95-100%
Passing No. 80 Sieve	75%
Passing No. 200 Sieve	55%

2.06 ANTI-STRIPPING COMPOUND

A. Anti-Stripping compound, as required in the job mix formula, shall be furnished in the amounts calculated therein.

2.07 JOB MIX FORMULA:

A. A job mix formula based on representative samples, including filler if required, shall be determined submitted by the CONTRACTOR for approval of the ENGINEER.

B. The resultant job mix formula shall be within the master range for the specified type of HMAC.

C. The job mix formula for each mixture shall establish a single percentage of aggregate passing each required sieve size and a single percentage of bituminous material to be added to the aggregate and shall provide for 3 to 5% air voids in the resultant design mix. During the mix design process the following factors will be considered: air voids, Marshall stability, durability, water resistance, and asphalt film thickness.

D. After the job mix formula is established, mixtures for the project shall conform to the following tolerances which may fall outside of the specified master range:

	Percent by Weight or Volume as Applicable
Passing 1-3/4" sieve, retained on 7/8" sieve	± 5
Passing 7/8" sieve, retained on 5/8" sieve	± 5
Passing 5/8" sieve, retained on 3/8" sieve	± 5
Passing 3/8" sieve, retained on No.4 sieve	± 5
Passing No.4 sieve, retained on No.10 sieve	± 5
Total retained on No.10 sieve	± 5
Passing No.10 sieve, retained on No.40 sieve	± 3
Passing No.40 sieve, retained on No.80 sieve	± 3
Passing No.80 sieve, retained on No.200 sieve	± 3
Passing No.200 sieve	± 3
Asphaltic Material	± 0.05 by wt or 1.2 by vol.
Mixing Temperature	± 20° F

E. Asphaltic mixture shall be tested in accordance with TxDOT Test Method Tex-200-4 (Part I or Part III) and shall have the following laboratory values:

		Surface Course	Base Course
Density:	Minimum	95%	95%
	Maximum	98%	99%
	Optimum	96.5%	96.5%
Stability (Hveem)			
	Minimum	30%	30%
	Maximum	45%	45%
Stability (Marshall – 75 Blow Briquette)		1500 lbs	1500 lbs.
Voids		3 - 7%	4 - 7%
Voids Filled With Asphalt		75 - 85%	65 - 80%
Sand Equivalent		40	40

2.08 EQUIPMENT:

A. All equipment for the handling of all material, mixing, and placing of HMAC shall be in accordance with the provisions of TxDOT Item 340.

2.09 STOCKPILING, STORAGE, PROPORTIONING AND MIXING:

A. Stockpiling, storage proportioning and mixing operations shall be in accordance with the Provisions of TxDOT Item 340.

PART 3 - EXECUTION

3.01 WEATHER AND TEMPERATURE LIMITATIONS:

A. Asphaltic mixture, when placed with a spreading and finishing machine, or the tack coat shall not be placed when the air temperature is 50° F and falling, but may be placed when the air temperature is 40° F and rising.

B. Asphaltic mixture, when placed with a motor grader, shall not be placed when the air temperature is less than or equal to 60° F and falling, but may be placed when the air temperature is greater than or equal to 50° F and rising.

C. Mat thicknesses of 1 inch or less shall not be placed when the temperature on which the mat is to be laid is below 50° F.

D. No tack coat or asphaltic mixture shall be placed when the humidity, general weather conditions and temperature and moisture condition of the base, in the opinion of the ENGINEER, are unsuitable.

E. If, after being discharged from the mixer and prior to placing, the temperature of the asphaltic mixture is 50° F or more below the temperature established by the ENGINEER, all or any part of the load may be rejected and payment will not be made for the rejected material.

3.02 EQUIPMENT:

A. Hauling Equipment:

1. Trucks used for hauling asphaltic mixtures shall have tight, clean, smooth metal beds that have been thinly coated with a minimal amount of paraffin oil, lime slurry, tine solution or other approved material to prevent mixture adhesion to the bed.

2. The dispatching of hauling equipment shall be arranged so that all material delivered may be placed and all rolling completed during daylight hours, unless otherwise directed by the ENGINEER.

3. All trucks shall be equipped with a cover of canvas, or other suitable material to protect the mixture from weather or on hauls where the temperature of the mixture will fall below specified level. Use of covers will be as directed by the ENGINEER.

B. Rollers:

1. Pneumatic Tire Roller. This roller shall consist of not less than seven pneumatic tire wheels, running on axles in such manner that the rear group

of tires shall cover the entire gap between adjacent tires of the 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 manner that the roller may be turned within a minimum circle. The tire shall provide surface contact pressures up to 90 pounds per square inch or more. The roller shall be so constructed as to operate in both a forward and a reverse direction with suitable provisions for moistening the surface of the tires while operating; and shall be approved by the ENGINEER. It shall be operated in accordance with the manufacturer's recommendations.

2. Two Axle Tandem Roller. This roller shall be an acceptable power-driven, steel-wheel, tandem roller weighing not less than eight tons. It must operate in forward and reverse directions; contain provision for moistening the surface of the wheels while in motion; and shall be approved by the ENGINEER. It shall be operated in accordance with the manufacturer's recommendations.

3. Three Wheel Roller. This roller shall be an acceptable power- driven, all steel, three wheel roller weighing not less than 10 tons. It must operate in forward and reverse directions; contain provisions for moistening the surface of the wheel while in motion; and shall be approved by the ENGINEER. It shall be operated in accordance with the manufacturer's recommendations.

4. Vibratory Steel Wheel Roller. If approved for use by the OWNER, this roller shall have a minimum weight of six 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. It shall be operated in accordance with the manufacturer's recommendations.

C. Straight Edges:

1. The CONTRACTOR shall provide an acceptable 16-foot straight-edge for surface testing. Satisfactory templates shall be provided as required by the ENGINEER.

D. Spreading and Finishing Machine:

1. Bituminous pavers shall be self-contained, power-propelled units, provided with an activated screed or a strike-off assembly, heated if necessary, and capable of spreading and finishing courses of bituminous plant mix material in lane widths applicable to the specified typical section and thickness shown on the plans.

2. The paver shall be equipped with a receiving hopper having sufficient capacity for a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed. Design will be such that no part of the truck weight will be supported by the paver.

3. The screed or strike-off assembly shall effectively produce a finished surface of the required evenness and texture without tearing, shoving or gouging the mixture. When laying mixtures, the paver shall be capable of being operated at forward speeds consistent with satisfactory laying of the mixture. The screed shall be adjustable for both height and crown and shall be equipped with a controlled heating device.

4. The bituminous paver shall be equipped with an automatic leveling device controlled from an external guide. The initial pass for each course shall be made using a paver equipped with a 40-foot minimum external reference, except that these requirements will not apply when asphalt concrete is placed adjacent to portland cement concrete pavement. Subsequent passes may utilize the matching device of one foot minimum length riding on the adjacent lay.

3.03 CONSTRUCTION METHODS:

A. Spreading and Finishing:

1. The asphalt concrete mixture shall be laid on the approved surface, spread and struck off to the grade and elevation established. It shall be spread and compacted in layers as shown on the plans or as directed by the ENGINEER. Bituminous pavers shall be used to distribute the mixture either over the entire width or over such partial width as may be practicable.

2. The ENGINEER will determine a minimum placement temperature within a range from 220° F to 300° F which will produce the required density. The established placement temperature, which is measured immediately behind the laydown machine, shall not vary more than 20° F.

3. A conventional paver or suitable equipment approved by the ENGINEER may be used to place asphalt concrete material on shoulders depressed from the traveled lanes in order to establish a uniform typical section. Approval of the equipment used will be based upon the results obtained.

4. The asphalt concrete may be dumped from the hauling vehicles directly into the paving machine or it may be dumped upon the surface being paved and subsequently loaded into the paving machine; however, no asphaltic concrete shall be dumped from the hauling vehicles at a distance greater than 250 feet in front of the paving machine. When asphaltic concrete is dumped first upon the surface being paved, the loading equipment shall be self-supporting and shall not exert any vertical load on the paving machine. Substantially all of the asphaltic concrete dumped shall be picked up and loaded into the paving machine.

5. To achieve, as far as practicable, a continuous operation, the speed of the paving machine shall be coordinated with the production of the plant. Sufficient hauling equipment shall be available to insure continuous operation.

6. The control system shall control the elevation of the screed at each end by controlling the elevation of one end directly and the other indirectly either

through controlling the transverse slope or alternately when directed, by controlling the elevation of each end independently, including any screed attachment used for widening, etc. Failure of the control system to function properly shall be cause for the suspension of the asphaltic concrete operations.

7. When dumping directly into the paving machine from trucks, care shall be taken to avoid jarring the machine or moving it out of alignment.

8. All courses of asphaltic concrete shall be placed and finished by means of self-propelled paving machines except under certain conditions or at certain locations where the ENGINEER deems the use of self-propelled, paving machines impracticable.

9. Self-propelled paving machines shall spread the asphaltic concrete without segregation or tearing within the specified tolerances, true to the line, grade, and crown indicated on the plans. Pavers shall be equipped with hoppers and augers which will place the asphaltic concrete evenly in front of adjustable screeds without segregation. Screeds shall include any strike-off device operated by tamping or vibrating action which is effective without tearing, shoving or gouging the asphaltic concrete and which produces a finished surface of an even and uniform texture for the full width being paved. Screeds shall be adjustable as to height and crown and shall be equipped with a controlled heating device for use when required.

10. On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable, the mixture shall be spread, raked, fluted and compacted with hand tools. For such areas the mixture shall be dumped, spread and screed to give the required compacted thickness.

B. Compaction:

1. Rolling with the 3-wheel and tandem roller 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.

2. Alternate trips of the roller shall be slightly different in length.

3. Rolling with a pneumatic tired roller shall be as directed by the ENGINEER.

4. Rolling shall continue with no further compression can be obtained and all roller marks are eliminated.

5. The motion of the roller shall be slow enough at all times to avoid displacement of asphaltic materials. If displacement occurs, it shall be corrected immediately by use of rakes and fresh asphaltic mixtures, where required.

6. The roller shall not be allowed to stand on the surface course when it has not been fully compacted and allowed to cool.

7. To prevent adhesion of the surface course to the roller, the wheels shall be kept thoroughly moistened with water; however, excess water shall not be allowed.

8. All precautions shall be taken to prevent dripping of gasoline, oil, grease, or other foreign substances on the surface or base courses during rolling operations or while rollers are standing.

9. With the approval of the ENGINEER, a vibratory steel wheeled roller may be substituted for the 3-wheel roller and tandem roller.

10. Along forms, curbs, headers, walls and other places not accessible to the rollers, the mixture shall be thoroughly compacted with hot hand tampers, smoothing irons, or with mechanical tampers. On depressed areas, a trench roller may be used or cleated compression strips may be used under the roller to transmit compression to the depressed area.

11. Any mixture that becomes loose, broken, mixed with dirt, segregated, or is in any way defective shall be removed and replaced with fresh hot bituminous mixture, which shall be compacted to conform with the surrounding area. Any area showing excess or deficiency of bituminous material shall be corrected immediately as directed by the ENGINEER.

C. In-Place Density:

1. In-place density shall be required for all mixtures except thin irregular depth leveling courses.

2. Each course, after final compaction, shall have a density of not less than 95 percent of the density developed in the laboratory test method outlined in TxDOT Bulletin C-14.

3. Density shall be determined with a portable nuclear test device in conformity with ASTM D-2950.76.

4. Calibration of the portable nuclear device will be established by the ENGINEER from cut pavement samples tested in accordance with AASHTO T-166 (weight, volume method). The density readings of the cut pavement samples determined in accordance with AASHTO T-166 (weight, volume method), and the density readings of the pavement samples determined by the portable nuclear test device in conformity with ASTM D 2950 will be correlated by the ENGINEER.

5. Other methods of determining in-place density may be used as deemed necessary by the ENGINEER.

6. It is intended that acceptance density testing will be done while the bituminous mixture is hot enough to permit further compaction if necessary. If the density of an acceptance section does not meet the specified requirements, the CONTRACTOR shall continue the compaction effort until the optimum density is obtained. Rolling for any compactive effort will not be allowed when the temperature of the mix is below 175° F unless authorized in

writing by the ENGINEER. Rerolling the paved surface after it has initially cooled will not be allowed.

7. If in-place density tests of the mixture produce a value lower than specified and in the opinion of the ENGINEER is not due to a change in the quality of the material, production may proceed with subsequent changes in the mix and/or construction procedures until in-place density equals or exceeds the specified density.

8. In-place density tests will be provided by the ENGINEER unless otherwise specified.

D. Joints:

1. Placing of the asphalt concrete shall be as continuous as possible. Rollers shall not pass over the unprotected end of a freshly laid mixture unless authorized by the ENGINEER.

2. When plant mix bituminous pavement is placed over plant mix bituminous treated base or when plant mixed seal coat is placed over plant mix bituminous pavement, longitudinal joints shall be staggered at least 6 inches with relation to the longitudinal joints of the underlying course.

3. Transverse joints shall have a two foot or 12:1 minimum taper. Longitudinal joints shall have a one foot or 6:1 minimum taper. All transverse tapers shall be cut and squared off prior to commencing new work. Tapered longitudinal joints from previous operations shall be cleaned and tack coated if directed by the ENGINEER. All joints shall be completely bonded. The surface of each course at all joints shall be smooth and shall not show any deviations in excess of 3/16 of an inch when tested with a 10-foot straightedge in any direction.

4. When paving under traffic, the CONTRACTOR shall plan his daily surfacing operations on a schedule which will result in not more than one (1) day's operation of exposed longitudinal joints. The longitudinal joints shall not have a height greater than two (2) inches and shall not be left exposed longer than 24 hours.

E. Surface Tolerance:

1. Upon completion, the pavement shall be true to grade and cross section. Except at intersections or any changes of grade, when a 16 foot straight edge is laid on the finished surface parallel to the centerline of the roadway, the surface shall not vary from the edge of the straight edge more than 1/16-inch per foot. Areas that are not within this tolerance shall be brought to grade immediately following the initial rolling. After the completion of final rolling, the smoothness of the course shall be checked, and the irregularities that exceed the specified tolerances <u>or</u> that retain any water on the surface shall be corrected by removing the defective work and replacing with new material as directed by the ENGINEER at the expense of the CONTRACTOR.

F. Manholes and Valve Covers:

1. Manhole frames and valve covers shall be adjusted prior to placing the surface course.

G. Compacted Thickness of HMAC Surface and Base Courses:

1. Surface Courses. The compacted thickness or depth of the asphaltic concrete surface course shall be as shown on the plans. Where the plans require a depth or thickness of the surface course greater than two inches compacted depth, same shall be placed in multiple courses of equal depth, each of which shall not exceed two inches compacted depth. If, in the opinion of the ENGINEER, an additional tack coat is considered necessary between any of the multiple courses, it shall be applied at the rate as directed.

2. Base Courses. The compacted thickness or depth of each base course shall be as shown on the plans. Where the plans require 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. If, in the opinion of the ENGINEER, an additional tack coat is considered necessary between any of the multiple lifts, it shall be applied as hereinbefore specified and at the rate as directed.

H. Pavement Thickness Tests:

1. 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 ENGINEER 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. The cost for the initial pavement thickness test shall be at the expense of the ENGINEER. In the event a deficiency in the thickness of pavement is revealed during normal testing operations, subsequent tests necessary to isolate the deficiency shall be at the CONTRACTOR's expense.

I. Price Adjustment for Roadway Density

1. The payment of the unit price will be adjusted for roadway density as outlined in the following table. The adjustment will be applied on a lot by lot basis for each lift. The adjustment will be based on the average of five density tests. The price adjustment will be applied to the entire asphalt concrete mix which includes the HMAC aggregate, the asphalt cement and anti-stripping compound, if used.

Average Density % of Lab Density	Percent of Contract Price To Be Paid
Above 95%	100%
94.0 to 94.99	96%
93.0 to 93.99	91%
92.0 to 92.99	85%
Less than 92.00	*

* This lot shall be removed and replaced to meet specification requirements as ordered by the ENGINEER. In lieu thereof, the CONTRACTOR and the ENGINEER may agree in writing that for practical purposes, the lot shall not be removed and will be paid for at 50% of the contract price.

PART 4 - MEASUREMENT AND PAYMENT

4.01 INCIDENTAL WORK:

A. Prime coat, anti-stripping compound, where used, and tack coat shall not be measured for direct payment, but shall be considered as subsidiary work pertaining to the placing of asphaltic mixtures of the contract price.

4.02 MEASUREMENT:

A. Hot-mix asphalt concrete material shall be measured by the ton of 2,000 pounds or by the square yard of the type or types used in the completed and accepted work, as shown on the Bid Proposal.

B. Weight shall be determined by a certified scale approved by the OWNER and recorded serially numbered weight tickets, identifying the vehicle and presented to the ENGINEER's representative on the job.

4.03 PAYMENT:

A. Work performed and materials furnished, as prescribed by this item, measured as provided herein, shall be paid at the unit bid price per ton or square yard for the type or types of hot mix asphalt concrete pavement shown on the proposal.

B. Unit bid price shall be payment in full for quarrying; furnishing all materials; for all heating; mixing; hauling; cleaning existing base course or pavement; placing asphaltic mixtures; rolling and finishing; and for all labor, tools, equipment and incidentals necessary to complete the work, including the work and materials involved in the application of prime coat and tack coat.

*** * * END OF SECTION * * ***

PART 1 - GENERAL

1.01 GENERAL DESCRIPTION OF WORK COVERED:

A. Mixing, placing, finishing and providing all related services necessary to construct all cast-in-place concrete work indicated on plans.

1.02 QUALITY ASSURANCE:

A. Comply with the latest published edition of the American Concrete Institute (ACI) and American Society of Testing and Materials (ASTM) standards and codes. Applicable standards and codes include, but are not limited to, the following:

1. ASTM A36 - Structural Steel.
2. ASTM C33 - Concrete Aggregates.
3. ASTM C39 - Concrete Strength of Molded Concrete Cylinders.
4. ASTM C94 - Ready-Mixed Concrete.
5. ASTM C143 - Slump of Portland Cement Concrete.
6. ASTM C150 - Portland Cement Concrete.
7. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
8. ACI 301 - Specification for Structural Concrete for Building.
9. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
10. ACI 315 - Manual of Standard practice for Detailing.
11. ACI 318 - Building Code Requirements for Reinforced Concrete.
12. ACI 347 - Recommended Practice for Concrete Formwork.

B. Submit compliance submittals as specified in Division 1, including but not limited to the following: bar schedule, bar details, shop drawings including size and location of openings, waterstops, joint systems and curing method.

C. Submit proposed concrete mix proportions to Engineer prior to placing concrete.

PART 2 - PRODUCTS

2.01 PORTLAND CEMENT:

A. Type I, Type II or Type III, conforming to ASTM C150, as modified by Texas State Department of Highways and Public Transportation, 1982 Standard Specifications.

B. Type I or II cement may be used unless Type II is specified.

C. Except when Type II is specified, Type III may be used when the anticipated air temperature for the 12 hours following the placement of the concrete is not anticipated to exceed 60°F.

D. Type III may be used in all pre-cast, pre-stressed concrete, except in piling when Type II cement is required for use as substructure concrete.

E. All cement used in a monolithic placement shall be of the same type.

F. Cements may be either bagged or bulk. Partially set or caked cement will be rejected.

G. All types of cements shall be "low alkali" cements.

2.02 WATER:

A. Water shall be clear, fresh, free from injurious amounts of oil, alkaline, acid or organic matter, or other deleterious substances and shall not contain more than 1000 parts per million of chlorides, as Cl, nor more than 1000 parts per million of sulfates, as SO_4.

B. Water of known potable quality requires no testing. Other sources shall meet the requirements of AASHTO T-26.

C. Water shall have a pH of not less than 4.5 or more than 8.5.

2.03 FINE AGGREGATE:

A. Natural sand, manufactured sand or a combination of the two, with or without mineral filler.

B. The sand, or mixture of sand, comprising a single fine aggregate, shall consist of clean, hard, durable, uncoated grains and shall be essentially free from clay lumps, salt or alkali, and other foreign material.

C. The maximum permissible percentage, by weight of deleterious substances shall not exceed the following:

Material removed by decantation	3.0%
Other deleterious substances such as coal, shale, coated grains and soft flaky particles	3.0%

An additional loss of 2% by decantation may be allowed, provided this new additional loss is material of the same quality as specified for fine aggregate or mineral filler.

D. Gradation, percent of weight retained:

Sieve Size	Percent Retained
3/8 inch	0
No. 4	0 - 5
No. 8	0 - 20
No. 16	15 - 50
No. 30	35 - 75
No. 50	65 - 90
No. 100	90 - 100
No. 200	97 - 100

E. Fineness Modulus:

1. For Grade 1 only - 2.3 minimum, 3.1 maximum.

F. Mineral Filler:

1. May be added upon written authorization of Engineer
2. Shall be stone dust or clean crushed sand, or other approved inert material.
3. Shall not exceed 5% of the fine aggregate.
4. Shall meet the following requirements:
   a. Passing No. 30 sieve 95 to 100%
   b. Passing No. 100 sieve 70 to 100%

2.04 COARSE AGGREGATE:

A. Crushed stone, gravel, crushed gravel, crushed blast furnace slag or a combination of these.

B. Gravel and crushed gravel shall consist of clean, hard durable particles, free from adherent coating, thin or elongated pieces, soft or disintegrated particles, dirt, organic or deleterious substances, salt or alkali, and other foreign material.

C. Crushed stone shall consist of the clean, dust free product resulting from the crushing of stone. There shall be no adherent coatings, clay, loam, organic or deleterious substances, salt or alkali, and other foreign material.

D. The maximum permissible percentage, by weight, of deleterious substances shall not exceed the following:

Material removed by decantation	1.00%
Shale, Slate or other similar material	1.00%
Clay lumps	0.25%
Soft fragments	3.00%
Other deleterious substances, including friable, thin, elongated or laminated pieces	3.00%

The sum of all deleterious substances exclusive of material removed by decantation	5.00%

E. Coarse aggregates shall have a percent wear of not more than 45 when tested in accordance with Test Method Tex-410-A.

F. Gradation, percent of weight retained:

1. Grade No. 1 - Maximum Nominal Size 2 1/2-inches (63 mm)

Sieve	Percentage Retained
2 1/2-inches	0
2-inches	0 - 20
1 1/2-inches	15 - 50
3/4-inches	60 - 80
No. 4	95 - 100

2. Grade No. 2 - Maximum Nominal Size 1 1/2-inches (37.5 mm)

Sieve	Percentage Retained
2-inches	0
1 1/2-inches	0 - 5
3/4-inches	30 - 65
3/8-inches	70 - 90
No. 4	95 - 100

3. Grade No. 3 - Maximum Nominal Size 1-inch (25 mm)

Sieve	Percentage Retained
1 1/2-inches	0 - 5
3/4-inches	10 - 40
1/2-inches	40 - 75
No. 4	95 - 100

4. Grade No. 4 - Maximum Nominal Size 3/8-inch (9.5 mm)

Sieve	Percentage Retained
1/2-inches	0 - 5
3/8-inches	5 - 30
No. 4	75 - 100

G. Gradation Requirements - maximum size of aggregate for structural concrete shall not exceed three inches, and shall be reduced in size to meet the following conditions:

1. One-sixth (1/6) of the least dimension between forms of that part of the structure in which concrete is to be placed.
2. Three-fourths (3/4) of the clear space between reinforcement.
3. The maximum size aggregate is defined as the clear space between the

sides of the smallest square openings through which 95 percent of the weight of the aggregate can be passed.

4. Unless otherwise noted or restricted by above, the Grade No. 2 gradation shall be used.

2.05 PIT-RUN AGGREGATE:

A. Pit-run aggregate is the natural gravel and sand obtained from pits without the addition of other fine or coarse aggregates, and shall consist of hard, durable, uncoated pebbles or stone particles mixed with sand.

B. Pit-run aggregate shall be free from lumps of clay and injurious amounts of dust, shale, soft or flaky particles, salt and alkali.

C. Pit-run aggregate shall be well graded from coarse to fine when tested by standard laboratory methods and shall meet the following minimum requirements for percentages by weight:

1. Retained on 1/4 in sieve 55 to 60%

D. Pit-run aggregate shall not be used for high-strength concrete of 3000 psi and stronger.

E. Pit-run aggregate may be used only for concrete cushion, cradle and protection for pipe.

2.06 ADMIXTURES:

A. Concrete admixtures shall comply with Section 03320.

2.07 REINFORCING STEEL:

A. Reinforcing steel shall comply with Section 03330.

2.08 CURING MATERIALS:

A. Liquid Membrane: white pigmented chlorinated rubber, ASTM C309.

B. Liquid Membrane: resin base, clear compound, permitting application of paint, Servicised Products Corporation - Code 2802 or equal.

C. Plastic Film: White pigmented, 0.00085-inches (minimum) thick.

D. Burlap: jute fabric, lean, free of impurities.

E. Surface Hardener: gray crystal, acidic fluosilicate base, slightly hygroscopic chemical surface hardener, SIKA Hardener, SIKA Chemical Corporation, or equal.

2.09 JOINT MATERIALS:

A. Joint Sealer: hot poured, non-extruding, elastic, ASTM D1190.

B. Preformed Expansion Joint Filler: non-extruding, bituminous fiber, ASTM D1751.

2.10 WATERSTOP:

A. Polyvinyl chloride or rubber, centerbulb.

B. Size to suit joinings, minimum 6-inches.

2.11 FORM MATERIALS:

A. Use plywood, metal, metal framed plywood faced or other acceptable panel-type material.

B. Coat forms with non-bonding, non-staining commercial compounds.

2.12 MOISTURE BARRIER:

A. Polyethylene sheet, minimum 8-mil., ASTM E154.

2.13 CONCRETE MIX DESIGN AND CONTROL:

A. Submit not less than 10 days prior to the start of concreting operations to the Engineer:

1. Mix design, using a coarse aggregate factor acceptable to the Engineer.
2. Sufficient samples of all materials to be incorporated into the mix for testing.
3. Full description of the source of supply of each material component.

B. Coarse aggregate factor:

1. Not more than 0.82 when voids less than 48%.
2. Not more than 0.85 when voids exceed 48%.
3. Not less than 0.68.

C. No changes or deviations from proportions or sources of supply without approval of Engineer.

D. No concrete may be placed on the job site until the mix design has been approved by Engineer in writing to the Contractor.

2.14 CONCRETE QUALITY:

A. Consistency:

1. Mortar shall cling to the coarse aggregate.
2. The aggregate shall not segregate during transport.
3. The concrete and mortar shall show no free water when removed from the mixer.

B. The consistency should allow the completion of all finishing operations with the addition of water to the surface.

C. The concrete shall be uniform, workable, cohesive, possess satisfactory finishing qualities and be of the stiffest consistency that can be placed and vibrated into a homogeneous mass.

D. Excessive bleeding shall be avoided.

E. Slump requirements shall be as follows:

Structural Concrete	Average Slump	Maximum Slump
1. Cased Drilled Shafts and Thin-walled Sections (9-inches or less)	4	5
2. Slabs, Caps, Columns, Piers, wall sections over 9-inches. etc.	3	4
3. Slip Form Paving	1/2	2
4. Underwater or Seal Concrete	5	6
5. Rip-rap, Curb, Gutter and other Miscellaneous Surfaces	As Specified By Owner	As Specified By Owner

NOTE: No concrete shall be permitted with slump in excess of the maximums shown. Any concrete mix failing to meet the above consistency requirements, although meeting the slump requirements shall be considered unsatisfactory; and the mix shall be changed to correct such unsatisfactory conditions.

F. The concrete shall comply with Table 1 below:

TABLE 1 - CLASSES OF CONCRETE

Class Of Concrete	Minimum Maximum SX Cement Per CY	Minimum Comp. Strength 28-day PSI	Minimum Beam Strength 7-day psi ****	Maximum Water Cement Item 2.1.1 (c)(4)	Coarse Aggregate Number
A	5.0	3000	500	6.5	2-3-4
B	4.0	2000	330	8.0	2-3-4
C*	6.0	3600	600	6.0	1-2-3**
D	3.0	1500	250	11.0	2-3-4
E	6.0	3000	500	7.0	2-3
F	6.5	4200	700	5.5	2-3
H***	6.5 - 8.0	ASP	NA	5.5	3

ASP = As Specified on Plans.
*Entrained Air.
**No. 1 coarse aggregate may be used in foundations only (Except cased drilled shafts).
***Prestressed Concrete.
****ASTI C293 (Center Point).

2.15 GROUT:

A. Non-Shrink:

1. Use premixed non-shrink, Embeco Pre-Mixed Grout or Embeco Pre-Mixed Mortar by Master Builders Company or equal.
2. Keep water to a minimum for placing by the dry packing method.

PART 3 - EXECUTION

3.01 SUBGRADE:

A. Insure subgrade is true to line and grade and compacted as specified.

B. Fill and recompact any ruts or depressions.

C. Check cross section with a template.

D. Place moisture barrier or moisten subgrade prior to placing of concrete. Method to be approved by Engineer.

3.02 FORMS:

A. Provide forms for all concrete work, including footings and base slabs.

B. Construct forms so that completed concrete will conform to shapes, lines, grades and dimensions indicated and required.

C. Forms shall be true, plumb and level with reasonably tight joints. Adequately support and brace forms.

D. Place anchors, inserts, blots, sleeves and other devices indicated or required for the various portions of all the work.

E. Oil temporary forms with non-staining form oil before reinforcing steel is placed.

F. Rough form finish as defined by ACI 301 permitted for concealed concrete.

G. Smooth form finish as defined by ACI 301 permitted for concealed concrete.

H. Provide 3/4 inch chamfer on exposed corners and edges, and 1-foot below ground level.

3.03 REMOVAL OF FORMS:

A. Do not remove forms or supports until concrete has acquired sufficient strength to safely support its own weight and the superimposed loads.

B. Remove formwork for columns, walls, beam sides and other parts not supporting the weight of the concrete as soon as the concrete has hardened sufficiently to resist damage from removal operations.

C. Formwork for slabs, beam soffits and other parts supporting the weight of the concrete shall remain in place until the concrete has reached its specified 28-day strength.

D. Protect concrete from damage prior to acceptance.

E. Prohibit traffic until concrete is at least 10 days old.

F. Cure areas previously covered by forms.

3.04 MIXING CONCRETE:

A. Maintain all equipment, tools, and machinery used for hauling materials and performing any part of the work to insure completion of the work underway without excessive delays for repairs or replacement.

B. Mixing shall be done in a mixer of adequate size and type to produce uniform distribution of the material throughout the mass.

C. The mixer shall have a plate affixed showing the manufacturer's recommended operating data and it shall be operated within the speed and capacity limits stated thereon.

D. The absolute volume of the concrete batch shall not exceed the rated capacity of the mixer.

E. The entire contents of the drum shall be discharged before any materials are placed.

F. Improperly mixed concrete will not be placed.

G. The mixing time shall be in accordance with the recommendations of the mixer manufacturer.

H. Transit Mix Concrete:

1. Sufficient transit mix equipment shall be assigned exclusively to the project as required for continuous operation.
2. Satisfactory evidence shall be furnished so that the delivery of concrete shall be continuous at regular and uniform intervals, without stoppage or interruption.
3. Concrete shall not be placed on the job after a period of 1 hour after the cement has been placed in the mixer, with mixer turning; 30 minutes without turning.

I. Continuous Volumetric Mix Concrete:

1. A mobile, continuous, volumetric mixer of the rotating puddle type may be used for when approved by Engineer.
2. Mixers shall be designed to receive all the concrete ingredients, including admixtures, required by the mix design in a continuous uniform rate and mixed to the required consistency before discharging.
3. The mixers shall have adequate water supply and metering devices.
4. Calibration of these mixers will be required.

3.05 PLACING CONCRETE:

A. The minimum temperature of all concrete at the time of placement shall not be less than 50°F.

B. Clean transporting equipment, reinforcing and embedded items before placing concrete.

C. Batch trucks or paving equipment not permitted on prepared subgrade unless authorized by the Engineer based on actual job conditions.

D. Place no concrete until after inspection of forms by Engineer.

E. The maximum time interval between the addition of cement to the batch, and the placing of concrete in the forms shall not exceed the following:

Air or Concrete Temperature	Non-Agitated Concrete	Maximum Time
80°F or Above	26.6°C	15 minutes
35 to 79°F	1.6 to 26.1°C	30 minutes

Air or Concrete Temperature	Agitated Concrete	Maximum Time
90°F or Above	32.2°C	45 minutes
75 to 89°F	23.9 to 31.6°C	60 minutes
35 to 74°F	1.6 to 23.3°C	90 minutes

F. Prevent segregation during placing.

G. Consolidate flat work with one pass of mechanical vibrator moving parallel to centerline. Unusual section and widths may be hand puddled and finished.

H. Place concrete continuously so that each pour unit will be monolithic in construction and will terminate at expansion, contraction or construction joint. Permit not more than 30 minutes between depositing adjacent batches.

I. Place slab concrete over membrane before the waterproofing membrane becomes damaged or dirty.

J. Concrete placement will not be permitted when impending weather conditions will impair the quality of the work.

K. Slope horizontal surfaces of exterior concrete for drainage.

L. Deposit concrete in forms in horizontal layers not deeper than 24 inches. Avoid inclined construction joints. Place each layer while preceding layer is still plastic to avoid cold joints.

M. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.

N. Do not use vibrators to transport concrete inside of forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to penetrate placed layer of concrete and at least 6-inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. Limit vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

3.06 PLACING CONCRETE IN WATER:

A. Concrete shall be deposited in water only when specified on the plans or with written permission of the Engineer.

B. The forms or cofferdams shall be sufficiently tight to prevent any water current passing through the space in which the concrete is deposited.

C. Pump will not be permitted during the concrete placing, nor until it has set for at least 36 hours.

D. The concrete shall be placed with a tremie, closed bottom-dump bucket or other approved method.

E. The concrete shall not be allowed to fall freely through the water nor shall it be disturbed after it has been placed. Its surface shall be kept approximately level during placement.

F. The tremie shall consist of a water-tight tube 14-inches or less in diameter. It shall be constructed so that the bottom can be sealed and opened after it is in place and fully charged with concrete. It shall be supported so that it can be easily moved horizontally to cover all the work area and vertically to control the concrete flow. The lower end of the tremie shall be submerged in the concrete at all times.

G. Bottom-dump buckets used for underwater placing shall have a capacity of not less than one-half cubic yard. It shall be lowered gradually and carefully until it rests upon the concrete already placed and raised very slowly during the upward travel; the intent being to maintain still water at the point of discharge and to avoid agitating the mixture.

H. The placing operations shall be continuous until the work is complete.

I. Unless otherwise specified, all concrete placed under water, except seal concrete, shall contain an additional sack of cement per cubic yard.

3.07 JOINTS:

A. Type ‘A’ (Contraction) Joints:

1. Extend entirely across flat slabs at locations shown.
2. Where location is not shown, maximum spacing is:
    a. Driveways: 10-feet.
    b. Sidewalks: 4-feet.
    c. Other flat slabs: 20 times slab thickness.
3. Saw depth not less than 1/4 slab thickness.

B. Type ‘B’ (Isolation) Joint:

1. Install where shown on the plans.
2. Where location is not shown, place between all structures and features which project through, into or against slab.
3. Install according to manufacturer's recommendations. Set material securely before placing concrete.
4. Install 1/2-inch width unless shown otherwise.

C. Filling Joints:

1. Fill no later than 14 days after sawing.
2. Fill immediately following cleaning.
3. Fill to 1/8-inch of surface.
4. Remove excess while material is still pliable.
5. Refill low areas where necessary.
6. Omit filling sidewalk joints.

3.08 FINISHING EXTERIOR FLAT WORK:

A. Strike off and float as required.

B. Check surface with ten foot straight edge, maximum variance allowed is 1/8-inch.

C. Drag concrete surface longitudinally with double thickness burlap drag after completion of straight edging unless noted otherwise.

D. Use edger on edges of slab.

E. Use hand finishing only when approved by Engineer.

3.09 FINISHING OTHER CONCRETE:

A. Interior floors: smooth, steel-troweled finish. Use edger on exposed edges. Grind smooth defects which would telegraph through applied finish flooring.

B. Exterior walks and steps: lightly broomed finish transverse to traffic flow. Use edger on exposed edges.

C. Other surfaces:

1. Remove fins, projections and loose material.
2. Clean surfaces of form oil.
3. Patch honeycomb, aggregate pockets, voids and holes as follows:
    a. Chip out until sound concrete is exposed to minimum depth of 1-inch .
    b. Prepare patching mortar with approximately two parts of normal Portland Cement, one part white cement, nine parts fine aggregate; vary proportions of aggregate as necessary to match color of adjacent concrete.
4. Fill holes left by form ties to within 1 inch of surface with non-shrink grout. Fill remainder with patching mortar specified hereinbefore.
5. Apply grout-cleaned finish to all exposed vertical surfaces. Wet surface and rub grout on surfaces with rubber or cork float. Scrape off excess grout and finish with brick rubbing or as approved by Engineer.

D. Coordinate required finish with Engineer.

3.10 CURING:

A. Contractor shall inform the Engineer fully of the methods and procedures proposed for curing; shall provide proper equipment and in adequate amounts; and shall have approval of the proposed method, equipment and materials prior to placing concrete.

B. All concrete shall be cured for a period of 4 days except as noted herein.

1. Exceptions to 4-day Curing.
   a. Upper surfaces of Bridge Roadways, Median and Sidewalk Slabs, and Top Slabs of Direct Traffic Culverts require 8 curing days.
   b. A curing day is defined as a calendar day when the ambient temperature, taken in the shade away from artificial heat, is above 50° F(10°C) for at least 19 hours. If the ambient temperature is 50° F or less, a curing day is accepted only if satisfactory provisions are made to maintain the temperature at all surfaces of the concrete above 40° Fahrenheit (4.4°C) for the entire 24 hours.

C. Form Curing:

1. When forms are left in contact with the concrete, other curing methods shall not be required except for cold-weather protection.

D. Water Curing:

1. All exposed surfaces of the concrete shall be kept wet continuously for the required curing time. The water used for curing shall meet requirements for concrete mixing water.
   a. Wet Mat:
      (1) Cotton mats shall be used for this curing method. The mats shall not be placed in contact with the concrete until such time that damage shall not occur to the surfaces.
      (2) Damp burlap blankets made from 9-ounce stock may be placed upon the damp concrete surface for temporary protection prior to the application of the cotton mats.
      (3) The mats may be placed by and wetted down after placement.
      (4) Mat curing, except for continuous placements, shall commence not later than three hours after finishing of the roadway slab.
      (5) The mats shall be weighted down adequately to provide continuous contact with all concrete surfaces where possible.
      (6) The surfaces of the concrete shall be kept wet for the required curing time.
      (7) Surfaces which cannot be cured by contact shall be enclosed with mats, anchored positively to the forms, or to the ground, so that outside air cannot enter the enclosure. Sufficient moisture shall be provided inside the enclosure to keep all surfaces of the concrete wet.
   b. Water spray:
      (1) This method shall be accomplished by overlapping sprays or

sprinklers, so that all unformed surfaces are kept continuously wet.

c. Ponding:

(1) This method requires the covering of the surface with a minimum of two inches (5 cm) of clean granular material, kept wet at all times; or water to a minimum depth of one inch (2.5 cm). Satisfactory provisions shall be made to provide a dam to retain the granular material or water.

E. Membrane Curing

1. Unless otherwise shown on the plans, Type 2 membrane curing compound may be used where permitted.
2. A membrane shall be applied in a single, uniform coating at the rate of coverage recommended by the manufacturer and as approved by the Engineer, but not less than nine gallons per 210 feet (.0038M^3 63M) of area. Tests for acceptance shall be at this specified rate.
3. Membrane curing shall not be applied to dry surfaces; but shall be applied to horizontal surfaces just before free moisture has disappeared.
4. Formed surfaces and surfaces which have been given a first rub shall be dampened and shall be moist at the time of application of the membrane.

	REQUIRED		**PERMITTED**	
Structure Unit Description	Water for Complete Curing	Membrane for Interim Curing	Water for Complete Curing	Membrane for Interim Curing
Upper surfaces of bridge roadway; median *and* sidewalk slabs; top slabs of direct traffic culverts; top surface of any concrete unit upon which concrete is to be placed and bonded at a later interval (stub walls risers, etc.) Other super-structure concrete (curbs, wing-walls, parapet walls, etc.)	X	X		Resin Basin
Top surface of precast and/or prestressed piling	X	X		
All substructure con-crete culverts box sewers inlets man-holes retaining walls riprap	X	X		

*Polyethylene sheeting or burlap polyethylene mats fastened to prevent outside air from entering into the concrete shall be considered equivalent to water or membrane curing per this item.

5. When membrane is used for complete curing, the film shall remain unbroken for the minimum curing period specified. Membrane which is damaged shall be corrected immediately by reapplication of membrane.

3.11 TESTING:

A. Furnish at least five cylinders or beams from each 50 cubic yard, or portion thereof for test purposes unless otherwise directed by Engineer. Test two cylinder at 7 days, test two cylinders at 28 days and test final cylinder only if needed for confirmation of compression strength.

3.12 MISCELLANEOUS CONCRETE ITEMS:

A. Filling-in: fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Use non-shrink grout as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

B. Equipment bases and foundations: provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of the manufacturer furnishing machines and equipment. Use non-shrink grout as shown on plans.

C. Steel pan stairs: provide concrete fill for steel pan stair treads and landings and associated items. Cast-in safety inserts and accessories as shown on drawings. Screen, tamp and finish concrete surfaces as scheduled.

D. Reinforced masonry: provide concrete grout for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT:

A. Cast-in-place concrete for the work shown on the plans shall be measured by the cubic yard as specified in the pans and contract.

4.02 PAYMENT:

A. The accepted quantities of cast-in-place concrete shall be paid for at the unit bid price per cubic yard.

B. The unit bid price shall be full compensation for furnishing, hauling, and mixing all concrete materials, including trial batches; placing curing and finishing all concrete; for all grouting and joints; furnishing and placing all expansion and

construction joints, except as provided in the plans; furnishing and placing metal flashing strips and waterstops; and for all forms and false-work, labor tools, equipment and incidentals necessary to complete the work.

C. The preceding provisions for payment shall not be interpreted to provide payment of concrete in railing, piling, precast, prestressed concrete units or other concrete items of which provision is otherwise made in the contract.

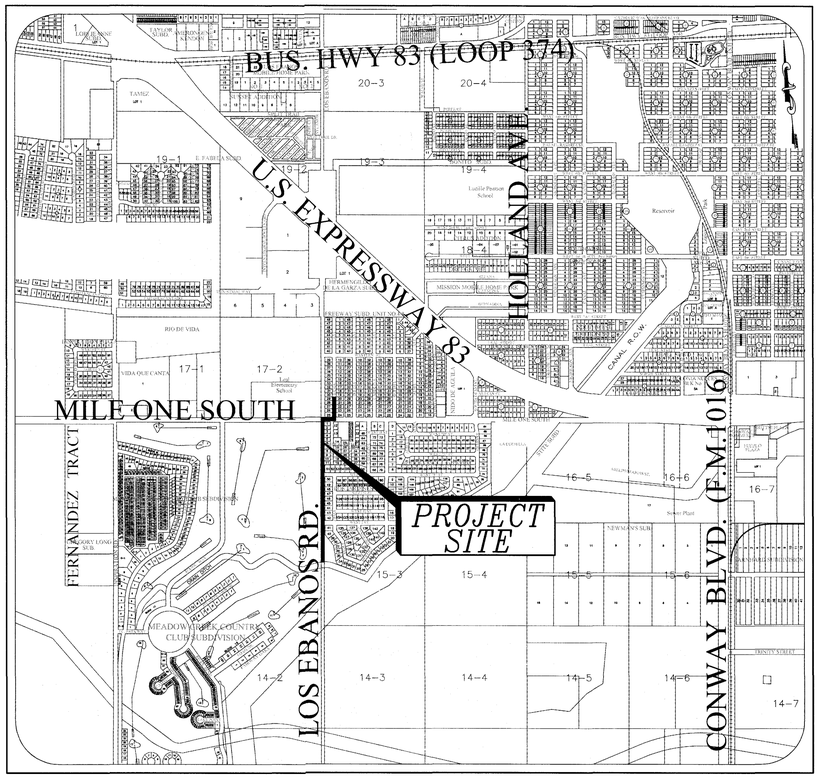
*****END OF SECTION*****

Bid No: 20-278-08-14
City of Mission Drainage Improvement Project for Erma Street

EXHIBIT I

Plans and Specifications

CITY OF MISSION
DRAINAGE IMPROVEMENTS
MILE ONE SOUTH AND ERMA STREET



LOCATION MAP
SCALE: N.T.S.

INDEX OF SHEETS

SHEET#	DESCRIPTION
1 –	GENERAL NOTES
2 –	EXISTING UTILITY, TOPOGRAPHIC AND DEMOLITION LAYOUT
3 –	STORM DRAINAGE PLAN & PROFILE
4 –	STORM DRAINAGE PLAN & PROFILE
5 –	STANDARD STORM DRAINAGE DETAILS
6 –	STANDARD PAVING DETAILS

CITY OFFICIALS

DR. ARMANDO OCAÑA . . . . . MAYOR
NORIE GONZALEZ–GARZA . . . . . MAYOR PRO–TEM
JESSICA ORTEGA–OCHOA . . . . . COUNCIL MEMBER PLACE 1
RUBEN PLATA . . . . . COUNCIL MEMBER PLACE 2
JOSE ALBERTO VELA . . . . . COUNCIL MEMBER PLACE 4

RANDY PEREZ . . . . . CITY MANAGER

JAVIER HINOJOSA ENGINEERING
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416 E. DOVE AVENUE McALLEN, TEXAS 78504
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TBPELS FIRM No. F–1295

STATE OF TEXAS
JAVIER HINOJOSA
74803
REGISTERED
PROFESSIONAL ENGINEER

JULY, 2020

170601

GENERAL NOTES:

1. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE UNDERGROUND UTILITIES. WHETHER SHOWN OR NOT SHOWN ON THE DRAWINGS, SUFFICIENTLY IN ADVANCE OF OPERATIONS TO PRECLUDE DAMAGE TO SAME.
2. WATER, SEWER, OR OTHER UTILITY SERVICES SHALL NOT BE INTERRUPTED. ANY DAMAGES TO EXISTING UTILITIES WILL BE THE CONTRACTOR'S RESPONSIBILITY.
3. IN THE EVENT OF DAMAGE TO UNDERGROUND FACILITIES, WHETHER SHOWN OR NOT SHOWN IN THE DRAWINGS, THE CONTRACTOR SHALL MAKE THE NECESSARY REPAIRS TO PLACE THE FACILITIES BACK IN SERVICE AT NO INCREASE IN THE CONTRACTOR'S PRICE AND ALL SUCH REPAIRS SHALL CONFORM TO THE REQUIREMENTS OF THE COMPANY OR AGENCY SERVICING THE FACILITY.
4. THE CONTRACTOR SHALL EXERCISE EXTRA CARE TO PREVENT DAMAGE TO ALL OTHER STRUCTURES IN THE AREA INCLUDING BUILDINGS, FENCES, ROADS, PIPELINES, UTILITIES, ETC., WHETHER PUBLICLY OR PRIVATELY OWNED.
5. UNTIL ACCEPTANCE BY THE ENGINEER OF ANY PART OR ALL OF THE CONSTRUCTION, AS PROVIDED FOR IN THE PLANS AND THESE SPECIFICATIONS, IT SHALL BE UNDER THE CHARGE AND CARE OF THE CONTRACTOR, AND HE SHALL TAKE EVERY NECESSARY PRECAUTION AGAINST INJURY OR DAMAGE TO ANY PART OF THE WORK. THE CONTRACTOR SHALL REBUILD, REPAIR, RESTORE AND MAKE GOOD, AT HIS OWN EXPENSE, ALL INJURIES OR DAMAGE TO ANY PORTION OF THE WORK BEFORE ITS COMPLETION AND ACCEPTANCE.
6. NO OPEN TRENCHES OR EXCAVATION SHALL BE LEFT OPEN OVERNIGHT.
7. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED FOR THIS PROJECT FROM CITY OF MISSION, THE TEXAS DEPARTMENT OF TRANSPORTATION, AND UNITED IRRIGATION DISTRICT.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION OF REMOVAL AND/OR RELOCATION OF GAS VALVES, WATER METERS OR IRRIGATION VALVES.
9. CONTRACTOR TO COORDINATE ALL WORK WITH MR. J.P.TERRAZAS, P.E., CITY OF MISSION, CITY ENGINEER, (956-580-8672) PRIOR TO START OF COSTRUCTION.
10. ALL DRIVEWAYS AND SIDEWALKS TO BE RECONSTRUCTED WITH EXISTING LIKE MATERIALS TO BE MINIMUM OF THE FOLLOWING:

ASPHALT DRIVEWAYS :	8" FLEX BASE AND 2" H.M.A.C.
CONCRETE DRIVEWAYS :	6" REINFORCED CONCRETE (3,500 P.S.I.)
CALICHE DRIVES :	8" FLEX BASE
CULVERTS :	18" R.C.P.

11. ALL EXISTING PAVEMENT THAT IS DAMAGED TO BE REPLACED WITH 8" FLEX AND 2" H.M.A.C. AND ALL EDGES TO BE SAW CUT.
12. CONTRACTOR TO PROVIDE TRAFFIC CONTROL DURING THE CONSTRUCTION APPROVED BY THE CITY OF MISSION TO INSURE THE SAFETY OF PUBLIC.
13. PROPER SEDIMENT CONTROL DEVISES SHALL BE UTILIZED DURING CONSTRUCTION ON ALL DRAINAGE STRUCTURES. ALL GRATE INLETS SHALL HAVE FILTER FABRIC INLET PROTECTION TO PREVENT SOIL EROSION INTO THE DRAINAGE SYSTEM.
14. CONTRACTOR TO PROVIDE ANY AND ALL TEMPORARY GRAPHIC COSNTRUCTION SIGNS DIRECTIONAL SIGNS AND ANY OTHER SIGNS THAT MAY BE REQUIRED DURING CONSTRUCTION. CONSTRUCTION.
15. ALL WORK SHALL BE COMPLETED TO THE SATISFACTION OF CITY OF MISSION., TXDOT AND UNITED IRRIGATION DISTRICT.
16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING THE CITY OF MISSION PUBLIC WORKS DEPARTMENT 48 HOURS PRIOR TO COMMENCEMENT OF WORK @ (956) 585-8780 TO COORDINATE AND MEET ANY REQUIREMENTS AND/OR SPECIFICATIONS.
17. THE CONTRACTOR SHALL BE RESPONSIBLE TO CALL DIG TESS 48 HOURS PRIOR TO COMMENCEMENT OF WORK FOR UTILITY SPOTTING @ (1-800-DIG-TESS).
18. LOCATIONS OF UNDERGROUND FACILITIES ARE FROM BEST INFORMATION AVAILABLE. NEITHER THE OWNER OR ENGINEER, WARRANT THE ACCURACY OF THE INFORMATION PROVIDED. ANY DEVIATIONS SHALL BE CALLED TO THE ENGINEER'S ATTENTION IMMEDIATELY.
19. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE CORRESPONDING UTILITY CORPORATION IN REGARDS TO THE RELOCATION/ADJUSTION OF ANY CONFLICTING UTILITIES. THE RELOCATION/ADJUSTMENT SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.
20. THE CONTRACTOR SHALL REMOVE ALL FENCES LOCATED WITHIN THE EASEMENTS AND RIGHT OF WAY, INTERFERING WITH CONSTRUCTION OPERATION AND PROVIDE TEMPORARY FENCING DURING CONSTRUCTION. REMOVED FENCES SHALL BE REPLACED WITH A NEW FENCE OR UNDAMAGED ORIGINAL FENCING. REMOVAL AND REPLACEMENT OF EXISTING AND TEMPORARY FENCES SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.
21. THE CONTRACTOR SHALL PROVIDE ACCESS TO EXISTING RESIDENCES AT ALL TIMES.
22. ANY DAMAGES TO FENCES, WALKS, OR PRIVATE PROPERTY SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE
23. NO OPEN EXCAVATION SHALL BE LEFT OPEN OVERNIGHT. ALL EXCAVATIONS WHICH CANNOT BE BACKFILLED OVERNIGHT SHALL BE COVERED. AS A MINIMUM, WITH STEEL PLATING WHEN IN PAVED AND UNPAVED AREAS SUBJECT TO VEHICULAR LOADING; PLYWOOD, WOOD PLANKING WITH O.S.H.A. ORANGE PLASTIC EXPANDED MESH BARRIER AROUND PERIMETER IN UNPAVED AREAS NOT SUBJECT TO VEHICULAR LOADING, OR AS APPROVED BY THE ENGINEER.
24. THE PREPARATION OF THESE PLANS REFLECTS INFORMATION, PROVIDED BY OTHERS, ON THE APPROXIMATE LOCATION AND EXISTENCE OF EXISTING UTILITY AND ADJACENT PHYSICAL FEATURES. HOWEVER, THEY DO NOT IMPLY OR AFFIRM THAT ALL UTILITIES OR PHYSICAL FEATURES ARE SHOWN. GENERALLY, UTILITY SERVICE CONNECTIONS ARE NOT INDICATED ON THESE PLANS. CONTRACTOR IS RESPONSIBLE FOR NOTIFICATIONS OF THE OWNER IMMEDIATELY UPON ENCOUNTERING UNFORESEEN CONFLICTS.
25. THE APPROXIMATE LOCATIONS OF KNOWN EXISTING UTILITIES ARE SHOWN, CONTRACTOR SHALL DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD PRIOR TO COMMENCING WORK. CONTRACTOR TO BE FULLY RESPONSIBLE FOR DAMAGES WHICH MIGHT OCCUR BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE EXISTING UTILITIES.
26. THE APPROXIMATE LOCATIONS OF KNOWN EXISTING UTILITIES ARE SHOWN, CONTRACTOR SHALL DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATIONS IN THE FIELD PRIOR TO COMMENCING WORK. CONTRACTOR TO BE FULLY RESPONSIBLE FOR DAMAGES WHICH MIGHT OCCUR BY HIS FAILURE TO EXACTLY LOCATE AND PRESERVE EXISTING UTILITIES.

GENERAL NOTES (CONT):

27. PUBLIC AND PRIVATE UTILITY LINES AND CUSTOMER SERVICE LINES MAY EXIST THAT ARE NOT SHOWN ON THE CONSTRUCTION DRAWINGS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO LOCATE, MAINTAIN AND PROTECT THE INTEGRITY OF THESE LINES. HAND EXCAVATION MAY BE REQUIRED. THE CONTRACTOR SHALL RESTORE RELOCATED OR DIVERTED UTILITY TO ITS ORIGINAL CONDITION AND LOCATION WHEN APPLICABLE UPON COMPLETION OF CONSTRUCTION. SAID RESTORATION SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.
28. THE CONTRACTOR SHALL ADJUST EXISTING AGUA S.U.D. WATER LINES AS REQUIRED TO INSTALL DRAINAGE IMPROVEMENTS SAID ADJUSTMENTS SHALL BE COORDINATED WITH AGUA S.U.D. PRIOR TO COMMENCEMENT OF WORK. SAID WATER LINE ADJUSTMENT SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.
29. THE CONTRACTOR SHALL ADJUST AND CONNECT TO NEW SYSTEM EXISTING FIELD DRAIN LINES AT PROPOSED LOCATIONS. SAID WORK SHALL BE COORDINATED WITH H.C.I.D. No. 6 PRIOR TO COMMENCEMENT OF WORK. SAID LINE ADJUSTMENTS AND CONNECTIONS SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.
30. THE CONTRACTOR TO MAINTAIN ALL EQUIPMENT AND TRANSPORTATION OF SAID EQUIPMENT WITHIN THE EXISTING RIGHTS-OF-WAY OF THE CITY, COUNTY, OR STATE.
31. DURING EXCAVATION OPERATIONS FOR DRAINAGE AND/OR UTILITIES, THE CONTRACTOR SHALL NOT PILE EXCAVATED MATERIAL OR EXCAVATE WITHIN THE DRIP LINE OF TREES THAT ARE TO BE PRESERVED.
32. WHERE NEW WATER LINES AND SEWER LINES ARE INSTALLED WITH A SEPARATION DISTANCE CLOSER THAN NINE FEET (I.E., WATER LINES CROSSING WASTEWATER LINES, WATER LINES PARALLELING WASTEWATER LINES, OR WATER LINES NEXT TO MANHOLES) THE INSTALLATION MUST MEET THE REQUIREMENTS OF 30 TAC 317(DESIGN OF SEWAGE SYSTEMS) OR 30 TAC 290 (WATER HYGIENE).
33. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING WATER AND SEWER CONNECTIONS TO ALL HOMES AND BUSINESSES IN WORKING ORDER AT ALL TIMES, EXCEPT FOR BRIEF INTERRUPTIONS IN SERVICE FOR CONNECTIONS TO BE REINSTALLED. IN NO CASE SHALL SERVICES BE ALLOWED TO REMAIN OUT OF SERVICE OVERNIGHT. CONTRACTOR IS RESPONSIBLE FOR DAMAGES TO SAID SERVICES.
34. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ADEQUATE DRAINAGE OF PROPOSED FACILITIES AT ALL TIMES DURING CONSTRUCTION.
35. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GRADING AREA BETWEEN THE BACK OF CURB/EDGE OF PAVEMENT, ROAD SIDE DITCH AND RIGHT-OF-WAY TO HAVE POSITIVE FLOW TO THE PROPOSED DRAINAGE SYSTEM.
36. THE CONTRACTOR SHALL PROVIDE/MAINTAIN ADEQUATE POSITIVE DRAINAGE AT ALL TIMES DURING THE INSTALLATION OF THE STRUCTURES, DRAINAGE, UTILITY, IRRIGATION AND ROAD IMPROVEMENTS. DEWATERING OF THE TRENCH MAY BE REQUIRED DURING THE INSTALLATION OF THE DRAINAGE, UTILITY AND IRRIGATION FACILITIES/STRUCTURES. SAID DEWATERING SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.
37. THE CONTRACTOR SHALL CLEANUP AND RESTORE THE AREA OF OPERATIONS TO A CONDITION AS GOOD AS OR BETTER THAN THAT WHICH EXISTED PRIOR TO INSTALLATION OF ALL ITEMS TO BE CONSTRUCTED.
38. ALL DEBRIS, VEGETATION AND SURPLUS MATERIAL, RESULTING FROM DEMOLITION AND/OR CLEARING OF THE RIGHT-OF-WAY IN PREPARATION OF PROPOSED IMPROVEMENTS SHALL BECOME PROPERTY OF THE CONTRACTOR AND SHALL BE PROPERLY DISPOSED OF AT A SITE ACCEPTABLE THE CITY OF MISSION, THE CONTRACTOR SHALL PROVIDE A LETTER STATING SO. THIS SHALL BE INCIDENTAL AND NOT A SEPARATE PAY ITEM UNLESS STATED SO. NO EXCESS EXCAVATED MATERIAL SHALL BE DEPOSITED IN LOW AREAS OR ALONG NATURAL DRAINAGE WAYS WITHOUT WRITTEN PERMISSION FROM THE AFFECTED PROPERTY OWNER AND THE CITY OF MISSION IF THE CONTRACTOR PLACES EXCESS MATERIAL IN THE AREAS WITHOUT WRITTEN PERMISSION, HE WILL BE RESPONSIBLE FOR ALL DAMAGE RESULTING FROM SUCH FILL AND CONTRACTOR SHALL REMOVE THE MATERIAL AT OWN COST.
39. THE CONTRACTOR IS RESPONSIBLE FOR THE PREPARATION AND SUBMITTAL OF THE TRENCH EXCAVATION PROTECTION PLAN. CONTRACTOR SHALL SUBMIT CONSTRUCTION DETAILS AND DESIGN CALCULATIONS BEARING THE SEAL OF A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS BEFORE CONSTRUCTING THE SHORING AND/OR UTILIZING A TRENCH PROTECTION SYSTEM (BOX). THE ENGINEER RESERVES THE RIGHT TO REJECT DESIGNS NOT MEETING THE REQUIREMENTS OF SECTION ITEM 402 AND 403.
40. THE CONTRACTOR SHALL BE RESPONSIBLE TO FOLLOW ALL T.C.E.Q. STORM WATER POLLUTION PREVENTION PLAN (SWP3) REQUIREMENTS AS PER SWP3 SHEETS AND AS STATED IN TEXAS POLLUTANT DISCHARGE ELIMINATION SYSTEM CONSTRUCTION GENERAL PERMIT (TPDES TXR150000, EFFECTIVE DATE MARCH 5, 2008), INCLUDING N.O.I. SUBMITTAL AND MS4 NOTIFICATION.
41. THE CONTRACTOR SHALL ABANDON AND CAP ANY PORTION OF PIPE LINE (STORM, IRRIGATION, ETC.) FOUND WITHIN THE PROPOSED PIPE TRENCH, AT THE ENGINEERS REQUEST. ONCE APPROVED BY THE ENGINEER, THE PIPE TO BE ABANDONED SHALL BE CAPPED AND SEALED WITH CEMENT AT BOTH ENDS OF THE TRENCH. THIS SHALL BE CONSIDERED SUBSIDIARY UNLESS OTHERWISE STATED.
42. ALL ROAD CROSSINGS SHALL BE REPLACED WITH A MINIMUM OF 8" 95% COMPACTED CALICHE AND 2" HMAC OR LIKE SECTION, WHICHEVER IS GREATER.
43. THE ENGINEER WILL PROVIDE CONTROL POINTS (BENCHMARK AND PROPERTY CORNERS) FOR THE WORK TO BE PERFORMED BY THE CONTRACTOR. CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION STAKING, INCLUDING BUT NOT LIMITED TO HORIZONTAL & VERTICAL GRADE CUTS FOR CURB & GUTTER, ROADWAY, STORM DRAIN PIPE, ROADSIDE DITCHES, DRIVEWAY CULVERTS AND DITCH WORK.
44. THE CONTRACTOR SHALL CONNECT ANY PROPOSED IRRIGATION LINE WITH EXISTING IRRIGATION PIPE IN ACCORDANCE WITH UNITED IRRIGATION DISTRICT SPECIFICATIONS. SUPPORT COLLARS MAY BE USED. THE CONTRACTOR SHALL BE RESPONSIBLE TO REPAIR ANY DAMAGE TO THE EXIST. LINE CAUSED BY THIS WORK. ELBOWS AND MISC. FITTINGS SHALL ALSO BE USE TO ACHIEVE A 1.0 FT SEPARATION BETWEEN TOP OF PROP. DRAIN LINE AND BOTTOM OF THE IRRIGATION LINE.
45. ELBOW FOR RCP OR HPP BEING PROPOSED AT THE END OF LINES SHALL BE PRE-FABRICATED AND SECURED TO THE PIPE WITH A CONCRETE COLLAR (TYPICAL ON ALL PIPE ELBOW INSTALLATIONS.) ELBOW SHALL BE REQUIRED AT ALL LOCATIONS SHOWN ON THE PLANS. THIS SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL. PRE-FABRICATED ELBOWS SHALL BE FIELD CONFIRMED BY THE CONTRACTOR.
46. THE CONTRACTOR SHALL RELOCATE OR RECONSTRUCT ALL MAIL BOXES TO BE 1' BEHIND BACK OF CURB OR 3' BEHIND EDGE OF PAVEMENT. MAIL BOXES SHALL BE REPLACED TO THE SAME EXISTING CONDITIONS OR BETTER. SAID RELOCATION AND/OR RECONSTRUCTION OF MAIL BOXES SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST AND REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED IN THE PROPOSAL.
47. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTING ALL EXISTING WATER VALVES AND MANHOLES TO MATCH PROPOSED FINISH GRADE OF ROADWAY. CONCRETE COLLARS SHALL BE INSTALLED TO MATCH TOPS WITH PAVEMENT GRADE. THIS WORK SHALL BE INCIDENTAL AND NOT A SEPARATE PAY ITEM UNLESS STATED OTHERWISE.

GENERAL NOTES (CONT):

48. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPLACEMENT/RELOCATION OF ALL REGULATORY SIGNS REMOVED DUE TO CONSTRUCTION OPERATIONS WITH THE SAME SIGN ON FIXED SUPPORT(S) IMMEDIATELY UPON ITS REMOVAL. APPROVAL BY THE ENGINEER IS NECESSARY BEFORE REMOVING ANY REGULATORY ROADWAY SIGN(S). FLAGGERS ARE REQUIRED TO BE AVAILABLE TO DIRECT TRAFFIC DURING SIGN INTERMEDIATE DOWN TIME. RELOCATION OF ANY DIRECTIONAL SIGN ASSEMBLIES REMOVED DURING CONSTRUCTION OPERATIONS IMMEDIATELY UPON THEIR REMOVAL IS REQUIRED. THESE SIGNS SHALL BE RELOCATED TO A LOCATION IN ACCORDANCE WITH THE LATEST VERSION OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES". IN NO CASE WILL A SIGN BE REMOVED WITHOUT A REPLACEMENT SIGN AND SUPPORT(S) BEING READILY AVAILABLE AND A LOCATION ESTABLISHED. REMOVAL AND RELOCATION OF THESE SIGNS WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE CONSIDERED SUBSIDIARY TO THE PROJECT COST REFLECTED IN THE UNIT BID PRICES FOR VARIOUS ITEMS LISTED ON THE PROPOSAL.
49. ALL CONSTRUCTION OPERATIONS SHALL BE CONDUCTED TO PROVIDE THE LEAST POSSIBLE INTERFERENCE TO TRAFFIC AS PROVIDED FOR IN THE SPECIFICATIONS, TXDOT STANDARDS, TEXAS M.U.T.C.D. AND/OR AS DIRECTED. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE CURRENT EDITION OF THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES".

EROSION CONTROL NOTES

1. THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) AND ENVIRONMENTAL PROTECTION AGENCY (EPA) REQUIRE EROSION AND SEDIMENTATION CONTROL FOR CONSTRUCTION. CONTRACTOR SHALL PROVIDE ALL REQUIRED EROSION AND SEDIMENTATION CONTROL. CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTATION OF THE STORM WATER POLLUTION PREVENTION PLAN.
2. AT A MINIMUM THESE CONTROLS SHALL CONSIST OF ROCK BERMS AND/OR SILT FENCES CONSTRUCTED PARALLEL TO AND DOWN GRADIENT FROM THE TRENCHES. THE ROCK BERM OR SILT FENCES SHALL BE INSTALLED IN A MANNER SUCH THAT ANY RAINFALL RUNOFF SHALL BE FILTERED. HAY BALES SHALL NOT BE USED FOR TEMPORARY EROSION AND SEDIMENTATION CONTROLS.
3. ALL SLOPES SHALL BE SADDLED OR SEEDED WITH APPROVED GRASS, GRASS MIXTURES OR GROUND COVER SUITABLE TO THE AREA AND SEASON IN WHICH THEY ARE APPLIED.
4. THE CONTRACTOR SHALL INSPECT THE CONTROLS AT WEEKLY INTERVALS AND AFTER EVERY SIGNIFICANT RAINFALL TO INSURE DISTURBANCE TO THE STRUCTURES HAS NOT OCCURRED. SEDIMENT DEPOSITED AFTER A RAINFALL SHALL BE REMOVED FROM THE SITE OR PLACED IN AN APPROVED DESIGNATED SOIL DISPOSAL AREA.
5. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE EMPLOYED DURING CONSTRUCTION TO PREVENT POINT SOURCE SEDIMENTATION LOADINGS OF DOWNSTREAM FACILITIES. SUCH INSTALLATIONS SHALL BE REGULARLY INSPECTED BY THE CONTRACTOR FOR EFFECTIVENESS. ADDITIONAL MEASURES MAY BE REQUIRED IF, IN THE OPINION OF THE OWNER, THEY ARE WARRANTED.
6. ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS SHALL BE IMPLEMENTED BEFORE CONSTRUCTION COMMENCES, SHALL BE MAINTAINED DURING CONSTRUCTION, AND SHALL BE REMOVED WHEN VEGETATION IS ESTABLISHED AND THE CONSTRUCTION AREA IS STABILIZED. ADDITIONAL PROTECTION MAY BE NECESSARY IF EXCESSIVE SOLIDS ARE BEING DISCHARGED FROM THE SITE.
7. ALL TEMPORARY EROSION AND SEDIMENTATION CONTROLS SHALL BE REMOVED BY THE CONTRACTOR AT FINAL ACCEPTANCE OF THE PROJECT BY THE OWNER.
8. ALL STAGING, MATERIAL STORAGE, STOCKPILE AND REFUSE AREAS SHALL REQUIRE APPLICABLE EROSION AND SEDIMENT CONTROL MEASURES.
9. ALL CONSTRUCTION DEBRIS SHALL BE CONTAINED WITHIN APPROPRIATE RECEPTACLES (ROLL-OFF CONTAINERS, DUMPSTERS, TRASH CANS, WIRE-MESH CAGES, Etc.) AND CONFINED WITHIN PERIMETER EROSION AND SEDIMENT CONTROLS.
10. THE CONTRACTOR MAY REFER TO THE TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES (2004 EDITION) ITEM 164, "SEEDING FOR EROSION CONTROL" AND ITEM 168, "VEGETATIVE WATERING" FOR VEGETATIVE STABILIZATION SPECIFICATIONS.
11. DUST CONTROL SHALL BE IMPLEMENTED AS NECESSARY OR AS DIRECTED BY THE ENGINEER. DUST CONTROL MAY CONSIST OF WATERING OR OTHER METHODS APPROVED BY THE PROJECT ENGINEER.
12. ALL DISCHARGES ASSOCIATED WITH DEWATERING OPERATIONS SHALL IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES. MEASURES MAY INCLUDE BUT ARE NOT LIMITED TO SEDIMENTATION BASINS OR FILTER SOCKS.
13. CONCRETE WASH-WATER SHALL NOT BE DISCHARGED DIRECTLY INTO A STORM SEWER SYSTEM OR RECEIVING STREAM. ALL WASH ACTIVITIES MUST BE PERFORMED WITHIN THE EXTENTS OF ESTABLISHED EROSION AND SEDIMENT CONTROL MEASURES OR DESIGNATED AREAS APPROVED BY PROJECT ENGINEER.
14. SEDIMENT SHALL BE CLEARED FROM ALL STORM SEWER PIPES, CULVERTS AND APPURTENANCES WITHIN THE LIMITS OF CONSTRUCTION PRIOR TO FINAL PROJECT ACCEPTANCE. SEDIMENT SHALL BE PROPERLY DISPOSED.

TRENCH SAFETY

1. IN ACCORDANCE WITH HOUSE BILLS 662 AND 665 ENACTED BY THE TEXAS LEGISLATURE (70TH REGULAR LEGISLATIVE SESSION), THE CONTRACTOR SHALL MEET THE REQUIREMENTS FOR TRENCH SAFETY AS OUTLINED IN THE CURRENT VERSION OF THE UNITED STATES DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) STANDARDS, 29 CFR, PART 1926, SUBPART P- EXCAVATIONS.
2. PRIOR TO COMMENCING ANY EXCAVATION, THE CONTRACTOR SHALL PROVIDE A TRENCH SAFETY PLAN. ALL PLANS SHALL BE PREPARED BY A PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN THE STATE OF TEXAS. THE PLAN SHALL BE SUBMITTED TO THE PROJECT ENGINEER.
3. IN THE EVENT CONDITIONS ENCOUNTERED IN THE FIELD REQUIRE TRENCH SAFETY SYSTEMS OUTSIDE OF THE EXTENTS SUGGESTED TRENCH PROTECTION SHOWN ON THE CONSTRUCTION PLANS, ALL EXCAVATION SHALL CEASE AND THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE PROJECT ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING A REVISED TRENCH SAFETY PLAN. NO EXCAVATION SHALL RESUME UNTIL THE REVISED TRENCH SAFETY PLAN HAS BEEN APPROVED.
4. THE CONTRACTOR SHALL ENSURE APPROVED TRENCH SAFETY PLANS ARE IMPLEMENTED. FAILURE TO ADHERE TO THE TRENCH SAFETY PLAN WILL RESULT IN A STOP WORK ORDER. NONCOMPLIANCE INCIDENTS MAY BE REPORTED TO OSHA
5. TRENCHES OR EXCAVATIONS MAY NOT BE LEFT OPEN OVERNIGHT UNLESS AUTHORIZED IN WRITING BY THE PROJECT ENGINEER. IN CASES WHERE TRENCHES ARE LEFT OPEN, THE CONTRACTOR MUST PROVIDE TRAFFIC RATED, ANCHORED STEEL PLATE COVERS APPROVED BY THE ENGINEER.

REVISIONS	
PROJECT No.	170601
DATE	JULY, 2020
DRAWN BY	J.H.
CHK. BY	J.H.

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GENERAL NOTES
CITY OF MISSION DRAINAGE IMPROVEMENTS
MILE ONE SOUTH AND ERMA STREET
MISSION, TEXAS

STATE OF TEXAS
JAVIER HINOJOSA
74808
REGISTERED
PROFESSIONAL ENGINEER

SHEET 1 OF 6 SHEETS

170601

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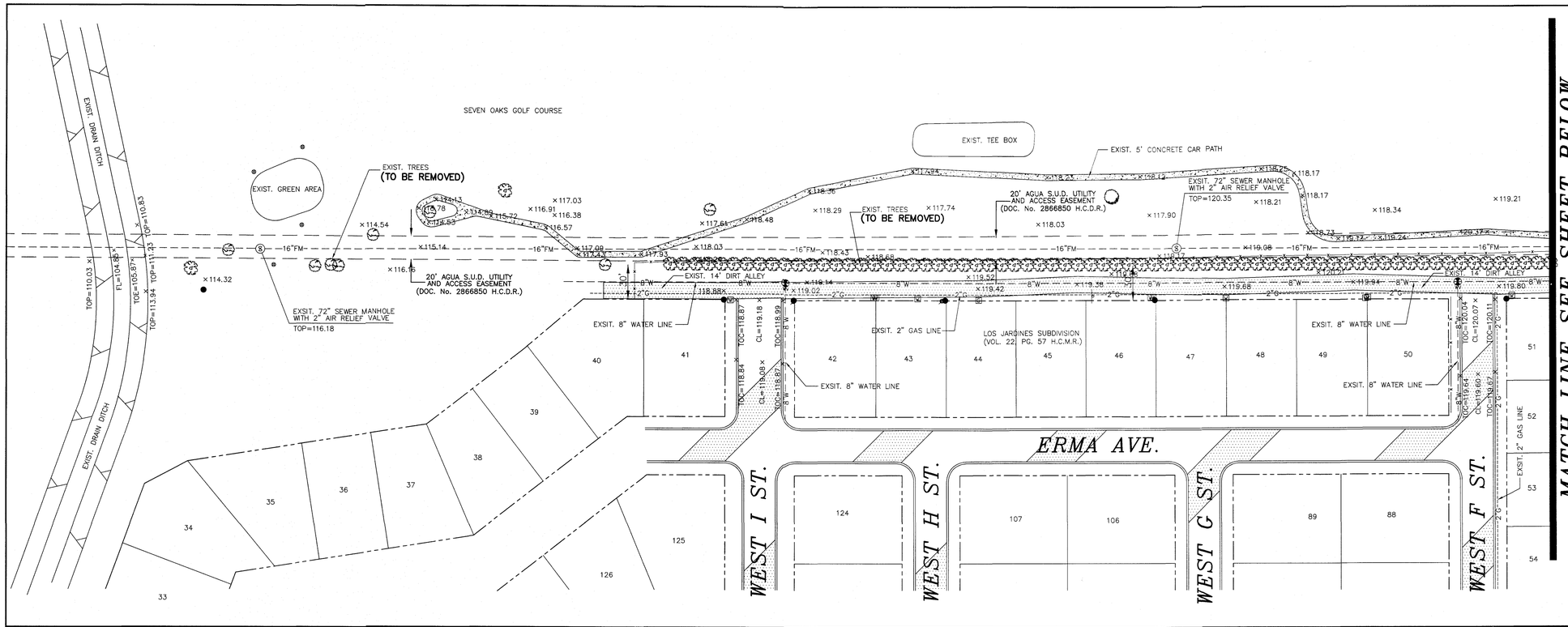
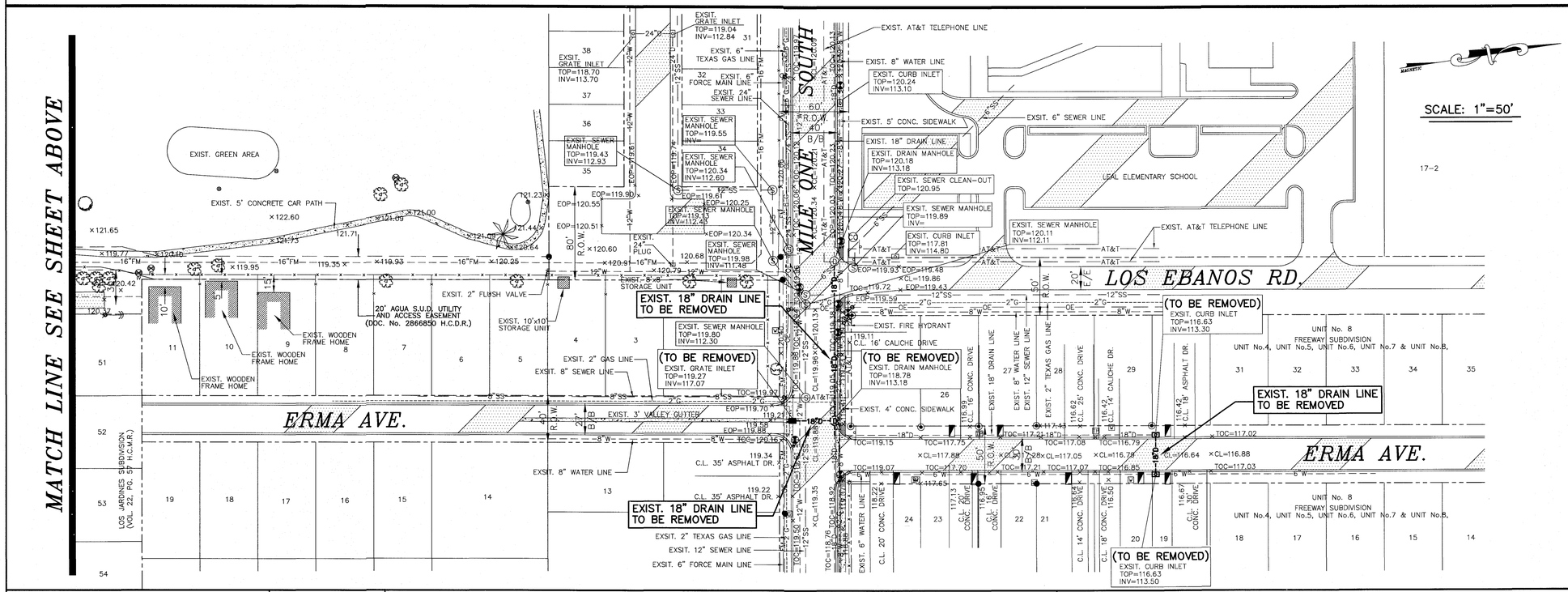


SCALE: 1"=50'

LEGEND:

x120.50	EXIST. NATURAL GROUND ELEVATION
xEOP=119.50	EXIST. EDGE OF PAVEMENT ELEVATION
xCL=120.00	EXIST. CENTER LINE ELEVATION
xTOC=119.00	EXIST. TOP OF CURVE ELEVATION
	POWER POLE
	GUY WIRE
	EXIST. SPRINKLER VALVE
	EXIST. WATER METER
	EXIST. SPRINKLER HEAD
	EXIST. LAMP POST
	EXIST. GAS METER
	EXIST. FIRE HYDRANT
	EXIST. WATER VALVE
	EXIST. MAIL BOX
	EXIST. OAK TREE
	EXIST. HUISACHE
	EXIST. PALO BLANCO TREE
	EXIST. MESQUITE TREE
	EXIST. PALM TREE
—2"G—	EXIST. 2" TEXAS GAS LINE
—OE—	EXIST. OVER HEAD ELECTRIC LINE
—18"D—	EXIST. 18" DRAINAGE LINE
—8"SS—	EXIST. 8" SANITARY SEWER LINE
—6"W—	EXIST. 6" WATER LINE
—8"W—	EXIST. 8" WATER LINE
—12"W—	EXIST. 12" WATER LINE



SCALE: 1"=50'

REVISIONS	

PROJECT No.	170601
DATE:	JULY, 2020
DRAWN BY	P.G. & A.G.
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EXISTING UTILITY, TOPOGRAPHIC AND DEMOLITION LAYOUT
CITY OF MISSION DRAINAGE IMPROVEMENTS
MILE ONE SOUTH AND ERMA STREET
MISSION, TEXAS

STATE OF TEXAS JAVIER HINOJOSA 74808 REGISTERED PROFESSIONAL ENGINEER

7-28-20

SHEET 2 OF 6 SHEETS

170601

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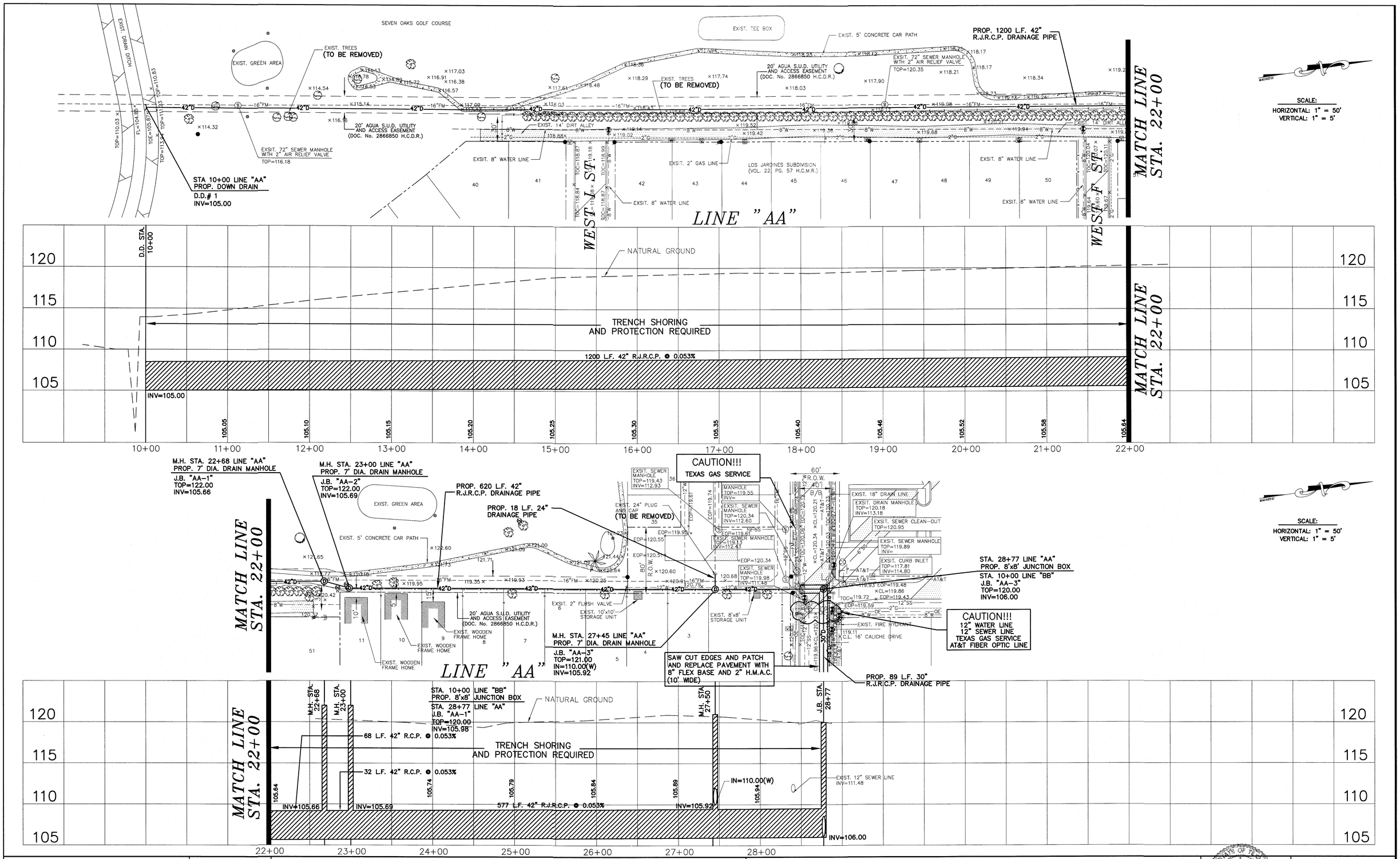

REVISIONS		
	PROJECT No.	170601
	DATE:	JULY, 2020
	DRAWN BY	P.G. & A.G.
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STORM DRAINAGE PLAN AND PROFILE
CITY OF MISSION DRAINAGE IMPROVEMENTS
MILE ONE SOUTH AND ERMA STREET – LINE "AA"
MISSION, TEXAS

STATE OF TEXAS JAVIER HINOJOSA 74808 REGISTERED PROFESSIONAL ENGINEER

7/28/20

SHEET 3 OF 6 SHEETS

170601

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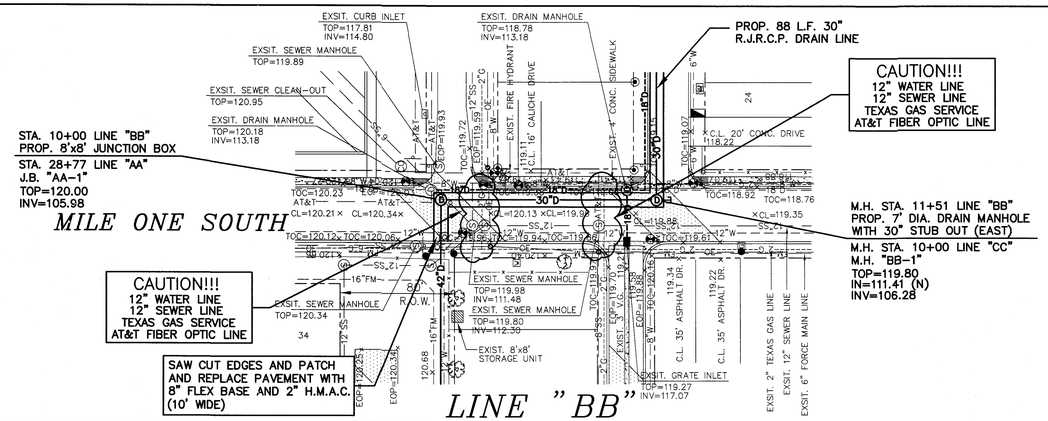
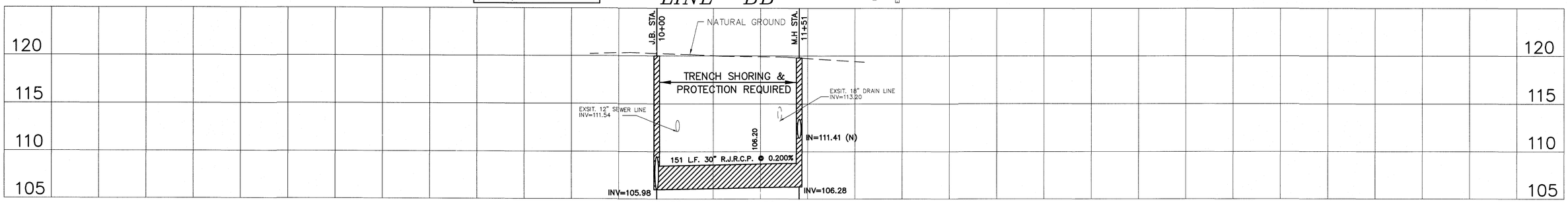
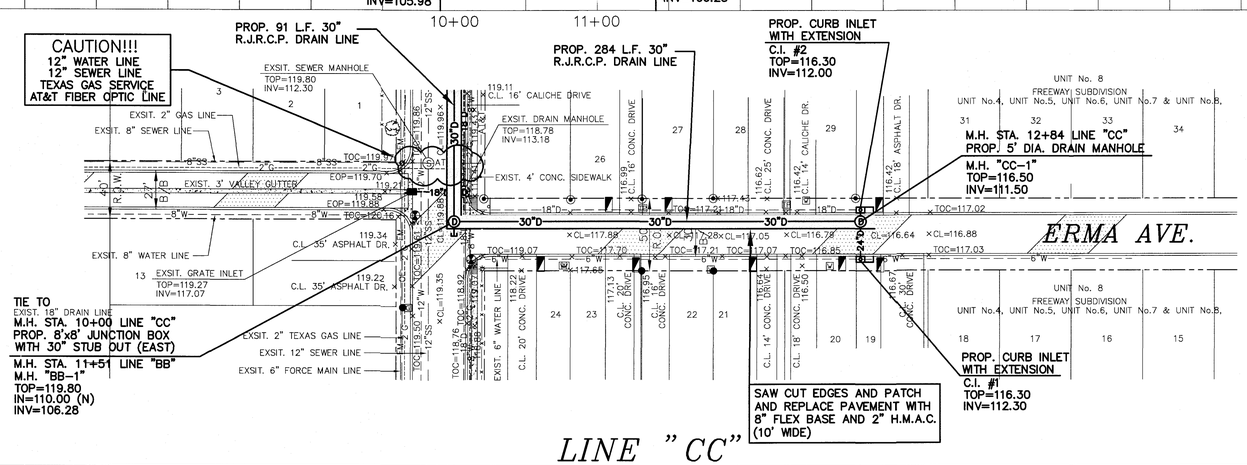


LINE "BB"





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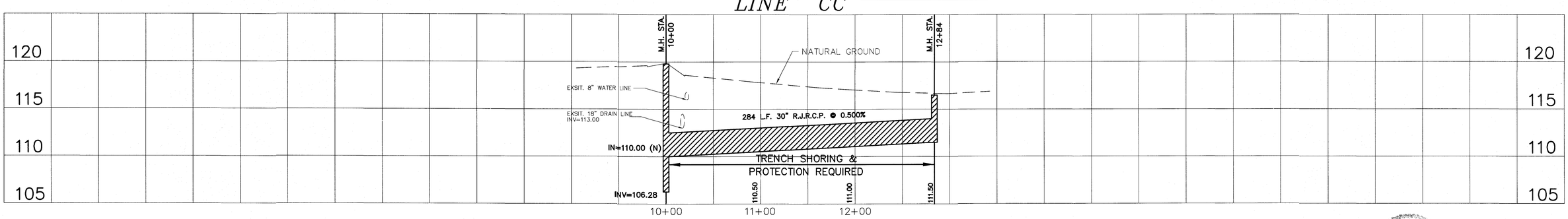

REVISIONS	
PROJECT No.	170601
DATE:	JULY, 2020
DRAWN BY	A. GAUNA
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STORM DRAINAGE PLAN AND PROFILE
CITY OF MISSION DRAINAGE IMPROVEMENTS
MILE ONE SOUTH AND ERMA STREET – LINES "BB" AND "CC"
MISSION, TEXAS

SHEET 4 OF 6 SHEETS

170601

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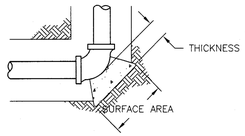
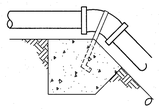
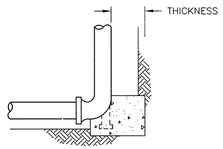


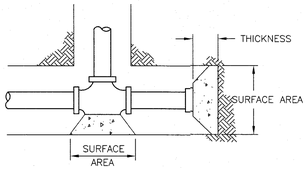
HORIZONTAL BENDS



VERTICAL BENDS

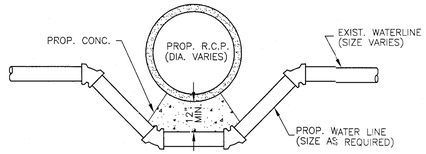


HYDRANT BURYS



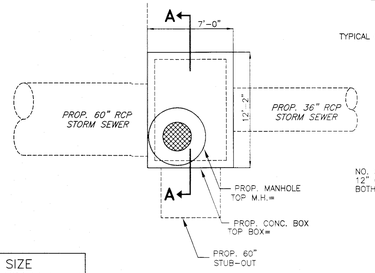
TEES & DEAD ENDS

THRUST BLOCKS DETAIL

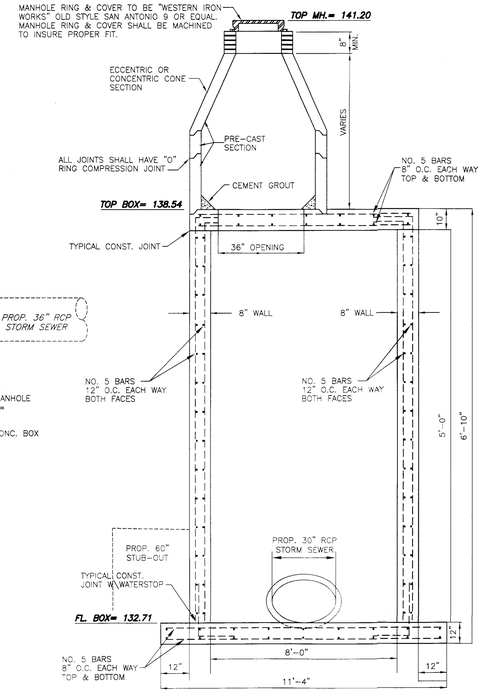


TYPICAL WATER LINE ADJUSTMENT DETAIL

N.T.S.

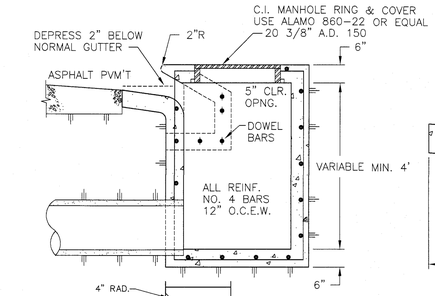


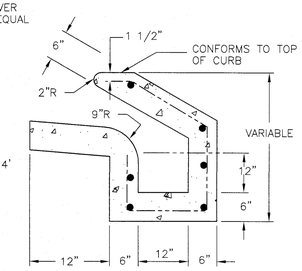
PLAN



SECTION A–A

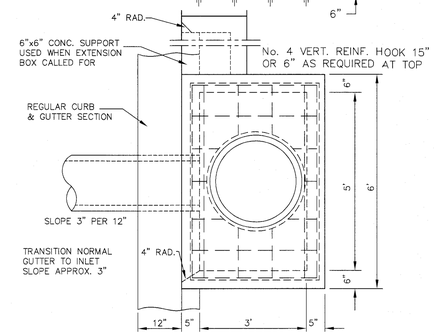
JUNCTION BOX W\MANHOLE





ALL STEEL TO BE NO. 4 BARS ON 12" SPACING IN BOTH DIRECTIONS.

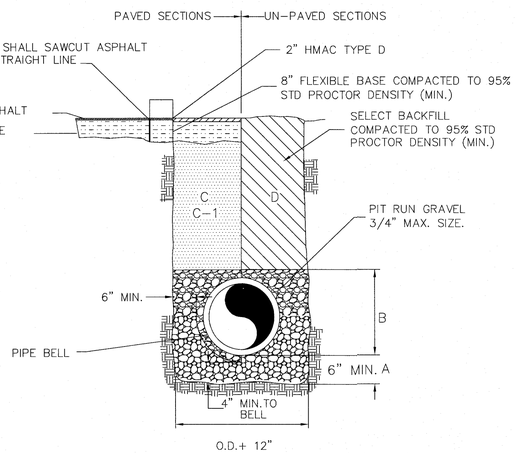
INLET EXTENSION



INLET EXTENSION

GENERAL NOTES:
1. CONCRETE TO HAVE 3000 p.s.i. AT MIN. 28 DAYS COMPRESSION STRENGTH.
2. ALL STEEL TO HAVE 4000 p.s.i. YIELD STRENGTH

CONSTRUCTION NOTES
A. DRAIN DITCH FLOW LINE
B. 6"X6" #6 WIRE MESH OR EQUAL LAPPED 6"
C. MIN. 3" COVER REQUIRED ON EVERY SIDE
D. MIN. 95% COMPACTION



A. GRAVEL BEDDING PLACED BEFORE PIPE IS LAID UP TO FLOW LINE OF PIPE (MIN. THICKNESS=6") – PIT RUN GRAVEL 3/4" MAX. SIZE.

B. GRAVEL PLACED AFTER PIPE IS LAID, FROM BOTTOM OF PIPE TO 4" ABOVE THE TOP OF PIPE. PIT RUN GRAVEL 3/4" MAX. SIZE.

C. TRENCH WIDTHS SHALL BE PIPE BELL O.D. + 12" OR IN ACCORDANCE WITH ASTM 2321 FOR PVC PIPE AND ASTM C12 (LATEST) FOR VITRIFIED CLAY PIPE.

C–1. (CITY STREETS, PARKING AREA, DRIVEWAYS) SELECT EXCAVATED BACK FILL COMPACTED TO 95 % SPD, 8" LIFTS, MECHANICAL COMPACTION.

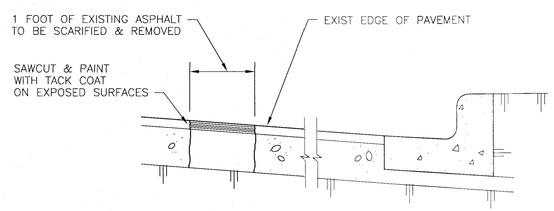
D. SELECT EARTH BACK FILL COMPACTED TO 95 % STD. PROCTOR DENSITY (12" LIFTS, MECHANICAL COMPACTION) FOUNDATION PREPARATION (WELLPOINTS, GRAVEL OR CEMENT STABILIZATION, OR APPROVED SUBSTITUTE) SHALL BE REQUIRED WHEN TRENCH BOTTOM IS UNSTABLE. BACK FILLING AT STRUCTURES SHALL BE PLACED IN UNIFORM LAYERS, MOISTENED AS REQUIRED TO APPROXIMATE OPTIMUM MOISTURE CONTENT, AND COMPACTED TO 95 % STD. PROCTOR DENSITY (USE RELATIVE DENSITY TEST PER ASTM D-4253 & ASTM D-698). THE THICKNESS OF EACH LOOSE LAYER SHALL NOT EXCEED 6". STRUCTURE BACK FILL MATERIAL SHALL BE SAND, APPROVED SITE SOIL, OR OTHER APPROVED SUBSTITUTE.

STORM SEWER BEDDING DETAIL

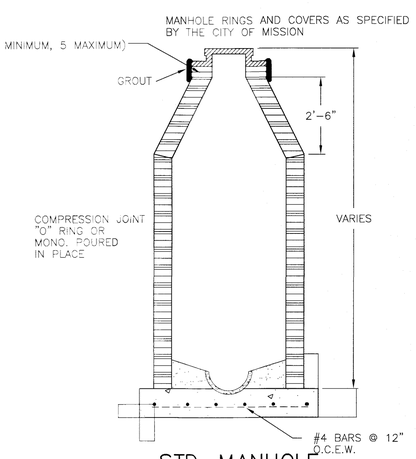
SCALE: N.T.S.

THRUST BLOCK SIZE			
DIAMETER OF PIPE INCHES	SURFACE AREA SQ. FT.	THICKNESS INCHES	WEIGHT AT VERTICAL BENDS – LBS
22-1/2° BENDS			
6 OR LESS	2	8	1,700
8	3	12	3,000
10	3.5	12	4,500
12	4	14	6,600
14	5	18	9,000
16	6	18	11,800
45° BENDS			
6 OR LESS	4	12	3,200
8	5	14	5,800
10	6	18	9,000
12	7	18	13,000
14	8	24	17,000
16	11.5	24	23,200
90° BENDS			
6 OR LESS	6	12	6,000
8	8	15	10,700
10	10	18	16,700
12	12	18	24,000
14	18	24	32,600
16	21	24	42,700
TEES & DEAD ENDS			
6 OR LESS	3	12	—
8	4	15	—
10	6	18	—
12	8.5	18	—
14	11.5	24	—
16	15	24	—

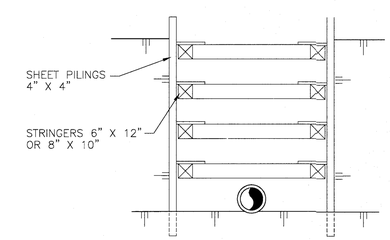
NOTE:
ALL VALUES SHOWN ARE MINIMUM FOR A HYDROSTATIC PRESSURE OF 150 P.S.I. AND A SOIL RESISTANCE OF 2,000 LBS/SQ. FT. WITH PIPE LINE A MINIMUM OF 2 FT. OF COVER



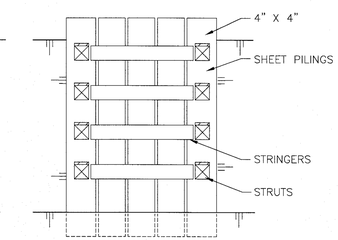
NEW ASPHALT MEETING EXISTING PAVEMENT



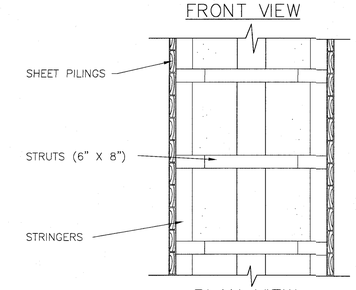
STD. MANHOLE



FRONT VIEW



SIDE VIEW



PLAN VIEW

TIMBER: SOUTHERN PINE WITH F_D 7/ 1750 p.s.i.

NOTE:
1. CONTRACTOR MAY PROPOSE ALTERNATE MEANS OF TRENCH PROTECTION. TRENCH PROTECTION AS DIRECTED BY ENGINEER OR CITY.
2. PROVIDE FOR ALL TRENCHES 5' OR GREATER IN DEPTH
3. ALL METHODS, MATERAILS & PRACTICES MUST MEET O.S.H.A. STANDARDS
4. FOR USE IN MEDIUM CLAY TRENCHES TO 12.5' ± DEEP.
5. SEE SPECIFICATIONS FOR CERTIFICATION REQUIREMENTS.

TYP TRENCH PROTECTION

REVISIONS	

170601
PROJECT No.
JULY, 2020
DATE
J.H.
DRAWN BY
J.H.
CHK. BY

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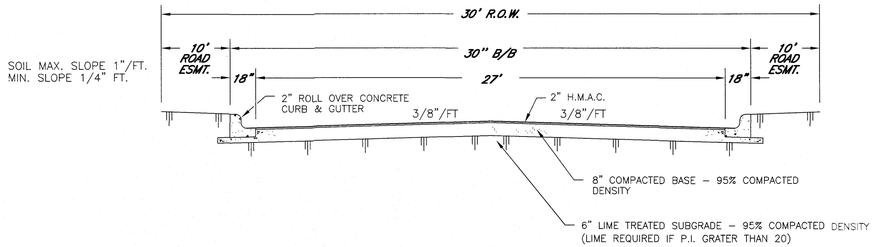
STANDARD STORM DRAINAGE DETAILS
CITY OF MISSION DRAINAGE IMPROVEMENTS
MILE ONE SOUTH AND ERMA STREET
MISSION, TEXAS

STATE OF TEXAS
JAVIER HINOJOSA
74803
REGISTERED PROFESSIONAL ENGINEER

SHEET 5 OF 6 SHEETS

170601

S:\2017\Mission\Grading Plans\City of Mission Erma-Los Ebanos\5-6.-Details.dwg, 7/28/2020 5:09:52 PM, Arch. D 24x36



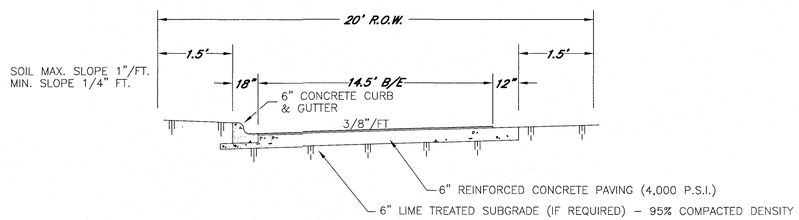
STD STREET CROSS SECTIONS

STANDARD CONCRETE CROSS SECTION

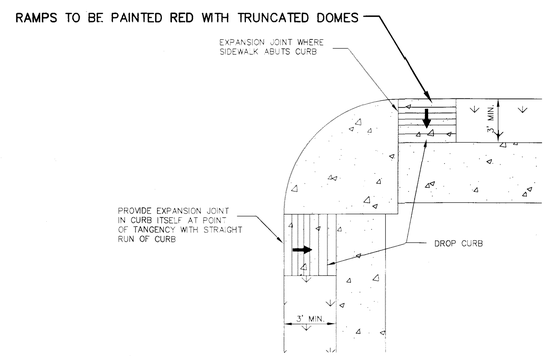
6" REINFORCED CONCRETE 3,500 P.S.I.

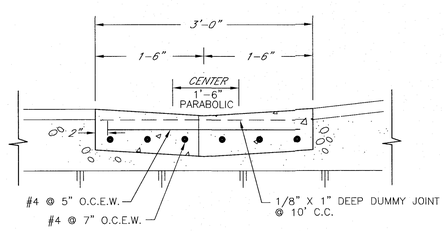
BAR SIZE	LONGITUDINAL SPACING	TRANSVERSE SPACING
No.3	12 INCES	12 INCES

6" SUBGRADE COMPACTED TO 95% DENSITY

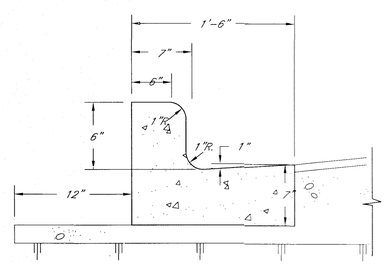


STD ALLEY CROSS SECTION

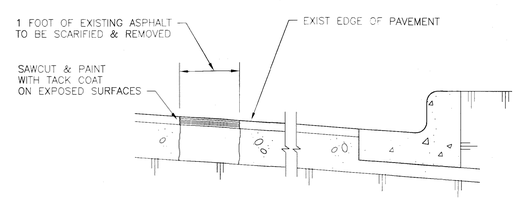




CONCRETE VALLEY GUTTER



CONCRETE CURB & GUTTER



NEW ASPHALT MEETING EXISTING PAVEMENT

SUBGRADE PREPARATION

AREAS TO SUPPORT PAVEMENTS SHOULD BE STRIPPED OF ALL EXISTING PAVEMENT CONSTITUENTS, FLATWORK, VEGETATION, AND/OR ORGANIC TOPSOIL DOWN TO A MINIMUM DEPTH OF 8 INCHES AND EXTENDING A MINIMUM OF 2 FT BEYOND THE PAVEMENT PERIMETERS. UPON COMPLETION OF SITE STRIPPING ACTIVITIES, THE EXPOSED SUBGRADE SHOULD BE TREATED WITH 4% LIME TO A DEPTH OF 6" AND THOROUGHLY PROOFROLLED IN ACCORDANCE WITH THE SITE PREPARATION SUBECTION RECOMMENDATIONS PROVIDED IN THE FOUNDATION CONSTRUCTION CONSIDERATIONS SECTION OF THIS REPORT. LIKEWISE, UPON COMPLETION OF THE PROOFROLLING ACTIVITIES AND JUST PRIOR TO SELECT FILL OR FLEXIBLE BASE PLACEMENT, THE EXPOSED SUBGRADE SHOULD BE SCARIFIED AND RECOMPACTED.

SELECT FILL

IF IMPLEMENTED, SELECT FILL MATERIALS UTILIZED FOR ACHIEVING FINISHED SUBGRADE ELEVATIONS IN PAVEMENT AREAS SHOULD BE IN ACCORDANCE WITH THE SELECT FILL SUBSECTION RECOMMENDATIONS PROVIDED IN THE FOUNDATION CONSTRUCTION CONSIDERATIONS SECTION OF THIS REPORT.

FLEXIBLE BASE COURSE

THE FLEXIBLE BASE COURSE SHOULD CONSIST OF MATERIAL CONFORMING TO TXDOT 2014 STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES, ITEMS 247, FLEXIBLE BASE, TYPES A OR D, GRADE.

THE FLEXIBLE BASE COURSE SHOULD BE PLACED IN LOOSE LIFTS WITH A MAXIMUM COMPACTED THICKNESS OF 10 IN. AND COMPACTED TO A MINIMUM OF 95 PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D1557. THE MOISTURE CONTENT OF THE FLEXIBLE BASE COURSE MATERIALS SHOULD BE MAINTAINED WITHIN THE RANGE OF PLUS OR MINUS THREE PERCENTAGE POINTS FROM THE OPTIMUM MOISTURE CONTENT UNTIL PERMANENTLY COVERED.

ASPHALTIC CONCRETE SURFACE COURSE

THE ASPHALTIC CONCRETE SURFACE COURSE SHOULD CONFORM TO TXDOT 2014 STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES, ITEM 340, HOT MIX ASPHALTIC CONCRETE PAVEMENT, TYPE D. THE ASPHALTIC CONCRETE SHOULD BE COMPACTED TO A MINIMUM OF 92 PERCENT OF THE MAXIMUM THEORETICAL SPECIFIC GRAVITY (RICE) OF THE MIXTURE DETERMINED IN ACCORDANCE TO TXDOT TEST METHOD TEX–227–F. PAVEMENT SPECIMENS, WHICH SHALL BE EITHER CORES OR SECTIONS OF ASPHALTIC PAVEMENT, SHALL BE TESTED ACCORDING TO TXDOT TEST METHOD TEX–207–F. THE NUCLEAR–DENSITY GAUGE OR OTHER METHODS, WHICH CORRELATE SATISFACTORILY WITH RESULTS OBTAINED FROM PROJECT ROADWAY SPECIMENS, MAY BE USED WHEN APPROVED BY THE ENGINEER. UNLESS OTHERWISE SHOWN ON THE PLANS, THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE REQUIRED ROADWAY SPECIMENS AT THEIR EXPENSE AND IN A MANNER AND AT LOCATIONS SELECTED BY THE ENGINEER.

PORTLAND CEMENT CONCRETE

THE PORTLAND CEMENT CONCRETE PAVEMENT SHOULD BE AIR–ENTRAINED TO A RESULT IN 4 PERCENT PLUS/MINUS 1 PERCENT AIR, SHOULD HAVE A MAXIMUM SLUMP OF 4 INCHES, AND SHOULD HAVE A MINIMUM 28–DAY COMPRESSIVE STRENGTH OF 4,000 PSI. A LIQUID MEMBRANE–FORMING CURING COMPOUND SHOULD BE APPLIED AS SOON AS PRACTICAL AFTER BROOM FINISHING THE CONCRETE SURFACE. THE CURING COMPOUND WILL REDUCE THE LOSS OF WATER FROM THE CONCRETE. THE REDUCTION IN THE RAPID LOSS OF WATER WILL REDUCE SHRINKAGE CRACKING OF THE CONCRETE.

CONCRETE PAVING

THE 7" CONCRETE PAVEMENTS BE REINFORCED WITH REINFORCING STEEL BARS. AS A MINIMUM, THE REINFORCING BARS SHOULD BE NO. 4 REINFORCING BARS. LONGITUDINAL REINFORCEMENT SHOULD BE PLACED AT 1/2 THE SLAB DEPTH +/– 1/2 INCH FROM THE SURFACE. AT A LONGITUDINAL EDGE, THE FIRST TWO SPACINGS FOR LONGITUDINAL REINFORCEMENT SHALL BE AT 1/2 THE NORMAL LONGITUDINAL SPACING. AT TRANSVERSE CONSTRUCTION JOINTS, ADDITIONAL LONGITUDINAL REINFORCEMENT SHALL BE PLACED AT A SPACING TWICE THE NORMAL LONGITUDINAL SPACING FOR A LENGTH OF 42 INCHES. AT TRANSVERSE JOINTS, THE FIRST TWO SPACINGS FOR TRANSVERSE REINFORCEMENT SHALL BE AT 1/2 THE NORMAL TRANSVERSE SPACING. ALL REINFORCEMENT SHOULD BE SPECIFIED AS DEFORMED STEEL MEETING THE REQUIREMENT OF ASTM A–615 (GRADE 60) OR ASTM A–616 (GRADE 60). SPLICES SHOULD BE A MINIMUM OF 33 NOMINAL BAR DIAMETERS. REINFORCING SHOULD NOT EXTEND ACROSS LONGITUDINAL AND EXPANSION JOINTS. DOWELS ACROSS LONGITUDINAL AND EXPANSION JOINTS ARE RECOMMENDED TO BE 1 1/4 INCH DIAMETER, SMOOTH BARS WITH A LENGTH OF 42 INCHES AND SPACED AT A MAXIMUM 24 INCHES ON CENTER.

IT IS RECOMMENDED THAT PAVEMENT WIDTHS GREATER THAN 15 FEET IN WIDTH HAVE A LONGITUDINAL JOINT. TRANSVERSE JOINTS ARE ALSO RECOMMENDED AT A MAXIMUM SPACING OF 15 FEET. THE LONGITUDINAL AND TRANSVERSE JOINTS SHOULD BE FORMED OR SAW CUT TO A DEPTH OF 1/3 OF THE SLAB DEPTH FOR CONCRETE CONTAINING SILICEOUS COARSE AGGREGATE AND 1/4 OF THE SLAB OF LIMESTONE AGGREGATE. SAWING OF JOINTS SHOULD BEGIN AS SOON AS THE CONCRETE WILL NOT CHIP AND RAVEL. IT IS RECOMMENDED THAT LONGITUDINAL AND EXPANSION JOINTS BE DOWELED TO PROMOTE LOAD TRANSFER. EXPANSION JOINT SPACINGS ARE NOT TO EXCEED A MAXIMUM OF 75 FEET AND NO EXPANSION OR CONTRACTION JOINTS SHOULD BE LOCATED WITHIN A SWALE OR DRAINAGE COLLECTION AREA. EXPANSION JOINTS ARE ALSO NEEDED TO SEPARATE THE CONCRETE SLAB FROM FIXED OBJECTS SUCH AS INLETS, LIGHT STANDARDS AND BUILDINGS.

IT IS RECOMMENDED THAT THE CONCRETE PAVEMENT SURFACE HAVE A MINIMUM SLOPE OF 0.015FT/FT TO PROVIDE ADEQUATE SURFACE DRAINAGE. IT IS RECOMMENDED THAT THE CONCRETE PAVEMENT SHOULD CURE A MINIMUM 7 DAYS BEFORE ALLOWING ANY TRAFFIC PROVIDED THAT ADEQUATE CONCRETE STRENGTH HAS BEEN ATTAINED AS DETERMINED BY THE PROJECT CIVIL ENGINEER.

REVISIONS		
		170601
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74808
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PROFESSIONAL ENGINEER

SHEET 6 OF 6 SHEETS

170601